UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 20-F

☐ REGISTRATION STATEMENT PURSUANT TO SECTION 12(b) OR (g) OF THE SECURITIES EXCHANGE ACT OF 1934

OR

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2021

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

OR

☐ SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Date of event requiring this shell company report

For the transition period from _____ to _____

Commission file number: 001-38764

APTORUM GROUP LIMITED
(Exact Name of Registrant as Specified in its Charter)

N/A
(Translation of Registrant's Name into English)

Cayman Islands
(Jurisdiction of Incorporation or Organization)

Ian Huen, Chief Executive Officer
Aptorum Group Limited
17 Hanover Square, London W1S 1BN, United Kingdom
Tel: +44 20 8092 9299
Fax: +44 20 3928 8277
(Address of principal executive offices and Name, Telephone, E-mail and/or Facsimile number and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Class A Ordinary shares, par value $1.00	APM	NASDAQ Global Market

Securities registered or to be registered pursuant to Section 12(g) of the Act:

None
(Title of Class)

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None
(Title of Class)

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

Class A Ordinary Shares: 13,202,408
Class B Ordinary Shares: 22,437,754

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Yes ☐ No ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or an emerging growth company. See definition of "large accelerated filer," accelerated filer," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐	Non-accelerated filer	☒
				Emerging growth company	☒

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards[+] provided pursuant to Section 13(a) of the Exchange Act. ☐

[+] The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP ☒	International Financial Reporting Standards as issued by the International Accounting Standards Board ☐	Other ☐

* If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow. Item 17 ¨ Item 18 ¨

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

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INTRODUCTION

Unless the context otherwise requires, in this annual report on Form 20-F references to:

- "505(b)(2) Application" refers to an application for which one or more of the investigations relied upon by the applicant for approval "were not conducted by or for the applicant and for which the applicant has not obtained a right of reference or use from the person by or for whom the investigations were conducted" (21 U.S.C. 355(b)(2)).
- "A*STAR" refers to Agency for Science, Technology and Research
- "Acticule" refers to Acticule Life Sciences Limited, an 80% owned subsidiary of Aptorum Group.
- "Aeneas Group" refers to Aeneas Limited and its subsidiaries. Aeneas Limited is 76.8% owned by Jurchen Investment Corporation. Because Mr. Huen, our CEO, holds 100% equity interest in Jurchen Investment Corporation, we refer Aeneas Group as a fellow subsidiary of Aptorum Group.
- "AML" refers to Aptorum Medical Limited, a 91% owned subsidiary of Aptorum Group, as of the date of this report.
- "AML Clinic" refers to an outpatient medical clinic operated by AML under the name of Talem Medical.
- "Aptorum Group," "Company," "we," "Group" and "us" refer to Aptorum Group Limited, a Cayman Islands exempted company with limited liability whose principal place of business is in Hong Kong.
- "Aptorum Non-Therapeutics Group" refers to the Company's non-therapeutics segment that encompasses: diagnostics projects including the novel molecular-based rapid pathogen identification and detection diagnostics ("RPIDD") technology, natural supplement products including NativusWell®, and the AML Clinic.
- "Aptorum Therapeutics Group" refers to the Company's therapeutics segment that is operated through its wholly-owned subsidiary, Aptorum Therapeutics Limited, a Cayman Islands exempted company with limited liability, whose principal place of business is in Hong Kong and its indirect subsidiary companies, whose principal places of business are in the United Kingdom, Singapore and Hong Kong.
- "At The Market Offering" or "ATM Offering" refers to the offering and sale of the Company's Class A Ordinary Shares, offered pursuant to the prospectus supplement and the accompanying prospectus to the registration statement on Form F-3 (File No. 333-235819), in which H.C. Wainwright & Co., LLC ("Wainwright"), acted as the Company's sales agent in accordance with certain at the market offering agreement (the "Sales Agreement"), dated as of March 26, 2021, by and between the Company and Wainwright.
- "Bond" refers to the $15,000,000 convertible bond the Company originally issued to Peace Range Limited in the Bond Offering, but which has since been repurchased by one of the Company's wholly owned subsidiaries, Aptorum Investment Holding Limited, pursuant to that certain Bond Repurchase Agreement dated April 24, 2019 between the Company, Peace Range Limited and Aptorum Investment Holding Limited, and which has matured and been redeemed on October 25, 2019
- "Bond Offering" refers to the Company's private offering of the Bond that closed on April 25, 2018.
- "cGCP" refers to Current Good Clinical Practice as adopted by the applicable regulatory authority.
- "cGLP" refers to Current Good Laboratory Practice as adopted by the applicable regulatory authority.
- "cGMP" refers to Current Good Manufacturing Practice as adopted by the applicable regulatory authority.

- "Class A Ordinary Shares" refers to the Company's Class A Ordinary Shares, par value $1.00 per share.
- "Class B Ordinary Shares" refers to the Company's Class B Ordinary Shares, par value $1.00 per share.
- "CMC" refers to chemical, manufacturing and control.
- "Covar" refers to Covar Pharmaceuticals Incorporated, a contract research organization engaged by the Company.
- "CROs" refers to contract research organizations.
- "CTA" refers to Clinical Trial Application.
- "EEA" refers to the European Economic Area.
- "EMA" refers to the European Medicines Agency.
- "EMEA" refers to Europe, the Middle East and Africa.
- "EPO" refers to the European Patent Organization or the European Patent Office operated by it.
- "European Patent" refers to patents issuable by the EPO.
- "EU" refers to the European Union.
- "Exchange Act" refers to the U.S. Securities Exchange Act of 1934, as amended.
- "FDA" refers to U.S. Food and Drug Administration.
- "FDCA" refers to the U.S. Federal Food, Drug and Cosmetic Act.
- "Fiscal year" refers to the period from January 31 of each calendar year to December 31 of the following calendar year.
- "HKD" refers to Hong Kong Dollars.
- "Hong Kong" or "H.K." refers to Hong Kong Special Administrative Region of the People's Republic of China.
- "Hong Kong Doctors" refers to the doctors in Hong Kong under the employment of AML Clinic.
- "IND" refers to Investigational New Drugs.
- "IP" refers to intellectual property.
- "IPO" or "Offering" means the initial public offering by the Company of 761,419 Class A Ordinary Shares consummated on December 17, 2018.
- "Jurchen" refers to Jurchen Investment Corporation, a company wholly-owned by our CEO, Ian Huen, and a holding company of Aptorum Group.
- "Lead Projects" refers to ALS-4, SACT-1 and RPIDD.
- "Major Patent Jurisdictions" refers to the United States, member states of the European Patent Organization and the People's Republic of China.
- "Mios" refers to Mios Pharmaceuticals Limited, a variable interest entity which we hold 97.93% economic interest and 36.17% voting power.

- "Nativus" refers to Nativus Life Sciences Limited, a wholly-owned subsidiary of Aptorum Group.
- "NMPA" refers to China's National Medical Products Administration and its predecessor, the China Food and Drug Administration.
- "NDA" refers to a New Drug Application issued by the FDA.
- "Ordinary Shares" refers to the Class A Ordinary Shares and Class B Ordinary Shares collectively.
- "PRC" and "China" refer to the People's Republic of China.
- "Registered Direct Offering" means the registered direct offering by the Company of 1,351,350 Class A Ordinary Shares and warrants to purchase up to 1,351,350 Class A Ordinary Share consummated on February 28, 2020.
- "Restructure" refers to the Company's change from an investment fund with management shares and non-voting participating redeemable preference shares to a holding company with operating subsidiaries, effective as of March 1, 2017.
- "Registration Statement" refers to the Company's Registration Statement on Form F-1 (File No. 333-227198) for the sale of up to 3,493,969 Class A Ordinary Shares (including Class A Ordinary Shares underlying certain warrants and a bond, as fully described therein) which initially filed on September 5, 2018 and became effective on December 3, 2018.
- "R&D" refers to research and development.
- "R&D Center" refers to an in-house pharmaceutical development center located in Hong Kong Science and Technology Park.
- "Securities Exchange Commission," "SEC," "Commission" or similar terms refer to the Securities Exchange Commission.
- "Sarbanes-Oxley Act" refers to the Sarbanes-Oxley Act of 2002.
- "Scipio" refers to Scipio Life Sciences Limited, a variable interest entity which we hold 97.93% economic interest and 35.06% voting power.
- "Securities Act" refers to the Securities Act of 1933.
- "Series A Notes" refers to Series A convertible notes, at a purchase price of $10,000 per note, sold in the Series A Note Offering.
- "Series A Note Investors" refers to the investors who purchased Series A Notes.
- "Series A Note Offering" refers to the private offering of Series A Notes, pursuant to Regulation S or Regulation D, as promulgated under the Securities Act that closed on May 15, 2018.
- "UK" refers to the United Kingdom.
- "United States," "U.S." and "US" refer to the United States of America.
- "Videns" refers to Videns Incorporation Limited, a wholly-owned subsidiary of Aptorum Group.
- "US$," "U.S. dollars," or "dollars" are to the legal currency of the United States.

Discrepancies in any table between the amounts identified as total amounts and the sum of the amounts listed therein are due to rounding.

This annual report on Form 20-F includes our audited consolidated balance sheets as of December 31, 2021 and 2020, and the related consolidated statements of operations and comprehensive (loss) income, equity and cash flows for the years ended December 31, 2021, 2020 and 2019.

Our operations and equity are funded in U.S. dollars and we currently incur the majority of our expenses in U.S. dollars or in H.K. dollars. H.K. dollar is currently pegged to the U.S. dollar; however, we cannot guarantee that such peg will continue to be in place in the future. Our exposure to foreign exchange risk primarily relates to the limited cash denominated in currencies other than the functional currencies of each entity and limited revenue contracts dominated in H.K. dollars in certain PRC operating entities. We do not believe that we currently have any significant direct foreign exchange risk and have not hedged exposures denominated in foreign currencies or any other derivative financial instruments.

Part I

Item 1. IDENTITY OF DIRECTORS, SENIOR MANAGEMENT AND ADVISERS

Not Applicable.

Item 2. OFFER STATISTICS AND EXPECTED TIMETABLE

Not Applicable.

Item 3. KEY INFORMATION

A. [Reserved]

B. Capitalization and Indebtedness

Not applicable.

C. Reasons for the Offer and Use of Proceeds

Not applicable.

D. Risk Factors

Our business faces significant risks. You should carefully consider all of the information set forth in this annual report on Form 20-F and in our other filings with the United States Securities and Exchange Commission, or the SEC, including the following risk factors which we face and which are faced by our industry. Our business, financial condition, results of operations and growth prospects could be materially adversely affected by any of these risks. This report also contains forward-looking statements that involve risks and uncertainties. Our results could materially differ from those anticipated in these forward-looking statements, as a result of certain factors including the risks described below and elsewhere in this annual report and our other SEC filings. See "Special Note Regarding Forward-Looking Statements" below.

Summary Risk Factors

The following summarizes some, but not all, of the risks provided below. Please carefully consider all of the information discussed in this Item 3.D. "Risk Factors" in this annual report for a more thorough description of these and other risks.

Risks Related to the Preclinical and Clinical Development of Our Drug Candidates

- Risks relating to not generate sufficient revenue
- Risks relating to uncertainty in preclinical development process
- Risks relating to fail to identify additional drug candidates
- Risks relating to conduct clinical trials in or outside the U.S.

Risks Related to Obtaining Regulatory Approval for Our Drug Candidates

- Risks relating to fail or delay to obtain regulatory approval
- Risks relating to undesirable adverse event
- Risks relating to fail to complete the 505(b)(2) pathway for the pediatric formulation
- Risks relating to our third-party suppliers fail to comply with the FDA's good manufacturing practice regulations or fail to respond to an FDA Form 483 or subsequent Warning Letter

Risks Related to Commercialization of Our Drug Candidates

- Risks relating to fail to achieve market acceptance

Risks Related to Our IP

- Risks relating to being unaware of others' pending patent applications
- Risks relating to unable to protect and enforce our IP rights throughout the world
- Risks relating to lawsuits for protecting our IP or against infringing IP rights of other parties
- Risks relating to non-compliance with patent protection requirements or obligations in the license agreements
- Risks relating to the terms and scope of our patents not sufficient to protect our candidates
- Risks relating to unable to obtain or maintain rights of the developing technology through acquisitions or licenses

Risks Related to Our Reliance on Unrelated Parties

- Risks relating to manufacturers fail to provide sufficient quantities of clinical supply on our candidate at acceptable quality levels or prices

Risks Related to AML Clinic, Natural Supplements and Diagnostic Technology

Risks Related to Our Industry, Business and Operation

- Risks relating to not complying with laws
- Risks relating to difficulties in managing our growth
- Risks relating to unable to collaborations, strategic alliances or acquisitions or enter into royalty-seeking or sublicensing arrangements
- Risks relating to our disclosure controls and procedures and internal financial reporting controls
- Risks relating to do business internationally
- Risks relating to product liability lawsuits arise from clinical trials
- Risks relating to inadequate insurance coverage
- Risks relating to failure in safeguarding our computer network system
- Risks relating to outbreak of the novel coronavirus disease, COVID-19, or other pandemic, epidemic or outbreak of an infectious disease

Risks Related to Our Corporate Structure

- Risks relating to our Class B shareholders have higher voting rights

Risks Related to our Securities

- Risks relating to certain existing shareholders have substantial influence over our Company and their interests may not be aligned with the interests of our other shareholders
- Risks relating to conduct substantially all of our operations outside the United States
- Risks relating to adopt certain home country practices or take advantage of certain reduced reporting requirements

Risks Related to the Preclinical and Clinical Development of Our Drug Candidates

We currently do not generate revenue from product sales and may never become profitable; unless we can raise more capital through additional financings, of which there can be no guarantee, our principal source of revenue will be from AML Clinic, which may not be substantial.

Our ability to generate revenue and become profitable depends upon our ability to successfully complete the development of, and obtain the necessary regulatory approvals for, the drug candidates in our Lead Projects and any future drug candidates we may develop, as we do not currently have any drugs that are available for commercial sale. We expect to continue to incur losses before commercialization of our drug candidates and any future drug candidates. None of our drug candidates has been approved for marketing in the U.S., Europe, the PRC or any other jurisdictions and may never receive such approval. Our ability to generate revenue and achieve profitability is dependent on our ability to complete the development of our drug candidates and any future drug candidates we develop in our portfolio, obtain necessary regulatory approvals, and have our drugs products under development manufactured and successfully marketed, of which there can be no guarantee. Although AML Clinic commenced operations in June 2018 and we have received some revenue from such operations, even at full capacity, AML Clinic may not bring enough revenue to support our operation and R&D. Thus, we may not be able to generate a profit until our drug candidates become profitable.

Even if we receive regulatory approval and marketing authorization for one or more of our drug candidates or one or more of any future drug candidates for commercial sale, a potential product may not generate revenue at all unless we are successful in:

- developing a sustainable and scalable manufacturing process for our drug candidates and any approved products, including establishing and maintaining commercially viable supply relationships with third parties;
- launching and commercializing drug candidates following regulatory approvals and marketing authorizations, either directly or with a collaborator or distributor;
- obtaining market acceptance of our drug candidates as viable treatment options;
- addressing any competing technological and market developments;
- negotiating and maintaining favorable terms in any collaboration, licensing or other arrangement into which we may enter to commercialize drug candidates for which we have obtained required approvals and marketing authorizations; and
- maintaining, protecting and expanding our portfolio of IP rights, including patents, trade secrets and know-how.

In addition, our ability to achieve and maintain profitability depends on timing and the amount of expenses we will incur. Our expenses could increase materially if we are required by the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities to perform studies in addition to those that we currently have anticipated. Even if our drug candidates are approved for commercial sale, we anticipate incurring significant costs associated with the commercial launch of these products.

Our ability to become and remain profitable depends on our ability to generate revenue. Even if we are able to generate revenues from AML Clinic or the sale or sublicense of any products we may develop or license, we may not become profitable on a sustainable basis or at all. Our failure to become and remain profitable would decrease the value of our Company and adversely affect the market price of our Class A Ordinary Shares, which could impair our ability to raise capital, expand our business or continue our operations.

AML Clinic's operations and the initial commercialization of our NativusWell® (NLS-2) natural supplements may be our principal source of revenue for the foreseeable future and most likely, without additional financing, such revenue will not be sufficient for us to carry out all of our plans.

As stated above, we have not generated any revenue and do not foresee generating any revenue from our drug candidates in the near future. Effective as of March 2018, we leased the property in Central, Hong Kong that is the home to AML Clinic, which commenced operations in June 2018. We also expect to launch NativusWell® (NLS-2) to the market in 2022.

Until our therapeutic candidates produce revenue, our principal source of revenue is from AML Clinic, but neither is sufficient by themselves to fund our other operations; even if we receive revenue from NativusWell® (NLS-2) natural supplements later this year, which we cannot guarantee, it will not provide sufficient revenue. We believe that available cash, together with the efforts from management plans and actions described elsewhere in this report, should enable the Company to meet presently anticipated cash needs for at least the next 12 months after the date that the financial statements are issued and the Company has prepared the consolidated financial statements on a going concern basis. However, the Company continues to have ongoing obligations and it expects that it will require additional capital in order to execute its longer-term development plan. If the Company encounters unforeseen circumstances that place constraints on its capital resources, management will be required to take various measures to conserve liquidity, which could include, but not necessarily be limited to, deferring some of its research and seeking to dispose of marketable securities. Management cannot provide any assurance that the Company will raise additional capital if needed.

Preclinical development is a long, expensive and uncertain process, and we may terminate one or more of our current preclinical development programs.

Traditionally, drug discovery and development is a time-consuming, costly and high-risk business. On average, the cost of launching a new drug is estimated to approach US$2.6 billion and can take around 12 years to make it to the market (4 key benefits of drug repositioning. (n.d.). Retrieved from http://www.totalbiopharma.com/2012/07/04/4-key-benefits-drug-repositioning/). Despite the huge expenditures, only approximately 1 in 1,000 potential drugs is graduated to human clinical trials after pre-clinical testing in the United States, (Norman, G. A. Drugs, Devices, and the FDA: Part 1. JACC: Basic to Translational Science, 1(3), 170-179, 2016) and nearly 86.2% of drug candidates entering phase 1 trials fails to achieve drug approval. (Wong C. H., Siah K. W. & Lo A. W. (2019, April), "Estimation of clinical trial success rates and related parameters," retrieved from https://academic.oup.com/biostatistics/article/20/2/273/4817524). Even after a drug is commercialized, there are just too many factors affecting the sales of pharmaceutical products, including unmet need/burden of disease (68.2%), clinical efficacy (47.3%), comparator choice (36.4%), safety profile (36.4%), and price (35.5%) (Sendyona, S., Odeyemi, I., & Maman, K. "Perceptions and factors affecting pharmaceutical market access: Results from a literature review and survey of stakeholders in different settings" Journal of Market Access & Health Policy, 4(1), 31660, 2016). In the end, on average, only 20% of approved new drugs generate revenues that exceed the average R&D investment. (Rosenblatt, M. (2014, December 19) "The Real Cost of "High-Priced" Drugs," retrieved from https://hbr.org/2014/11/the-real-cost-of-high-priced-drugs). We may determine that certain preclinical product candidates or programs do not have sufficient potential to warrant the allocation of resources toward them. Accordingly, we may elect to terminate our programs for and, in certain cases, our licenses to, such product candidates or programs. If we terminate a preclinical program in which we have invested significant resources, we will have expended resources on a program that will not provide a full return on our investment and missed the opportunity to have allocated those resources to potentially more productive uses.

Management has discretion to terminate the development of any of our projects at any time.

In light of the costs, both in time and expense, as well as the preclinical results and general business considerations, management may decide not to continue developing a particular preclinical program without announcement. Management will always base its decision on what it believes to be the most efficient use of the Company's resources to provide the most value to its shareholders. As a result, investors may not always be aware of the termination of a previously announced study or trial. The Company will continue to provide update on its active preclinical projects in its SEC filings and/or press releases, as appropriate.

We may not be successful in our efforts to identify or discover additional drug candidates. Due to our limited resources and access to capital, we must continue to prioritize development of certain drug candidates; such decisions may prove to be wrong and may adversely affect our business.

Although we intend to explore other therapeutic opportunities in addition to the drug candidates that we are currently developing, we may fail to identify other drug candidates for a number of reasons. For example, our research methodology may be unsuccessful in identifying potential drug candidates or those we identify may be shown to have harmful side effects or other undesirable characteristics that make them unmarketable or unlikely to receive regulatory approval.

Research programs to pursue the development of our drug candidates for additional indications and to identify new drug candidates and disease targets require substantial technical, financial and human resources whether or not we ultimately are successful. Our research programs may initially show promise in identifying potential indications and/or drug candidates, yet fail to yield results for clinical development for a number of reasons, including but not limited to:

- the research methodology used may not be successful in identifying potential indications and/or drug candidates;

- potential drug candidates may, after further study, be shown to have harmful adverse effects or other characteristics that indicate they are unlikely to be effective drugs; or

- it may take greater human and financial resources to identify additional therapeutic opportunities for our drug candidates or to develop suitable potential drug candidates through internal research programs than we will possess, thereby limiting our ability to diversify and expand our drug portfolio.

Because we have limited financial and managerial resources, we have chosen to focus at present on our three Lead Projects, which may ultimately prove to be unsuccessful. As a result of this focus, we may forego or delay pursuit of opportunities with other drug candidates, or for other indications that later prove to have greater commercial potential or a greater likelihood of success. Even if we determine to pursue alternative therapeutic or diagnostic drug candidates, these other drug candidates or other potential programs may ultimately prove to be unsuccessful. In short, our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities.

Accordingly, there can be no assurance that we will ever be able to develop suitable potential drug candidates through internal research programs. This could materially adversely affect our future growth and prospects.

If we encounter difficulties enrolling patients in our clinical trials, our clinical development activities could be delayed or otherwise adversely affected.

Although we obtained CTA/FDA approval to initiate clinical trials for our Lead Projects, there can be no assurance, timely completion of clinical trials in accordance with their protocols depends, among other things, on our ability to enroll a sufficient number of patients who meet the trial criteria and remain in the trial until its conclusion. We may experience difficulties enrolling and retaining appropriate patients in our clinical trials for a variety of reasons, including but not limited to:

- the size and nature of the patient population;

- patient eligibility criteria defined in the clinical protocol;

- the size of study population required for statistical analysis of the trial's primary endpoints;

- the proximity of patients to trial sites;

- the design of the trial and changes to the design of the trial;

- our ability to recruit clinical trial investigators with the appropriate competencies and experience;

- competing clinical trials for similar therapies or other new therapeutics exist and will reduce the number and types of patients available to us;

- clinicians' and patients' perceptions as to the potential advantages and side effects of the drug candidate being studied in relation to other available therapies, including any new drugs or treatments that may be approved for the indications we are investigating;

- our ability to obtain and maintain patient consents;

- patients enrolled in clinical trials may not complete a clinical trial; and

- the availability of approved therapies that are similar to our drug candidates.

Even if we are able to enroll a sufficient number of patients in our clinical trials, delays in patient enrollment may result in increased costs or may affect the timing or outcome of the planned clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our drug candidates.

Clinical drug development involves a lengthy and expensive process and could fail at any stage of the process. We have limited experience in conducting clinical trials and results of earlier studies and trials may not be reproduced in future clinical trials.

For our drug candidates, clinical testing is expensive and can take many years to complete, while failure can occur at any time during the clinical trial process. The results of studies in animals and early clinical trials of our drug candidates may not predict the results of later-stage clinical trials. Drug candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through studies in animals and initial clinical trials. In some instances, there can be significant variability in safety and/or efficacy results between different trials of the same drug candidate due to numerous factors, including changes in trial procedures set forth in protocols, differences in the size and type of the patient populations (including genetic differences), patient adherence to the dosing regimen and the patient dropout rate. Results in later trials may also differ from earlier trials due to a larger number of clinical trial sites and additional countries and languages involved in such trials. In addition, the design of a clinical trial can determine whether its results will support approval of a drug candidate, and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced and significant expense has been incurred.

A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in advanced clinical trials due to lack of demonstrated efficacy or adverse safety profiles, notwithstanding promising results in earlier trials. Clinical trials of potential products often reveal that it is not practical or feasible to continue development efforts. Furthermore, if the trials we conduct fail to meet their primary statistical and clinical endpoints, they will not support the approval from the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities for our drug candidates. If this occurs, we would need to replace the failed study with new trials, which would require significant additional expense, cause substantial delays in commercialization and materially adversely affect our business, financial condition, cash flows and results of operations.

If clinical trials of our drug candidates fail to demonstrate safety and efficacy to the satisfaction of the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities, or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our drug candidates.

Before applying for and obtaining regulatory approval for the sale of any of our drug candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of our drug candidates in humans. Clinical testing is expensive, difficult to design and implement, can take many years to complete and may fail. A failure of one or more of our clinical trials can occur at any stage of testing and successful interim results of a clinical trial do not necessarily predict successful final results.

We and our CROs are required to comply with current Good Clinical Practices ("cGCP") requirements, which are regulations and guidelines enforced by the FDA, NMPA, EMA, Health Canada and other comparable regulatory authorities for all drugs in clinical development. Regulatory authorities enforce these cGCP through periodic inspections of trial sponsors, principal investigators and trial sites. Compliance with cGCP can be costly and if we or any of our CROs fail to comply with applicable cGCP, the clinical data generated in our clinical trials may be deemed unreliable and the FDA, NMPA, EMA, Health Canada or comparable regulatory authorities may require us to perform additional clinical trials before approving our marketing applications.

We may experience numerous unexpected events during, or as a result of, clinical trials that could delay or prevent our ability to receive regulatory approval or commercialize our drug candidates, including but not limited to:

- regulators, institutional review boards ("IRBs") or ethics committees may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- clinical trials of our drug candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon drug development programs;
- the number of patients required for clinical trials of our drug candidates may be larger than we anticipate, enrollment may be insufficient or slower than we anticipate or patients may drop out at a higher rate than we anticipate;

- our contractors and investigators may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we might have to suspend or terminate clinical trials of our drug candidates for various reasons, including a lack of clinical response or a determination that participants are being exposed to unacceptable health risks;
- regulators, IRBs or ethics committees may require that we or our investigators suspend or terminate clinical research for various reasons, including non-compliance with regulatory requirements;
- the cost of clinical trials of our drug candidates may be greater than we anticipate;
- the supply or quality of our drug candidates or other materials necessary to conduct clinical trials of our drug candidates may be insufficient or inadequate; and
- our drug candidates may cause adverse events, have undesirable side effects or other unexpected characteristics, causing us, our investigators, or regulators to suspend or terminate the trials.

If we are required to conduct additional clinical trials or other testing of our drug candidates beyond those that we currently contemplate, if we are unable to successfully complete clinical trials of our drug candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if they raise safety concerns, we may:

- be delayed in obtaining regulatory approval for our drug candidates;
- not obtain regulatory approval at all;
- obtain approval for indications that are not as broad as intended;
- have a drug removed from the market after obtaining regulatory approval;
- be subject to additional post-marketing testing requirements;
- be subject to restrictions on how a drug is distributed or used; or
- be unable to obtain reimbursement for use of a drug.

Delays in testing or approvals may result in increases in our drug development costs. We do not know whether any clinical trials will begin as planned, will need to be restructured, or will be completed on schedule, or at all. Clinical trials may produce negative or inconclusive results. Moreover, these trials may be delayed or proceed less quickly than intended. Delays in completing our clinical trials will increase our costs, slow down our drug candidate development and approval process, and jeopardize our ability to commence product sales and generate revenues and we may not have sufficient funding to complete the testing and approval process. Any of these events may significantly harm our business, financial condition and prospects, lead to the denial of regulatory approval of our drug candidates or allow our competitors to bring drugs to market before we do, impairing our ability to commercialize our drugs if and when approved.

Significant clinical trial delays also could shorten any periods during which we have the exclusive right to commercialize our drug candidates or allow our competitors to bring products to market before we do, impair our ability to commercialize our drug candidates and may harm our business and results of operations.

We may in the future conduct clinical trials for our drug candidates in sites outside the U.S. and the FDA may not accept data from trials conducted in such locations.

We may in the future conduct certain of our clinical trials outside the U.S. Although the FDA may accept data from clinical trials conducted outside the U.S. for our New Drug Application ("NDA"), acceptance of this data is subject to certain conditions imposed by the FDA. There can be no assurance the FDA will accept data from any of the clinical trials we conduct outside the U.S. If the FDA does not accept the data from any of our clinical trials conducted outside the U.S., it would likely result in the need for additional clinical trials in the U.S., which would be costly and time-consuming and could delay or prevent the commercialization of any of our drug candidates.

Risks Related to Obtaining Regulatory Approval for Our Drug Candidates

The regulatory approval processes of the FDA, NMPA, EMA, Health Canada and other comparable regulatory authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our current drug candidates or any future drug candidates we may develop, our business will be substantially harmed.

We cannot commercialize drug candidates without first obtaining regulatory approval to market each drug from the FDA, NMPA, EMA, Health Canada or comparable regulatory authorities. Before obtaining regulatory approvals for the commercial sale of any drug candidate for a target indication, we must demonstrate in studies in animals and well-controlled clinical trials, and, with respect to approval in the United States and other regulatory agencies, to the satisfaction of the FDA, NMPA, EMA, Health Canada or comparable regulatory authorities, that the drug candidate is safe and effective for use for that target indication and that the manufacturing facilities, processes and controls are adequate.

The time required to obtain approval from the FDA, NMPA, EMA, Health Canada and other comparable regulatory authorities is unpredictable but typically takes many years following the commencement of studies in animals and clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities.

In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval can differ among regulatory authorities and may change during the course of the development of a drug candidate. We have not obtained regulatory approval for any drug candidate. It is possible that neither our existing drug candidates nor any drug candidates we may discover or acquire for development in the future will ever obtain regulatory approval. Even if we obtain regulatory approval in one jurisdiction, we may not obtain it in other jurisdictions.

Our drug candidates could fail to receive regulatory approval from any of the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities for many reasons, including but not limited to:

- disagreement with regulators regarding the design or implementation of our clinical trials;
- failure to demonstrate that a drug candidate is safe and effective or safe, pure and potent for its proposed indication;
- failure of clinical trial results to meet the level of statistical significance required for approval;
- failure to demonstrate that a drug candidate's clinical and other benefits outweigh its safety risks;
- disagreement with regulators regarding our interpretation of data from studies in animals or clinical trials;
- insufficiency of data collected from clinical trials of our drug candidates to support the submission and filing of a New Drug Application ("NDA"), or other submission or to obtain marketing approval;
- the FDA, NMPA, EMA, Health Canada or a comparable regulatory authority's finding of deficiencies related to the manufacturing processes or facilities of third-party manufacturers with whom we contract for clinical and commercial supplies; and
- changes in approval policies or regulations that render our preclinical studies and clinical data insufficient for approval.

Any of the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities may require more information, including additional preclinical studies or clinical data, to support approval, which may delay or prevent approval and our commercialization plans, or we may decide to abandon the development program. If we were to obtain approval, regulatory authorities may approve any of our drug candidates for fewer or more limited indications than we request. Regulatory authorities also may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a drug candidate with a label that is not desirable for the successful commercialization of that drug candidate. In addition, if our drug candidate produces undesirable side effects or involves other safety issues, the FDA may require the establishment of a Risk Evaluation Mitigation Strategy ("REMS"), or NMPA, EMA, Health Canada or other comparable regulatory authorities may require the establishment of a similar strategy. Such a strategy may, for instance, restrict distribution of our drug candidates, require patient or physician education, or impose other burdensome implementation requirements on us.

Regulatory approval may be substantially delayed or may not be obtained for one or all of our drug candidates if regulatory authorities require additional time or studies to assess the safety or efficacy of our drug candidates.

We currently do not have any drug candidates that have gained approval for sale by the FDA, NMPA or EMA, Health Canada or other regulatory authorities in any other country, and we cannot guarantee that we will ever have marketable drugs. Despite SACT-1 having been granted orphan drug status, this is not an approval for sale by the FDA. Our business is substantially dependent on our ability to complete the development of, obtain marketing approval for and successfully commercialize drug candidates in a timely manner. We cannot commercialize drug candidates without first obtaining marketing approval from the FDA, NMPA, EMA, Health Canada and comparable regulatory authorities. In the U.S., we hope to file INDs for the drug candidates from our Lead Projects and, subject to the approval of IND, Phase 1 clinical trials in humans. Even if we are permitted to commence such clinical trials, they may not be successful and regulators may not agree with our conclusions regarding the data generated by our clinical trials.

We may be unable to complete development of our drug candidates or initiate or complete development of any future drug candidates we may develop on our projected schedule. While we believe that our existing cash will likely enable us to complete the preclinical development of at least one of our current Lead Projects, the full clinical development, manufacturing and launch of that drug candidate, will take significant additional time and likely require funding beyond the existing cash. In addition, if regulatory authorities require additional time or studies to assess the safety or efficacy of our drug candidates, we may not have or be able to obtain adequate funding to complete the necessary steps for approval for our drug candidates or any future drug candidates.

Preclinical studies in animals and clinical trials in humans to demonstrate the safety and efficacy of our drug candidates are time-consuming, expensive and take several years or more to complete. Delays in preclinical or clinical trials, regulatory approvals or rejections of applications for regulatory approval in the U.S., Europe, the PRC or other markets may result from many factors, including but not limited to:

- our inability to obtain sufficient funds required to conduct or continue a trial, including lack of funding due to unforeseen costs or other business decisions;
- regulatory reports for additional analysts, reports, data, preclinical studies and clinical trials;
- failure to reach agreement with, or inability to comply with conditions imposed by the FDA, NMPA, EMA, Health Canada or other regulators regarding the scope or design of our clinical trials;
- regulatory questions regarding interpretations of data and results and the emergence of new information regarding our drug candidates or other products;
- delay or failure in obtaining authorization to commence a clinical trial or inability to comply with conditions imposed by a regulatory authority regarding the scope or design of a clinical trial;
- withdrawal of clinical trial sites from our clinical trials as a result of changing standards of care or the ineligibility of a site to participate in our clinical trials;
- unfavorable or inconclusive results of clinical trials and supportive non-clinical studies, including unfavorable results regarding effectiveness of drug candidates during clinical trials;
- difficulty in maintaining contact with patients during or after treatment, resulting in incomplete data;
- our inability to obtain approval from IRBs or ethics committees to conduct clinical trials at their respective sites;
- our inability to enroll and retain a sufficient number of patients who meet the inclusion and exclusion criteria in a clinical trial;

- our inability to conduct a clinical trial in accordance with regulatory requirements or our clinical protocols;
- clinical sites and investigators deviating from trial protocol, failing to conduct the trial in accordance with regulatory requirements, withdrawing from or dropping out of a trial, or becoming ineligible to participate in a trial;
- failure of our clinical trial managers to satisfy their contractual duties or meet expected deadlines;
- manufacturing issues, including problems with manufacturing or timely obtaining from third parties sufficient quantities of a drug candidate for use in a clinical trial;
- ambiguous or negative interim results, or results that are inconsistent with earlier results;
- feedback from the FDA, NMPA, EMA, Health Canada, an IRB, data safety monitoring boards, or comparable entities, or results from earlier stage or concurrent studies in animals and clinical trials, regarding our drug candidates, including which might require modification of a trial protocol;
- unacceptable risk-benefit profile or unforeseen safety issues or adverse side effects; and
- a decision by the FDA, NMPA, EMA, Health Canada, an IRB, comparable entities, or the Company, or recommendation by a data safety monitoring board or comparable regulatory entity, to suspend or terminate clinical trials at any time for safety issues or for any other reason.

Changes in regulatory requirements and guidance may also occur, and we may need to amend clinical trial protocols submitted to applicable regulatory authorities to reflect these changes. Amendments may require us to resubmit clinical trial protocols to IRBs or ethics committees for re-examination, which may increase the costs or time required to complete a clinical trial.

If we experience delays in the completion of, or the termination of, a clinical trial, of any of our drug candidates, the commercial prospects of our drug candidates will be harmed, and our ability to generate product sales revenues from any of those drug candidates will be delayed. In addition, any delay in completing our clinical trials will increase our costs, slow down our drug candidate development and approval process, and jeopardize our ability to commence product sales and generate revenues. Any of these occurrences may harm our business, financial condition and prospects significantly. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our drug candidates.

If we are required to conduct additional clinical trials or other studies with respect to any of our drug candidates beyond those that we initially contemplated, if we are unable to successfully complete our clinical trials or other studies or if the results of these studies are not positive or are only modestly positive, we may be delayed in obtaining regulatory approval for that drug candidate, we may not be able to obtain regulatory approval at all or we may obtain approval for indications that are not as broad as intended. Our product development costs will also increase if we experience delays in testing or approvals, and we may not have sufficient funding to complete the testing and approval process. Significant clinical trial delays could allow our competitors to bring their products to market before we do and impair our ability to commercialize our drugs, if and when approved. If any of this occurs, our business will be materially harmed.

Our drug candidates may cause undesirable adverse events or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following any regulatory approval.

Undesirable adverse events caused by our drug candidates or any future drug candidates we may develop could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities. Results of our potential clinical trials could reveal a high and unacceptable severity or prevalence of adverse effects. In such event, our trials could be suspended or terminated and the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities could order us to cease further development of, or deny approval of, our drug candidates for any or all target indications. Drug-related adverse events could also affect patient recruitment or the ability of enrolled subjects to complete the trial, could result in potential product liability claims and may harm our reputation, business, financial condition and business prospects significantly.

Additionally, if any of our current or future drug candidates receives regulatory approval, and we or others later identify undesirable side effects caused by such drugs, a number of potentially significant negative consequences could result, including but not limited to:

- suspending the marketing of the drug;
- having regulatory authorities withdraw approvals of the drug;
- adding warnings on the label;
- developing a REMS for the drug or, if a REMS is already in place, incorporating additional requirements under the REMS, or to develop a similar strategy as required by a comparable regulatory authority;
- conducting post-market studies;
- being sued and held liable for harm caused to subjects or patients; and
- damage to our reputation.

Any of these events could prevent us from achieving or maintaining market acceptance of the particular drug candidate, if approved, and could significantly harm our business, results of operations and prospects.

Even if we receive regulatory approval for our drug candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our drug candidates.

If our drug candidates or any future drug candidates we develop are approved, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing studies, and submission of safety, efficacy, and other post-market information, including both federal and state requirements in the United States and requirements of comparable regulatory authorities outside of the United States.

Manufacturers and manufacturers' facilities are required to comply with extensive requirements from the FDA, NMPA, EMA, Health Canada and comparable regulatory authorities, including, in the United States, ensuring that quality control and manufacturing procedures conform to cGMP regulations. As such, our contract manufacturers will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any NDA, other marketing application, and previous responses to inspection observations. Accordingly, we and others with whom we work must continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production and quality control.

Any regulatory approvals that we receive for our drug candidates may be subject to limitations on the approved indicated uses for which the drug may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials and surveillance to monitor the safety and efficacy of the drug candidate. The regulatory authorities may also require risk management plans or programs as a condition of approval of our drug candidates (such as REMS of the FDA and risk-management plan of the EMA), which could entail requirements for long-term patient follow-up, a medication guide, physician communication plans or additional elements to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA, NMPA, EMA, Health Canada or a comparable regulatory authority approves our drug candidates, we will have to comply with requirements including, for example, submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with cGCP and cGMP, for any clinical trials that we conduct post-approval.

The FDA may impose consent decrees or withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the drug reaches the market. Later discovery of previously unknown problems with our drug candidates, including adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical studies to assess new safety risks; or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of our drug candidates, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- fines, untitled or warning letters, or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or suspension or revocation of license approvals;
- product seizure or detention, or refusal to permit the import or export of our drug candidates; and
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Companies may promote drugs only for the approved indications and in accordance with the provisions of the approved label and may not promote drugs for any off-label use, such as uses that are not described in the product's labeling and that differ from those approved by the regulatory authorities. However, physicians may prescribe drug products for off-label uses and such off-label uses are common across some medical specialties. Thus, they may, unbeknownst to us, use our product for an "off label" indication for a specific treatment recipient. The FDA, NMPA, EMA, Health Canada and other regulatory authorities actively enforce the laws and regulations prohibiting the promotion of off-label uses, and if we are found to be out of compliance with the requirements and restrictions imposed on us under those laws and restrictions, we may be subject to significant liability, including civil and administrative remedies as well as criminal sanctions, and the off-label use of our products may increase the risk of product liability claims. In addition, management's attention could be diverted from our business operations and our reputation could be damaged.

The policies of the FDA, NMPA, EMA, Health Canada and other regulatory authorities may change and we cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any regulatory approval that we may have obtained and we may not achieve or sustain profitability.

Despite FDA's consent for us to pursue the 505(b)(2) development pathway for SACT-1, we may be unable to successfully complete the 505(b)(2) pathway for the pediatric formulation of SACT-1 to treat neuroblastoma as planned, which would materially impact our likelihood of obtaining FDA approval.

Even though the FDA is allowing us to pursue the 505(b)(2) regulatory pathway for our product candidates, we will need to conduct additional clinical trials, provide additional data and information and meet additional standards for regulatory approval. If this were to occur, the time and financial resources required to obtain FDA approval for our product candidates would likely substantially increase. We cannot assure you that we will receive the requisite or timely approvals for commercialization of such product candidate. Any failure to obtain regulatory approval of our product candidates would significantly limit our ability to generate revenues, and any failure to obtain such approval for all of the indications and labeling claims we deem desirable could reduce our potential revenues.

If we or our third-party suppliers fail to comply with the FDA's good manufacturing practice regulations or fail to adequately, timely, or sufficiently respond to an FDA Form 483 or subsequent Warning Letter, this could impair our ability to market our products in a cost-effective and timely manner and could result in FDA enforcement action.

We and our third-party suppliers are required to comply with the FDA's Current Good Manufacturing Practices (cGMP) which covers the methods and documentation of the design, testing, production, control, quality assurance, labeling, packaging, sterilization, storage and shipping of our products. The FDA audits compliance with the cGMP and related regulations through periodic announced and unannounced inspections of manufacturing and other facilities. The FDA may conduct these inspections or audits at any time. If, during the inspection, FDA identifies issues which, in FDA's judgment, may constitute violations of the Federal Food, Drug, and Cosmetic Act or FDA's regulations, the FDA inspector may issue an FDA Form 483 listing these observations.

Note that if an entity does not address observations found in an FDA Form 483 to FDA's satisfaction, the FDA could take enforcement action, including any of the following sanctions:

- untitled letters, warning letters, fines, injunctions, consent decrees and civil penalties;
- customer notifications or recall, detention or seizure of our product;
- operating restrictions or partial suspension or total shutdown of production;
- refusing or delaying our requests for pre-market approval of new products;
- withdrawing pre-market approvals that have already been granted;
- refusal to grant export approval for our product; or
- criminal prosecution.

Any of the foregoing actions could have a material adverse effect on our reputation, business, financial condition and operating results.

Risks Related to Commercialization of Our Drug Candidates

Even if any of our drug candidates receive regulatory approval, it may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success.

After we complete clinical trials and receive regulatory approval for any of our drug candidates, which may not happen for some time, we recognize that such candidate(s) may ultimately fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. We may not be able to achieve or maintain market acceptance of our products over time if new products or technology are introduced that are more favorably received than our products, are more cost effective or render our drug obsolete. We will face competition with respect to our drug candidates from other pharmaceutical companies developing products in the same disease/therapeutic area and specialty pharmaceutical and biotechnology companies worldwide. Many of the companies against which we may be competing have significantly greater financial resources and expertise in research and development, manufacturing, animal testing, conducting clinical trials, obtaining regulatory approvals and marketing approval for drugs than we do. Physicians, patients and third-party payors may prefer other novel products to ours, which means that we may not generate significant sales revenues for that product and that product may not become profitable. The degree of market acceptance of our drug candidates, if approved for commercial sale, will depend on a number of factors, including but not limited to:

- clinical indications for which our drug candidates are approved;
- physicians, hospitals, and patients considering our drug candidates as a safe and effective treatment;
- the potential and perceived advantages of our drug candidates over alternative treatments;

- the prevalence and severity of any side effects;
- product labeling or product insert requirements of the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities;
- limitations or warnings contained in the labeling approved by the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities;
- the timing of market introduction of our drug candidates as well as competitive drugs;
- the cost of treatment in relation to alternative treatments and their relative benefits;
- the availability of adequate coverage, reimbursement and pricing by third-party payors and government authorities;
- lack of experience and financial and other limitations on our ability to create and sustain effective sales and marketing efforts or ineffectiveness of our sales and marketing partners; and
- changes in legislative and regulatory requirements that could prevent or delay regulatory approval of our drug candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any drug candidates for which we obtain regulatory approval.

We depend substantially on the success of the drug candidates being researched as our current Lead Projects. If we are unable to license or sublicense, sell or otherwise commercialize our drug candidates, or experience significant delays in doing so, our business will be materially harmed.

Our business and the ability to generate revenue related to product sales, if ever achieved, will depend on the successful development, regulatory approval and licensing or sublicensing or other commercialization of our drug candidates or any other drug candidates we may develop. We have invested a significant amount of financial resources in the development of our drug candidates and we may invest in other drug candidates. The success of our drug candidates and any other potential drug candidates will depend on many factors, including but not limited to:

- successful enrollment in, and completion of, studies in animals and clinical trials;
- other parties' ability in conducting our clinical trials safely, efficiently and according to the agreed protocol;
- receipt of regulatory approvals from the FDA, NMPA, EMA, Health Canada and other comparable regulatory authorities for our drug candidates;
- our ability to establish commercial manufacturing capabilities by making arrangements with third-party manufacturers;
- reliance on other parties to conduct our clinical trials swiftly and effectively;
- launch of commercial sales of our drug candidates, if and when approved;
- obtaining and maintaining patents, trade secrets and other IP protection and regulatory exclusivity, as well as protecting our rights in our own IP;
- ensuring that we do not infringe, misappropriate or otherwise violate patents, trade secrets or other IP rights of other parties;
- obtaining acceptance of our drug candidates by doctors and patients;
- obtaining reimbursement from third-party payors for our drug candidates, if and when approved;
- our ability to compete with other drug candidates and drugs; and
- maintenance of an acceptable safety profile for our drug candidates following regulatory approval, if and when received.

We may not achieve regulatory approval and commercialization in a timely manner or at all. Significant delays in obtaining approval for and/or to successfully commercialize our drug candidates would materially harm our business and we may not be able to generate sufficient revenues and cash flows to continue our operations.

Risks Related to Our IP

A significant portion of our IP portfolio currently includes pending patent applications that have not yet been issued as granted patents and if the pending patent applications covering our product candidates fail to be issued, our business will be adversely affected. If we or our licensors are unable to obtain and maintain patent protection for our technology and drugs, our competitors could develop and commercialize technology and drugs similar or identical to ours, and our ability to successfully commercialize our technology and drugs may be adversely affected.

Our success depends largely on our ability to obtain and maintain patent protection and other forms of IP rights for the composition of matter, method of use and/or method of manufacture for each of our drug candidates. Failure to obtain, maintain protection, enforce or extend adequate patent and other IP rights could materially adversely affect our ability to develop and market one or more of our drug candidates. We also rely on trade secrets and know-how to develop and maintain our proprietary and IP position for each of our drug candidates. Any failure to protect our trade secrets and know-how with respect to any specific drug and diagnostics technology candidate could adversely affect the market potential of that potential product.

As of the date of this report, the Company has, through its licenses, obtained rights to patents and patent applications covering some or all its drug and diagnostics technology candidates that have been filed in major jurisdictions such as the United States, member states of the European Patent Organization (the "EPO") and the PRC (collectively, "Major Patent Jurisdictions"), as well as in other countries. We have also filed a number of provisional applications to establish earlier filing dates for certain of our other ongoing researches, the specifics of which are currently proprietary and confidential. To the extent we do not seek or obtain patent protection in a particular jurisdiction, we may not have commercial incentive to seek marketing authorization in such jurisdiction. Nonetheless, other parties might enter those markets with generic versions or copies of our products and received regulatory approval without having significantly invested in their own research and development costs compared to the Company's investment. For more information about our IP portfolio, please refer to the Intellectual Property section below.

With respect to issued patents in certain jurisdictions, for example in the U.S. and under the EPO, we may be entitled to obtain a patent term extension to extend the patent expiration date provided we meet the applicable requirements for obtaining such patent term extensions. We have sought to support our proprietary position by working with our licensors in filing patent applications in the names of the licensors in the United States and through the PCT, related to the Lead Projects and certain other drug candidates. In the future, we intend to file patent applications on supplemental or improvement IP derived from the licensed technologies, where those IP would be solely or jointly owned by the Company pursuant to the terms of respective license agreements. Filing patents covering multiple technologies in multiple countries is time-consuming and expensive, and we may not have the resources file and prosecute all necessary or desirable patent applications in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection.

We cannot be certain that patents will be issued or granted with respect to patent applications that are currently pending, or that issued or granted patents will not later be found to be invalid or unenforceable.

The patent position of biotechnology and pharmaceutical companies is generally uncertain because it involves complex legal and factual considerations. The standards applied by the EPO, the U.S. Patent and Trademark Office, or USPTO, and foreign patent offices in granting patents are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in biotechnology and pharmaceutical patents. Consequently, patents may not issue from our pending patent applications and even if they do issue, such patents may not issue in a form that effectively prevents others from commercializing competing products. As such, we do not know the degree of future protection that we will have on our proprietary products and technology.

Additionally, the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the United States and abroad. Even if patents do successfully issue and even if such patents cover our drug candidates, other parties may initiate, for patents filed before March 16, 2013 (i.e., the enactment of the America Invents Act), interference or re-examination proceedings, for patents filed on or after March 16, 2013, post-grant review, *inter partes* review, nullification or derivation proceedings, in court or before patent offices, or similar proceedings challenging the validity, enforceability or scope of such patents, which may result in the patent claims being narrowed or invalidated. Successful defense of its patents can constitute a material factor in a company's expenses. According to an article published by BlueIron (https://finance.yahoo.com/news/current-patent-litigation-costs-between-120200165.html), depending on the value at stake, the American Intellectual Property Law Association's "2019 Report of the Economic Survey" reported the average costs of a patent litigation are between $2.3 million to $4.0 million.

In addition, the fact that the Company has exclusive rights to prevent others from using a patented invention does not necessarily mean that the Company itself will have the unrestricted right to use that invention. Other parties may obtain ownership or licenses to patents or other IP rights that cover the manufacture, use or sale of our current or future products (or elements thereof). This may enable such other parties to enforce their patents or IP rights against us, and may, as a result, affect the commercialization of our products or exploitation of our own technology. We endeavor to identify early patents and patent applications which may block development of a product or technology and minimize this risk by conducting prior art searches before and during the projects. However, relevant documents may be overlooked, yet-to-be published or missed, which may in turn impact on the freedom to commercialize the relevant asset. In such cases, we may not be in a position to develop or commercialize products or drug candidates unless we successfully pursue litigation to nullify or invalidate the other IP rights concerned, or enter into a license agreement with the IP right holder, if available on commercially reasonable terms.

If we are unable to obtain and maintain the appropriate scope for our patents, our competitors could develop and commercialize technology and drugs similar or identical to ours, and our ability to successfully commercialize our technology and drugs may be adversely affected.

We may not obtain sufficient claim scope in those patents to prevent another party from competing successfully with our drug and diagnostics technology candidates. Even if our patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our patents by developing similar or alternative technology or drug and diagnostics technology candidates in a non-infringing manner. The issuance of a patent is not conclusive as to its scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in patent claims being narrowed, invalidated or held unenforceable, which could limit our ability to stop or prevent us from stopping others from using or commercializing similar or identical technology and drug and diagnostics technology candidates, or limit the duration of the patent protection of our technology and drug and diagnostics technology candidates. Given the amount of time required for the development, testing and regulatory review of new drug and diagnostics technology candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing drug and diagnostics technology candidates similar or identical to ours.

Further, the issuance, scope, validity, enforceability and commercial value of our and our current or future licensors' or collaboration partners' patent rights are highly uncertain. Our and our licensors' pending and future patent applications may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products.

We may not be able to protect and enforce our IP rights throughout the world.

Our commercial success will depend, in part, on our ability to maintain IP protection for our drug candidates in which we seek to develop and commercialize. While we rely primarily upon a combination of patents, trademarks, trade secrets and other contractual obligations to protect the IP related to our brands, products and other proprietary technologies, these legal means may afford only limited protection.

Filing and prosecuting patents on drug candidates and defending the validity of the same (if challenged) in all countries throughout the world could be prohibitively expensive for us, and our IP rights in countries outside the Major Patent Jurisdictions can be less extensive than those in the Major Patent Jurisdictions. In addition, the laws of some countries in the rest of the world such as India do not protect IP rights to the same extent as laws in the Major Patent Jurisdictions. Consequently, we may not be able to prevent other parties from practicing our inventions in the rest of the world, despite our continued efforts in enforcing our IP rights through legal means. Competitors may use our technology in jurisdictions where we have not or not yet obtained patent protection to develop their own drugs and further, may export otherwise infringing drugs to non-U.S. jurisdictions where we have patent protection.

Our, our licensors' or collaboration partners' patent applications cannot be enforced against other parties practicing the technology claimed in such applications unless and until a patent issues from such applications, and then only to the extent the issued claims cover the technology. In addition, patents and other IP rights also will not protect our technology, drug candidates if another party, including our competitors, design around our protected technology, drug candidates without infringing, misappropriating or otherwise violating our patents or other IP rights.

Moreover, currently and as our R&D continues to progress, some of our patents and patent applications are or may be co-owned with another party. Some of our licenses already provide that future-developed technologies (and any resulting patents) will be co-owned with the licensors and other patents for technologies we may acquire or develop with other parties may also be jointly owned. If we are unable to obtain an exclusive license to any such co-owners' interest in such patents or patent applications, such co-owners may be able to license their rights to other persons, including our competitors, and our competitors could market competing products and technology, and we will be unable to transfer or grant exclusive rights to potential purchasers or development partners of such co-owned technologies. In addition, we may need the cooperation of any such co-owners of our patents in order to enforce such patents against other parties, and such cooperation may not be provided to us. Any of the foregoing could limit the revenue we might generate from our patents or patent applications and thus have a material adverse effect on our competitive position, business, financial conditions, results of operations, and prospects.

Because patent applications are confidential for a period of time after filing, and some remain so until issued, we cannot be certain that we or our licensors or collaborators were or will be the first to file any patent application related to a drug and diagnostics technology candidate. Furthermore, in the United States, if patent applications of other parties have an effective filing date before March 16, 2013, an interference proceeding can be initiated by such other party to determine who was the first to invent any of the subject matter covered by the patent claims of our applications. If patent applications of other parties have an effective filing date on or after March 16, 2013, in the United States a derivation proceeding can be initiated by such other parties to determine whether our invention was derived from theirs.

Even where we have a valid and enforceable patent, we may not be able to exclude others from practicing our invention where the other party can show that they used the invention in commerce before our filing date or the other party benefits from a compulsory license. In addition, we may be subject to other challenges regarding our exclusive ownership of our IP. If another party were successful in challenging our exclusive ownership of any of our IP, we may lose our right to use such IP, such other party may be able to license such IP to other parties, including our competitors, and our competitors could market competing products and technology. Any of the foregoing could have a material adverse effect on our competitive position, business, financial conditions, results of operations, and prospects.

Many companies have encountered significant problems in protecting and defending IP rights in jurisdictions outside Major Patent Jurisdictions. The legal systems of some countries do not favor the enforcement of patents, trade secrets and other IP, which could make it difficult in those jurisdictions for us to stop the infringement or misappropriation of our patents or other IP rights, or the marketing of competing drugs in violation of our proprietary rights generally.

To date, we have not sought to enforce any issued patents in any jurisdictions. Proceedings to enforce our patent and other IP rights in any jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business.

Furthermore, such proceedings could put our patents at risk of being invalidated, held unenforceable, or interpreted narrowly, could put our patent applications at risk of not issuing, and could provoke other parties to assert claims of infringement or misappropriation against us. We may not prevail in any lawsuits that we initiate in jurisdictions where opposition proceedings are available and the damages or other remedies awarded, if any, may not be commercially meaningful. The requirements for patentability may differ in certain countries, particularly developing countries. Certain countries in Europe, the PRC, and developing countries including India, have compulsory licensing laws under which a patent owner may be compelled to grant licenses to other parties. In those countries, we and our licensors may have limited remedies if patents are infringed or if we or our licensors are compelled to grant a license to another party, which could materially diminish the value of those patents. This could limit our potential revenue opportunities. Accordingly, our efforts to enforce our IP rights around the world may be inadequate to obtain a significant commercial advantage from the IP that we develop.

We may become involved in lawsuits to protect or enforce our IP, which could be expensive, time-consuming and unsuccessful. Our patent rights relating to our drug and diagnostics technology candidates could be found invalid or unenforceable if challenged in court or before the USPTO or comparable non-U.S. authority.

Competitors may infringe our patent rights or misappropriate or otherwise violate our IP rights. To counter infringement or unauthorized use, litigation may be necessary in the future to enforce or defend our IP rights, to protect our trade secrets or determine the validity and scope of our own IP rights or the proprietary rights of others. This can be expensive and time-consuming. Any claim that we assert against perceived infringers could also provoke these parties to assert counterclaims against us alleging that we infringe their IP rights. Many of our current and potential competitors have the ability to dedicate substantially greater resources to enforce and/or defend their IP rights than we can. Accordingly, despite our efforts, we may not be able to prevent other parties from infringing upon or misappropriating our IP. Litigation could result in substantial costs and diversion of management resources, which could harm our business and financial results. In addition, in an infringement proceeding, a court may decide that patent rights or other IP rights owned by us are invalid or unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patent rights or other IP rights do not cover the technology in question. An adverse result in any litigation proceeding could put our patent, as well as any patents that may issue in the future from our pending patent applications, at risk of being invalidated, held unenforceable or interpreted narrowly. Furthermore, because of the substantial amount of discovery required in connection with IP litigation, there is risk that some of our confidential information could be compromised by disclosure during this type of litigation.

If we initiate legal proceedings against another party to enforce our patent, or any patents that may be issued in the future from our patent applications, that relates to one of our drug and diagnostics technology candidates, the defendant could counterclaim that such patent rights are invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace, and there are numerous grounds upon which another party can assert invalidity or unenforceability of a patent. Parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include ex parte re-examination, *inter partes* review, post-grant review, derivation and equivalent proceedings in non-U.S. jurisdictions, such as opposition proceedings. Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover and protect our drug and diagnostics technology candidates. With respect to the validity of our patents, for example, there may be invalidating prior art of which we, our patent counsel, and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our drug and diagnostics technology candidates. Such a loss of patent protection could have a material adverse impact on our business.

We may not be able to prevent misappropriation of our trade secrets or confidential information, particularly in countries where the laws may not protect those rights as fully as in the United States. Furthermore, because of the substantial amount of discovery required in connection with IP litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation.

We may be subject to claims challenging the inventorship of our patents and other IP.

Although we are not currently experiencing any claims challenging the inventorship of our patents or ownership of our IP, we may in the future be subject to claims that former employees, collaborators or other parties have an interest in our patents or other IP as inventors or co-inventors. For example, we may have inventorship disputes arise from conflicting obligations of consultants or others who are involved in developing our drug and diagnostics technology candidates and who have not clearly contracted to transfer or assign any rights they may have to the Company. In addition, for our licensed patents, although a majority of our licensors have procured assignment forms and records from inventors to affirm their ownership in the licensed IP, another party or former employee or collaborator of our licensors not named in the patents may challenge the inventorship of claim an ownership interest in one or more of our or our licensors' patents. Litigation may be necessary to defend against these and other claims challenging inventorship. If we fail in defending any such claims, in addition to paying monetary damages, we may lose rights such as exclusive ownership of, or right to use, our patent rights or other IP. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

If we are sued for infringing IP rights of other parties, such litigation could be costly and time-consuming and could prevent or delay us from developing or commercializing our drug candidates, the outcome of which would be uncertain and could have a material adverse effect on the success of our business.

Our commercial success depends in part on our avoiding infringement of the patents and other IP rights of other parties. There is a substantial amount of litigation involving patent and other IP rights in the biotechnology and pharmaceutical industries. Numerous issued patents, provisional patents and pending patent applications, which are owned by other parties, exist in the fields in which we are developing drug candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our drug candidates may give rise to claims of infringement of the patent rights of others.

Other parties may assert that we are employing their proprietary technology without authorization. There may be other patents of which we are currently unaware with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our drug candidates. Because patent applications can take many years to issue, there may be currently pending patent applications or provisional patents which may later result in issued patents that our drug candidates may infringe. In addition, other parties may obtain patents in the future and claim that use of our technology infringes upon these patents. If any other patents were held by a court of competent jurisdiction to cover the manufacturing process of any of our drug candidates, any molecules formed during the manufacturing process or any final drug itself, the holders of any such patents may be able to prevent us from commercializing such drug candidate unless we obtain a license under the applicable patents, or until such patents expire or they are finally determined to be held invalid or unenforceable. Similarly, if any other patent were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, including combination therapy or patient selection methods, the holders of any such patent may be able to block our ability to develop and commercialize the applicable drug candidate unless we obtain a license, limit our uses, or until such patent expires, or is finally determined to be held invalid or unenforceable. In either case, such a license may not be available on commercially reasonable terms or at all.

Other parties who bring successful claims against us for infringement of their IP rights may obtain injunctive or other equitable relief, which could prevent us from developing and commercializing one or more of our drug candidates. Defense of these claims, regardless of their merits, would involve substantial litigation expense and be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement or misappropriation against us, we may have to pay substantial damages, including treble damages and attorneys' fees in the case of willful infringement, obtain one or more licenses from other parties, pay royalties or redesign our infringing drug candidates, which may be impossible or require substantial time and monetary expenditure. In the event of an adverse result in any such litigation, or even in the absence of litigation, we may need to obtain licenses from other parties to advance our research or allow commercialization of our drug candidates. Any required license may not be available at all, or may not be available on commercially reasonable terms. In the event that we are unable to obtain such a license, we would be unable to further develop and commercialize one or more of our drug candidates, which could harm our business significantly. We may also elect to enter into license agreements in order to settle patent infringement claims or resolve disputes prior to litigation, and any such license agreements may require us to pay royalties and other fees that could significantly reduce our profitability for any product related to that patent and thus harm our business.

Even if resolved in our favor, litigation or other legal proceedings relating to IP claims may cause us to incur significant expenses, and could distract our technical personnel, management personnel, or both from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments, and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the market price of our Class A Ordinary Shares. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

There may be patent applications pending of which we are not aware, but which cover similar products to the ones we are attempting to license or develop, which may result in lost time and money, as well as litigation.

It is possible that we have failed to identify relevant outstanding patents or applications. For example, U.S. applications filed before November 29, 2000 and certain U.S. applications filed after that date that will not be filed outside the United States remain confidential until patents are issued. Patent applications filed in the United States after November 29, 2000 and generally filed elsewhere are published approximately 18 months after the earliest filing for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Therefore, patent applications covering our products could have been filed by others without our knowledge. Additionally, pending patent applications which have been published can, subject to certain limitations, be later amended in a manner that could cover our products or the use of our products. Holders of any such unanticipated patents or patent applications may actively bring infringement claims against us, with the same potential litigation consequences as alluded to elsewhere in this annual report. Any of these events could require us to divert substantial financial and management resources that we would otherwise be able to devote to our business.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment, and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees on any issued patent are due to be paid to the USPTO and other patent agencies in several stages over the lifetime of the patent. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment, and other similar provisions during the patent application process. Although an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance events that could result in abandonment or lapse of a patent or patent application include failure to respond to official actions within prescribed time limits, non-payment of fees, and failure to properly submit documents requesting an extension of time. In any such event, our competitors might be able to enter the market, which would have a material adverse effect on our business.

The terms of our patents may not be sufficient to effectively protect our drug and diagnostics technology candidates and business.

In most countries in which we file, including the United States, the term of an issued patent is generally 20 years from the earliest claimed filing date of a non-provisional patent application in the applicable country. Although various extensions may be available, the life of a patent and the protection it affords is limited. For example, depending upon the timing, duration and specifics of the FDA regulatory approval for our drug candidates, one or more of our U.S. patents, if issued, might be eligible for limited patent term restoration under the Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent term extension of up to five years as compensation for patent term lost during drug development and the FDA regulatory review process. Patent term extensions, however, cannot extend the remaining term of a patent beyond a total of 14 years from the date of drug approval by the FDA, and only one patent can be extended for a particular drug. The application for patent term extension is subject to approval by the USPTO, in conjunction with the FDA. We may not be granted an extension because of, for example, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain a patent term extension for a given patent or the term of any such extension is less than we request, the period during which we will have the right to exclusively market our drug will be that of the originally issued patents themselves.

Even if patents covering one of our drug candidates are obtained, thereby giving us a period of exclusivity for manufacturing and marketing that drug, we will not be able to assert such patent rights upon the expiration of the issued patents against potential competitors who may begin marketing generic copies of our medications, and our business and results of operations may be adversely affected.

Changes in patent law in the United States could diminish the value of patents in general, thereby impairing our ability to protect our drug and diagnostics technology candidates.

The United States has recently enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents once obtained, if any. Depending on decisions by the U.S. Congress, the federal courts and the USPTO, the laws and regulations governing patents in the United States could change in unpredictable ways that would weaken our ability to obtain new patents, or to enforce our existing patents and patents that we might obtain in the future. For example, in a recent case, *Assoc. for Molecular Pathology v. Myriad Genetics, Inc.*, the U.S. Supreme Court held that certain claims to naturally-occurring substances are not patentable. Although we do not believe that any of the patents owned or licensed by us will be found invalid based on this decision, future decisions by the courts, the U.S. Congress or the USPTO may impact the value of our patent rights. There could be similar changes in the laws of foreign jurisdictions that may impact the value of our patent rights or our other IP rights.

In addition, recent patent reform legislation in the U.S., including the Leahy-Smith America Invents Act, or the America Invents Act, could increase those uncertainties and costs. The America Invents Act was signed into law on September 16, 2011, and many of the substantive changes became effective on March 16, 2013. The America Invents Act reforms U.S. patent law in part by changing the U.S. patent system from a "first to invent" system to a "first inventor to file" system, expanding the definition of prior art, and developing a post-grant review system, thus changing the U.S. patent law in a way that may weaken our ability to obtain patent protection in the U.S. for those applications filed after March 16, 2013. Further, the America Invents Act created new procedures to challenge the validity of issued patents in the U.S., including post-grant review and *inter* partes review proceedings, which some other parties have been using to cause the cancellation of selected or all claims of issued patents of competitors. For a patent with an effective filing date of March 16, 2013 or later, a petition for post-grant review can be filed by another party in a nine-month window from issuance of the patent. A petition for *inter partes* review can be filed immediately following the issuance of a patent if the patent has an effective filing date prior to March 16, 2013. A petition for *inter partes* review can be filed after the nine-month-period for filing a post-grant review petition has expired for a patent with an effective filing date of March 16, 2013 or later. Post-grant review proceedings can be brought on any ground of invalidity, whereas *inter partes* review proceedings can only raise an invalidity challenge based on published prior art and patents. These adversarial actions at the USPTO review patent claims without the presumption of validity afforded to U.S. patents in lawsuits in U.S. federal courts, and use a lower burden of proof than used in litigation in U.S. federal courts. Therefore, it is generally considered easier for a competitor or other party to have a U.S. patent invalidated in a USPTO post-grant review or *inter partes* review proceeding than invalidated in a litigation in a U.S. federal court. If any of our patents are challenged by another party in such a USPTO proceeding, there is no guarantee that we or our licensors or collaborators will be successful in defending the patent, which would result in our loss of the challenged patent right.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to our issued patents, provisional patent, and pending patent applications, we expect to rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position and protect our drug and diagnostics technology candidates. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties that have access to them, such as our employees, corporate collaborators, outside scientific collaborators, sponsored researchers, contract manufacturers, consultants, advisors and other parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. However, any of these parties may breach such agreements and disclose our proprietary information, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive and time-consuming, and the outcome is unpredictable. If trade secrets which are material to our business were to be obtained by a competitor, our competitive position would be harmed.

We may be subject to claims that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed IP, including trade secrets or other proprietary information, of any such employee's former employer. In addition, while we typically require our employees, consultants and contractors who may be involved in the development of IP to execute agreements assigning such IP to us, we may be unsuccessful in executing such an agreement with each party who in fact develops IP that we regard as our own, which may result in claims by or against us related to the ownership of such IP. We are not aware of any threatened or pending claims that any of our projects involve misappropriated IP or other proprietary information, but in the future litigation may be necessary to defend against such claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable IP rights. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

We may be unable to execute on the optimal development plan for one or more of our existing product candidates if we are unable to obtain or maintain necessary rights for some aspect of the developing technology through acquisitions or licenses.

Our existing programs currently use or may in the future use additional technologies subject to proprietary rights held by others, such as particular compositions or methods of manufacture, treatment or use. The licensing and acquisition of IP rights is a competitive area, and more established companies may pursue strategies to license or acquire such IP rights that we may consider necessary or useful. These established companies may have a competitive advantage over us due to their size, cash resources and greater capabilities in clinical development and commercialization.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire IP rights on terms that would allow us to make an appropriate return on our investment. If we are unable to successfully obtain or maintain licenses or other rights from other parties to use IP of those parties, our business, financial condition and prospects for growth could suffer.

If we fail to comply with our obligations in the agreements under which we license IP rights from other parties or otherwise experience disruptions to our business relationships with our licensors, we could be required to pay monetary damages or could lose license rights that are important to our business.

Many of our projects (including our Lead Projects) are based on IP which we have licensed from other parties. (See "Item 4. Information on the Company – B. Business Overview – Intellectual Property") Certain of these license agreements impose diligence, development or commercialization obligations on us, such as obligations to pay royalties on net product sales of our drug candidates once commercialized by us, to pay a percentage of sublicensing revenues if the licensed product is sublicensed, to make other specified milestone and/or annual payments relating to our drug candidates or to pay license maintenance and other fees, as well as obligations to pursue commercialization with due diligence. Specifically, a number of our license agreements also require us to meet development timelines in order to maintain the related license(s). In spite of our efforts, our licensors might conclude that we have materially breached our obligations under such license agreements and might therefore seek to terminate the license agreements. If one of our licensors, despite our efforts, were to be successful in terminating its agreement with us, we would not be able to continue to develop, manufacture or market any drug candidate under that license agreements, and we could face claims for monetary damages or other penalties under that agreement. Such an occurrence would diminish or eliminate the value of that project to our Company, even if we are able to negotiate new or reinstated agreements, which may have less favorable terms. Depending on the importance of the IP and the related project, any such development could have a material adverse effect on our competitive position, business, financial conditions, results of operations, and prospects.

Moreover, disputes may arise regarding intellectual property subject to a licensing agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;

- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the priority of invention of patented technology.

In addition, the agreements under which we currently license intellectual property or technology from other parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which (depending on the importance of the IP and the related project) could have a material adverse effect on our business, financial condition, results of operations, and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangement for a project on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected drug and diagnostics technology candidates, which could have a material adverse effect on our business, financial conditions, results of operations, and prospects.

We may not have complete control of the preparation, filing and prosecution of patent applications, or to maintain patents, licensed by us from other parties.

The Company has in-licensed, and may in the future in-license patents owned or controlled by others for our use as part of our development plans. We also may out-license or sublicense patents which we own or control in collaborations with others for development and commercialization of our products. In either case, the continuing right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology under development is a matter for negotiation and we may not always be the party that obtains such control, in which case we will be reliant on our licensors, collaboration partners or sublicensees for determining strategies with respect to those patents. For our existing licenses, while we have an understanding with most of the licensors who maintain control over patent prosecution and we have jointly appointed and engaged patent agents nominated by us under one or more of our licenses, we cannot guarantee that such licensors or collaborators will always accept prosecution strategies proposed by us and/or our patent agents. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. If our current or future licensors or collaboration partners fail to establish, maintain or protect such patents and other IP rights, such rights may be reduced or eliminated. If our licensors or joint development partners are not fully cooperative or disagree with us as to the prosecution, maintenance or enforcement of any patent rights, such patent rights could be compromised.

Risks Related to Our Reliance on Unrelated Parties

We rely on unrelated parties to conduct discovery and further improvement of our innovations and licensed technologies, as well as our preclinical studies and clinical trials. If these unrelated parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize our drug candidates, and our business could be substantially harmed.

We have relied upon and plan to continue to rely upon CROs and collaborating institutions to monitor and manage data for our ongoing preclinical studies and programs. We rely on these parties for execution of preclinical studies and clinical trials, and control only certain aspects of their activities. Nevertheless, we are responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol, legal, and regulatory requirements and scientific standards, and our reliance on the CROs and collaborating institutions does not relieve us of our regulatory responsibilities. If CROs, collaborating institutions or clinical investigators do not successfully carry out their contractual duties or obligations or meet expected deadlines, development of our product candidates could be delayed and our business could be adversely affected.

In addition, our CROs and collaborating institutions, are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and waste. In the event of contamination or injury resulting from our use of hazardous materials, we might be held liable for any resulting damages, and any liability could exceed our resources. We could also be subject to civil or criminal fines and penalties, and significant associated costs.

If an IND for one of our drug candidates requires significantly larger quantities of the candidate to be tested, we expect to rely on unrelated parties to manufacture supplies of that candidate. If those unrelated parties fail to provide us with sufficient quantities of clinical supply on that candidate or fail to do so at acceptable quality levels or prices, or fail to maintain required cGMP licenses, we may not be able to manufacture that candidate in sufficient quantities to conduct the necessary human trials. Should the failure by the CRO occur in anticipation of or after marketing approval of that candidate, we may be unable to generate as much revenue as rapidly (and such revenue may not be as profitable) as we had anticipated.

The manufacture of many drug products, particularly in commercial quantities, can be complex and may require significant expertise and capital investment, particularly if the development of advanced manufacturing techniques and process controls are required. We intend to contract with outside contractors to manufacture clinical supplies and process our drug candidates. We have not yet had our drug candidates to be manufactured or processed on a commercial scale and may not be able to do so for any of our drug candidates.

As we expect to engage contract manufacturers, the Company will be exposed to the following risks:

- we might be unable to identify manufacturers on acceptable terms or at all because the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities must approve any manufacturers we determine to use and any potential manufacturer may be unable to satisfy federal, state or international regulatory standards;

- although we would be choosing manufacturers with the type of experience most suitable for our drug candidates, it is possible that our contract manufacturers may not be able to execute unique manufacturing procedures and other logistical support requirements we have developed and they might require a significant amount of support from us to implement and maintain the infrastructure and processes required to manufacture our particular drug candidates;

- our contract manufacturers might be unable to reproduce the quantity and quality of the drugs we need to meet our clinical and commercial needs within the time frames when we require those drugs;

- our contract manufacturers may breach their contracts with us, including by not performing as agreed or not devoting sufficient resources to our drug candidates, or they may not remain in the contract manufacturing business for the time required to supply our clinical trials or to successfully produce, store and distribute our products;

- even if initially accepted by regulatory authorities, a manufacturer remains subject to ongoing periodic unannounced inspection by regulatory authorities to ensure strict compliance with cGMP and other government regulations, and our contract manufacturers may fail to comply with these regulations and requirements, resulting in rescission of cGMP licenses and our inability to continue using their services, requiring us to find a replacement manufacturer;

- depending on the terms of our agreement with a manufacturer, we may not own, or may have to share, the IP rights to any improvements made by the manufacturer in the manufacturing process for our drug candidates; and

- our contract manufacturers may have unacceptable or inconsistent product quality success rates and yields.

Each of these risks could delay or prevent the completion of our clinical trials or the approval of any of our drug candidates by the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities, result in higher costs or adversely impact commercialization of our drug candidates.

We are also responsible for quality control by our manufacturers. We intend to rely on those unrelated-party manufactures to perform certain quality assurance tests on our drug candidates prior to delivery to patients. If these tests are not appropriately done and test data are not reliable, patients could be put at risk of serious harm and the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities could place significant restrictions on our Company until deficiencies are remedied.

Manufacturers of drug products often encounter difficulties in production, particularly in scaling up or out, validating the production process, and assuring high reliability of the manufacturing process (including the absence of contamination). These problems include logistics and shipping, difficulties with production costs and yields, quality control, including stability of the product, product testing, operator error, availability of qualified personnel, as well as compliance with strictly enforced federal, state and non-U.S. regulations. Furthermore, if contaminants are discovered in our supply of our drug candidates or in the manufacturing facilities, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. It is possible that stability failures or other issues relating to the manufacture of our drug candidates may occur in the future. Additionally, our manufacturers may experience manufacturing difficulties due to resource constraints, or as a result of labor disputes or unstable political environments. If our manufacturers were to encounter any of these difficulties, or otherwise fail to comply with their contractual obligations, our ability to provide our drug candidate to patients in clinical trials would be jeopardized. Any delay or interruption in the manufacturing of clinical trial supplies could delay the completion of clinical trials, increase the costs associated with maintaining clinical trial programs and, depending upon the period of delay, require us to begin new clinical trials with additional costs or terminate clinical trials completely.

Review of changes in the manufacturing process of our drug candidates could cause delays resulting from the need for additional regulatory approvals.

Changes in a process or procedure for manufacturing one of our drug candidates, including a change in the location where the drug candidate is manufactured or a change of a contract manufacturer, could require prior review by the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities and approval of the manufacturing process and procedures in accordance with the FDA, NMPA, EMA, or Health Canada's regulations, or comparable requirements. This review may be costly and time-consuming and could delay or prevent the launch of a product. The new facility will also be subject to pre-approval inspection. In addition, we would have to demonstrate that the product made at the new facility is equivalent to the product made at the former facility by physical and chemical methods, which are costly and time-consuming. It is also possible that the FDA, NMPA, EMA, Health Canada or other comparable regulatory authorities may require clinical testing as a way to prove equivalency, which would result in additional costs and delay.

Risks Related to AML Clinic

Failure to comply with all laws and regulations applicable to the business of AML Clinic could have a material, adverse impact on the Company's business.

Operation of AML Clinic subjects the Company to a variety of Hong Kong laws and regulations specific to companies and professionals in the business of delivering medical care. We and our employees will be subject to licensing and professional qualifications that do not apply to our other businesses. Breach of any of these laws, regulations or licensing requirements could subject the Company to significant fines and other penalties and possibly damage the Company's reputation, which could have a material adverse effect on the Company's business.

Risks Related to Our Natural Supplements

We may be subject to government regulations for natural supplements

From a regulatory perspective, some of the Company's non-drug candidates (including those developed under the project company Nativus), may be regulated as natural supplements, including NativusWell® (NLS-2). For those non-drug candidates that the Company plans to develop, they are subject to extensive and rigorous domestic government regulation, including regulation by the FDA, the Centers for Medicare & Medicaid Services, or CMS, other divisions of the U.S. Department of Health and Human Services, state and local governments and their respective foreign equivalents. The FDA regulates natural supplements, cosmetics and drugs under different regulatory schemes.

For example, the FDA regulates the processing, formulation, safety, manufacturing, packaging, labeling, advertising and distribution of natural supplements and cosmetics under its natural supplement and cosmetic authority, respectively. The FDA also regulates the research, development, pre-clinical and clinical testing, manufacture, safety, effectiveness, record keeping, reporting, labeling, storage, approval, advertising, promotion, sale, distribution, import and export of pharmaceutical products under various regulatory provisions. If any drug products we develop are tested or marketed abroad, they will also be subject to extensive regulation by foreign governments, whether or not we have obtained FDA approval for a given product and its uses. Such foreign regulation may be equally or more demanding than corresponding U.S. regulation.

Government regulation substantially increases the cost and risk of researching, developing, manufacturing and selling products. Our failure to comply with these regulations could result in, by way of example, significant fines, criminal and civil liability, product seizures, recalls, withdrawals, withdrawals of approvals and exclusion and debarment from government programs. Any of these actions, including the inability of our hormone therapy drug candidates to obtain and maintain regulatory approval, would have a materially adverse effect on our business, financial condition, results of operations and prospects.

In addition, the FDA's policies may change and additional government regulations may be issued that could prevent, limit, or delay regulatory approval of our drug candidates, or impose more stringent product labeling and post-marketing testing and other requirements.

We intend to launch and market NativusWell® (NLS-2) in Hong Kong. In Hong Kong, natural supplements are defined as "health food" products. "Health food" containing medicines are subject to the Pharmacy and Poisons Ordinance (Cap 138) and such "health food" containing Chinese medicines are regulated by the Chinese Medicine Ordinance (Cap 549), where they must meet the requirements in respect of safety, quality and efficacy before they can be registered.

For other "health food" products which cannot be classified as Chinese medicine or western medicine are regulated under the Public Health and Municipal Services Ordinance (Cap 132) as general food products. The Public Health and Municipal Services Ordinance requires the manufacturers and sellers of food to ensure that their products are fit for human consumption and comply with the requirements in respect of food safety, food standards and labelling. In addition, all prepackaged food should bear labels which correctly list out the ingredients of the food under the Food and Drugs (Composition and Labelling) Regulations (Cap 132W) under the Ordinance.

The NativusWell® (NLS-2) is made with the bioactive ingredient extracted Chinese yam powder and does not contain any western or Chinese medicine; therefore, registration is not required under the local laws for marketing in Hong Kong. We will, however, ensure the compliance of the Food and Drugs (Composition and Labelling) Regulations (Cap 132W) with by proper labelling in place.

Risks Related to Our Diagnostics Technology

Our products could in the future be subject to additional regulation by the U.S. Food and Drug Administration or other domestic and international regulatory agencies, which could increase our costs and delay our commercialization efforts, thereby materially and adversely affecting our business and results of operations.

The FDA has statutory authority to assure that medical devices and in vitro diagnostics, including those where the RPIDD technology may be utilized, are safe and effective for their intended uses. Should the RPIDD technology be utilized in U.S. as a Laboratory Developed Test (LDT), the FDA has historically exercised its enforcement discretion and may not enforce applicable provisions of the FDC Act and regulations with respect to LDTs. We believe the RPIDD may not be subject to the FDA's enforcement of its medical device regulations and the applicable FDC Act provisions.

However, if and when we utilize the RPIDD technology in the U.S., the FDA may disagree with our assessment that the RPIDD falls within the definition of an LDT and seek to regulate the RPIDD as medical devices. If the FDA determines that our products are subject to such requirements, we could be subject to enforcement action, including administrative and judicial sanctions, and additional regulatory controls and submissions for the RPIDD, all of which could be burdensome.

In the future, certain of our products or related applications could be subject to additional FDA regulation. Even where a product is not subject to FDA clearance or approval requirements, the FDA may impose restrictions as to the types of customers to which we can market and sell our products. Such regulation and restrictions may materially and adversely affect our business, financial condition and results of operations. Other regulatory regimes that do not currently present material challenges but that could in the future subject to regulations include biosecurity should our RPIDD technology be utilized in the U.S.

In addition, many countries have laws and regulations that could affect our products and which could limit our ability to sell our products in those countries. The number and scope of these requirements are increasing. We may not be able to obtain regulatory approvals in such countries or may incur significant costs in obtaining or maintaining foreign regulatory approvals. For example, the European Union, or EU, is transitioning from the existing European Directive 98/79/EC on in vitro diagnostic medical devices, or In Vitro Diagnostic Directive (IVDD), to the In Vitro Diagnostic Device Regulation (EU) 2017/746 (IVDR), which imposes stricter requirements for the marketing and sale of medical devices, including in the area of clinical evaluation requirements, quality systems and post-market surveillance. The IVDR is expected to become effective in May 2022. It is likely that we will be impacted by this new regulation, either directly as a manufacturer of IVDs, or indirectly as a supplier to customers who are placing IVDs in the EU market for clinical or diagnostic use. Complying with the requirements of the IVDR may require us to incur significant expenditures. Failure to meet these requirements could adversely impact our business in the EU and other regions that tie their product registrations or chemical regulations to the EU requirements.

Risks Related to Our Industry, Business and Operation

If we do not comply with laws regulating the protection of the environment and health and human safety, our business could be adversely affected.

Our research, development and clinic operations involve the use of hazardous materials, chemicals and various radioactive compounds/radiation and AML Clinic may create medical waste and radiation. Our R&D Center may maintain quantities of various flammable and toxic chemicals in our facilities that are required for our research, development and manufacturing activities. We are subject to local laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous materials and of medical waste at the jurisdictions where we operate our clinic and research facilities, which are currently limited to Hong Kong. We believe our procedures for storing, handling and disposing of these materials comply with the relevant guidelines and laws of the jurisdictions in which our facilities are located. Although we believe that our safety procedures for handling and disposing of these materials comply with the standards mandated by applicable regulations, the risk of accidental contamination or injury from these materials cannot be eliminated. If an accident occurs, we could be held liable for resulting damages, which could be substantial. We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of biohazardous materials and medical waste.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of these materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials. Additional federal, state and local laws and regulations affecting our operations may be adopted in the future. We may incur substantial costs to comply with, and substantial fines or penalties, if we violate any of these laws or regulations.

Our future success depends on our ability to retain our Chief Executive Officer, our scientific and clinical advisors, and other key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on Ian Huen, our Chief Executive Officer, as well as, other principal members of our management teams, scientific teams as well as scientific and clinical advisors. Although we have formal employment agreements, which we refer to as appointment letters, with all of our executive officers, these agreements do not prevent our executives from terminating their employment with us at any time, subject to applicable notice periods. Nevertheless, the loss of the services of any of these persons could impede the achievement of our research, development and commercialization objectives.

To induce valuable employees to remain at our Company, in addition to salary and cash incentives, we plan to provide share incentive grants that vest over time. The value to employees of these equity grants that vest over time may be significantly affected by movements in the price of our Class A Ordinary Shares that are beyond our control, and may at any time be insufficient to counteract more lucrative offers from other companies. Although we have appointment letters with our key employees, any of our employees could resign at any time, with 1-month to 3-months prior written notice or with payment in lieu of notice.

Recruiting and retaining qualified officers, scientific, clinical, sales and marketing personnel or consultants will also be critical to our success. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our discovery and preclinical studies development and commercialization strategy. The loss of the services of our executive officers or other key employees and consultants could impede the achievement of our research, development and commercialization objectives and seriously harm our ability to successfully implement our business strategy.

Furthermore, replacing executive officers and key employees or consultants may be difficult and may take an extended period of time, because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain regulatory approval of and commercialize drug and diagnostics technology candidates. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel or consultants on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel.

We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. If we are unable to continue to attract and retain high quality personnel, our ability to pursue our growth strategy will be limited.

We will need to increase the size and capabilities of our organization, and we may experience difficulties in managing our growth.

As of the date of this annual report, we have 26 full-time employees. Of these, 9 are engaged in research and development and laboratory operations, 13 are engaged in general and administrative functions and 4 are engaged in the clinic operation. As of the date of annual report, 25 of our employees are located in Asia and 1 of our employees is located in Europe. In addition, we have engaged and may continue to engage 56 independent contracted consultants and advisors to assist us with our operations. As our development and commercialization plans and strategies develop, and as we have transitioned into operating as a public company, we will need to establish and maintain effective disclosure and financial controls and make changes in our corporate governance practices. We will need to add a significant number of additional managerial, operational, sales, marketing, financial and other personnel with the appropriate public company experience and technical knowledge and we may not successfully recruit and maintain such personnel. Future growth will impose significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, maintaining and motivating additional employees;
- managing our internal development efforts effectively, including clinical, the FDA or other comparable regulatory authority review process for our drug and diagnostics technology candidates, while complying with our contractual obligations to contractors and others; and
- improving our operational, financial and management controls, reporting systems and procedures.

Our future financial performance and our ability to commercialize our drug candidates will depend, in part, on our ability to effectively manage our future growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities.

We currently rely, and for the foreseeable future will continue to rely, in substantial part on certain independent organizations, advisors and consultants for significant input in selecting and evaluating new products to pursue. These independent organizations, advisors and consultants may not continue to be available to us on a timely basis when needed, and in such case, we may not have the ability to find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities, or if the quality or accuracy of the services provided by consultants is compromised for any reason, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval of our drug candidates or otherwise advance our business. Furthermore, we may not be able to manage our existing consultants or find other competent outside contractors and consultants on economically reasonable terms, if at all.

If we are not able to effectively expand our organization by hiring new employees and expanding our groups of consultants and contractors, we may not be able to successfully implement the tasks necessary to further develop and commercialize our drug and diagnostics technology candidates and, accordingly, may not achieve our research, development and commercialization goals.

We intend to seek additional collaborations, strategic alliances or acquisitions or enter into royalty-seeking or sublicensing arrangements in the future, but we may not realize the benefits of these arrangements.

We intend to form or seek strategic alliances, create joint ventures or collaborations, acquire complimentary products, IP rights, technology or businesses or enter into additional licensing arrangements with unrelated parties that we determine may complement or augment our development and commercialization efforts with respect to our drug and diagnostics technology candidates. Any of these relationships may require us to incur non-recurring and other charges, increase our near and long-term expenditures, issue securities that dilute our existing shareholders, or disrupt our management and business.

We will face significant competition in seeking appropriate strategic partners and the negotiation process is likely to be time-consuming, costly and complex. Moreover, we may not be successful in our efforts to establish a strategic partnership or another alternative arrangement for any of our drug and diagnostics technology candidates because their state of development may be deemed to be too early for collaborative effort and others may not view our drug candidates as having the requisite potential to demonstrate safety and efficacy. If and when we enter into an agreement with a collaboration partner or sublicensee for development and commercialization of a drug or diagnostics technology candidate, we can expect to relinquish some or all of the control over the future success of that drug candidate to the unrelated-party.

Further, even if we enter into a collaboration involving any of our drug and diagnostics technology candidates, the arrangement will be subject to numerous risks, which may include the following:

- the collaborators will likely have significant discretion in determining the efforts and resources that they will apply to a collaboration;
- the collaborator may ultimately choose not pursue development and commercialization of our drug or diagnostics technology candidates or may elect not to continue or renew development or commercialization programs, based on clinical trial results, changes in their strategic focus due to the acquisition of competitive drugs, availability of funding, or other external factors, such as a business combination that diverts resources or creates competing priorities;

- the collaborator may delay clinical trials, provide insufficient funding for a clinical trial, stop a clinical trial, abandon a drug or diagnostics technology candidate, repeat or conduct new clinical trials, or require a new formulation of a drug or diagnostics technology candidate for clinical testing;

- the collaborator could independently develop, or develop with unrelated parties, drugs that compete directly or indirectly with our drugs or drug candidates;

- the collaborator with marketing and distribution rights to one or more drugs may not commit sufficient resources to their marketing and distribution;

- the collaborator may not properly maintain or defend our IP rights or may use our IP or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our IP or proprietary information or expose us to potential liability;

- disputes may arise between us and the collaborator that cause the delay or termination of the research, development or commercialization of our drug and diagnostics technology candidates, or that result in costly litigation or arbitration that diverts management attention and resources;

- the collaboration may be terminated and, if terminated, may result the Company needing additional capital to pursue further development or commercialization of the applicable drug and diagnostics technology candidates;

- the collaborator may own or co-own IP covering our drugs that results from our collaborating with them, and in such cases, we would not have the exclusive right to commercialize such IP;

- the collaboration may result in increased operating expenses or the assumption of indebtedness or contingent liabilities; and

- the collaboration arrangement may result in the loss of key personnel and uncertainties in our ability to maintain key business relationships.

As a result, if we enter into collaboration agreements and strategic partnerships or license our drugs, we may not be able to realize the benefit of such transactions, which could delay our timelines or otherwise adversely affect our business. Following a strategic transaction or license, we may not achieve the revenue or specific net income that justifies such transaction. If we are unable to reach agreements with a suitable collaborator on a timely basis, on acceptable terms, or at all, we may have to curtail the development of a drug or diagnostics technology candidate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense.

If we fail to enter into collaborations, we may seek to fund and undertake development or commercialization activities on our own, but we may not have sufficient funds or expertise to undertake the necessary development and commercialization activities. In such a case, we may not be able to further develop our drug and diagnostics technology candidates or bring them to market and generate product sales revenue, which would harm our business prospects, financial condition and results of operations.

Our employees, independent contractors, consultants, commercial partners and vendors may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements.

We are exposed to the risk of fraud, misconduct or other illegal activity by our employees, independent contractors, consultants, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and negligent conduct that fails to: comply with the laws of the FDA and other similar non-U.S. regulatory authorities; provide true, complete and accurate information to the FDA and other similar non-U.S. regulatory authorities; comply with manufacturing standards we have established; comply with healthcare fraud and abuse laws in the United States and similar non-U.S. fraudulent misconduct laws; or report financial information or data accurately or to disclose unauthorized activities to us. If we obtain the FDA approval for any of our drug and diagnostics technology candidates and begin commercializing those drugs in the United States, our potential exposure under U.S. laws will increase significantly and our costs associated with compliance with such laws are also likely to increase. These laws may impact, among other things, our current activities with principal investigators of our sponsored researches and research patients and our use of information obtained in the course of patient recruitment for clinical trials, as well as proposed and future sales, marketing and education programs. In particular, the promotion, sales and marketing of healthcare items and services, as well as certain business arrangements in the healthcare industry, are subject to extensive laws designed to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, structuring and commission(s), certain customer incentive programs and other business arrangements generally.

It is not always possible to identify and deter misconduct by employees and other parties, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses, or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant fines or other sanctions.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

Our disclosure controls and procedures are designed to reasonably assure that information required to be disclosed by us in reports we file or submit under the Exchange Act is accumulated and communicated to management, and recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC.

We believe that any disclosure controls and procedures, or internal controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met.

These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements due to error or fraud may occur and not be detected, which would likely cause investors to lose confidence in our reported financial information. This could in turn limit our access to capital markets, harm our results of operations, and lead to a decline in the trading price of our Class A Ordinary Shares. Additionally, ineffective internal control over financial reporting could expose us to increased risk of fraud or misuse of corporate assets and subject us to potential delisting from the stock exchange on which we list, regulatory investigations and civil or criminal sanctions. We may also be required to restate our financial statements from prior periods.

If we fail to establish and maintain proper internal financial reporting controls, our ability to produce accurate financial statements or comply with applicable regulations could be impaired.

Pursuant to Section 404 of the Sarbanes-Oxley Act, we are required to file a report by our management on our internal control over financial reporting, including an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. The presence of material weaknesses in internal control over financial reporting could result in financial statement errors which, in turn, could lead to errors in our financial reports and/or delays in our financial reporting, which could require us to restate our operating results. In connection with the audit of our financial statements for the year ended December 31, 2018, we and our independent registered public accounting firm identified one material weakness in our internal control over financial reporting, as defined in the standards established by the Public Company Accounting Oversight Board of the United States. The material weakness identified was the lack of dedicated resources to take responsibility for the finance and accounting functions and the preparation of financial statements in compliance with generally accepted accounting principles in the United States, or U.S. GAAP.

Since 2019, we took actions to remediate the abovementioned material weakness, and we believe we have remediated the material weakness by implementing the following measures:

- provide trainings to staff regarding to the preparation of financial statements in compliance with generally accepted accounting principles in the United States;
- change to a new and well-established accounting system to enhance effectiveness and financial and system control;
- establish clear roles and responsibilities for accounting and financial reporting staff to address finance and accounting issues; and
- continue to monitor the improvement on internal control over financial reporting.

As of December 31, 2021 and 2020, we determined that the aforementioned measures remediated the material weakness. However, since we are still in the process of replenishing and building up a qualified finance and accounting team with sufficient dedicated resources, our management assessed that the deficiency related to the lack of dedicated resources to take responsibility for the finance and accounting functions and the preparation of financial statements in compliance with generally accepted accounting principles in the United States, or U.S. GAAP, still existed as of December 31, 2021. Based on the definition of "material weakness" and "significant deficiency" in the standards established by the Public Company Accounting Oversight Board of the United States, our management concluded that the deficiency now only rises to the level of a significant deficiency. However, we cannot assure you that we will not identify additional material weaknesses or significant deficiencies in the future.

Our management concluded that our internal controls over financial reporting were effective as of December 31, 2021. However, if we fail to maintain effective internal controls over financial reporting in the future, our management and our independent registered public accounting firm may conclude that our internal control over financial reporting is not effective. Investors may lose confidence in our operating results, the price of the Class A Ordinary Shares could decline and we may be subject to litigation or regulatory enforcement actions. In addition, if we are unable to meet the requirements of Section 404 of the Sarbanes-Oxley Act, the Class A Ordinary Shares may not be able to remain listed on the NASDAQ Global Market.

We may market our products, if approved, globally; if we do, we will be subject to the risk of doing business internationally.

We operate and expect to operate in various countries, and we may not be able to market our products in, or develop new products successfully for, these markets. We may also encounter other risks of doing business internationally including but not limited to:

- unexpected changes in, or impositions of, legislative or regulatory requirements;
- efforts to develop an international sales, marketing and distribution organization may increase our expenses, divert our management's attention from the acquisition or development of drug candidates or cause us to forgo profitable licensing opportunities in these geographies;
- the occurrence of economic weakness, including inflation or political instability;
- the effects of applicable non-U.S. tax structures and potentially adverse tax consequences;
- differences in protection of our IP rights including patent rights of other parties;
- the burden of complying with a variety of foreign laws including difficulties in effective enforcement of contractual provisions;
- delays resulting from difficulty in obtaining export licenses, tariffs and other barriers and restrictions, potentially longer payment cycles, greater difficulty in accounts receivable collection and potentially adverse tax treatment; and
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad.

In addition, we are subject to general geopolitical risks in foreign countries where we operate, such as political and economic instability and changes in diplomatic and trade relationships, which could affect, among other things, customers' inventory levels and consumer purchasing, which could cause our results to fluctuate and our net sales to decline. The occurrence of any one or more of these risks of doing business internationally, individually or in the aggregate, could materially and adversely affect our business and results of operations.

If we engage in future acquisitions or strategic partnerships, this may increase our capital requirements, dilute our shareholders, cause us to incur debt or assume contingent liabilities, and subject us to other risks.

We may evaluate various acquisitions and strategic partnerships, including licensing or acquiring complementary products, IP rights, technology or businesses. Any potential acquisition or strategic partnership may entail numerous risks, including, but not limited to:

- increase in operating expenses and cash requirements;
- the assumption of additional indebtedness or contingent liabilities;
- the issuance of our equity securities;
- assimilation of operations, IP and products of an acquired company, including difficulties associated with integrating new personnel;
- the diversion of our management's attention from our existing product programs and initiatives in pursuing such a strategic merger or acquisition;
- retention of key employees, the loss of key personnel, and uncertainties in our ability to maintain key business relationships;
- risks and uncertainties associated with the other party to such a transaction, including the prospects of that party and their existing drugs or drug and diagnostics technology candidates and regulatory approvals; and
- our inability to generate revenue from acquired technology and/or products sufficient to meet our objectives in undertaking the acquisition or even to offset the associated acquisition and maintenance costs.

In addition, if we undertake acquisitions, we may issue dilutive securities, assume or incur debt obligations, incur large one-time expenses and acquire intangible assets that could result in significant future amortization expense. Moreover, we may not be able to locate suitable acquisition opportunities and this inability could impair our ability to grow or obtain access to technology or products that may be important to the development of our business.

If we fail to comply with the U.S. Foreign Corrupt Practices Act ("FCPA"), or other anti-bribery laws, including the Bribery Act 2010 of the United Kingdom (UK Bribery Act"), our reputation may be harmed and we could be subject to penalties and significant expenses that have a material adverse effect on our business, financial condition and results of operations.

We are subject to the FCPA. The FCPA and UK Bribery Act generally prohibits us from making improper payments to non-U.S. officials for the purpose of obtaining or retaining business or other benefits. We are also subject to the anti-bribery laws of other jurisdictions, particularly the PRC. As our business expands, the applicability of the FCPA and other anti-bribery laws to our operations will increase. Our procedures and controls to monitor anti-bribery compliance may fail to protect us from reckless or criminal acts committed by our employees or agents. If we, due to either our own deliberate or inadvertent acts or those of others, fail to comply with applicable anti-bribery laws, our reputation could be harmed and we could incur criminal or civil penalties, other sanctions and/or significant expenses, which could have a material adverse effect on our business, including our financial condition, results of operations, cash flows and prospects.

Our business and results of operations may be negatively impacted by the UK's withdrawal from the EU.

On June 23, 2016, the UK held a referendum in which a majority of voters approved an exit from the EU, or Brexit, and the UK formally left the EU on January 31, 2020. There was a transition period during which EU pharmaceutical laws continued to apply to the UK, which expired on December 31, 2020. However, the EU and the UK have concluded a trade and cooperation agreement, or TCA, which was provisionally applicable since January 1, 2021 and has been formally applicable since May 1, 2021. The TCA includes specific provisions concerning pharmaceuticals, which include the mutual recognition of GMP, inspections of manufacturing facilities for medicinal products and GMP documents issued, but does not foresee wholesale mutual recognition of UK and EU pharmaceutical regulations. At present, Great Britain has implemented EU legislation on the marketing, promotion and sale of medicinal products through the Human Medicines Regulations 2012 (as amended) (under the Northern Ireland Protocol, the EU regulatory framework will continue to apply in Northern Ireland). The regulatory regime in Great Britain therefore currently aligns in the most part with EU regulations, however it is possible that these regimes will diverge in the future now that Great Britain's regulatory system is independent from the EU and the TCA does not provide for mutual recognition of UK and EU pharmaceutical legislation. For example, the new Clinical Trials Regulation which became effective in the EU on January 31, 2022 and provides for a streamlined clinical trial application and assessment procedure covering multiple EU Member States has not been implemented into UK law, and a separate application will need to be submitted for clinical trial authorization in the UK. In addition, as we are headquartered in the UK, it is possible that Brexit may impact some or all of our current operations. For example, Brexit will impact our ability to freely move employees from our headquarters in the UK to other locations in the EU. Furthermore, if other EU Member States pursue withdrawal, barrier-free access among the EEA overall could be diminished or eliminated.

The long-term effects of Brexit will depend in part on how the terms of the TCA continue to take effect in practice and the terms of any further agreements the UK makes with the EU. Such a withdrawal from the EU is unprecedented, and it is unclear how the restrictions on the UK's access to the European single market for goods, capital, services and labor, or single market, and the wider commercial, legal and regulatory environment, will impact our future operations (including business activities conducted by third parties and contract manufacturers on our behalf) and clinical activities in the UK in the long term.

If we commence clinical trials of one of our drug or diagnostics technology candidates, and product liability lawsuits are brought against us, we may incur substantial liabilities and the commercialization of such drug or diagnostics technology candidates may be affected.

If any of our drug or diagnostics technology candidates enter clinical trials, we will face an inherent risk of product liability suits and will face an even greater risk if we obtain approval to commercialize any drugs. For example, we may be sued if our drug candidates cause or are perceived to cause injury or are found to be otherwise unsuitable during clinical testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the drug, negligence, strict liability or a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our drug candidates. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our drugs;
- injury to our reputation;
- withdrawal of clinical trial participants and inability to continue clinical trials;
- initiation of investigations by regulators;
- costs to defend the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- exhaustion of any available insurance and our capital resources;
- the inability to commercialize any drug candidate; and
- a decline in the price of our Class A Ordinary Shares.

We shall seek to obtain the appropriate insurance once our candidates are ready for clinical trial. However, our inability to obtain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of drugs we develop, alone or with collaborators. We currently do not have in place product liability insurance and although we plan to have in place such insurance as and when the products are ready for commercialization, as well as insurance covering clinical trials, the amount of such insurance coverage may not be adequate, we may be unable to maintain such insurance, or we may not be able to obtain additional or replacement insurance at a reasonable cost, if at all. Our insurance policies may also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts. Even if our agreements with any future corporate collaborators entitle us to indemnification against losses, such indemnification may not be available or adequate should any claim arise.

Additionally, we may be sued if the products that we commercialize, market or sell cause or are perceived to cause injury or are found to be otherwise unsuitable, and may result in:

- decreased demand for those products;
- damage to our reputation;
- costs incurred related to product recalls;
- limiting our opportunities to enter into future commercial partnership; and
- a decline in the price of our Class A Ordinary Shares.

Our insurance coverage may be inadequate to protect us against losses.

We currently maintain property insurance for our office premises (including two units of server and accessories). We hold employer's liability insurance generally covering death or work-related injury of employees; we maintain "Office Care Plan Insurance" for those persons working in our offices and "Medical Plan" for our employee. We hold public liability insurance covering certain incidents involving unrelated parties that occur on or in the premises of the Company. We have directors and officers liability insurance. We do not have key-man life insurance on any of our senior management or key personnel, or business interruption insurance. Our insurance coverage may be insufficient to cover any claim for product liability, damage to our fixed assets or employee injuries. If any claims for damage are brought against us, or if we experience any business disruption, litigation or natural disaster, we might incur substantial costs and diversion of resources.

Fluctuations in exchange rates could result in foreign currency exchange losses

Our operations and equity are funded in U.S. dollars and we currently incur the majority of our expenses in U.S. dollars or in H.K. dollars. H.K. dollar is currently pegged to the U.S. dollar; however, we cannot guarantee that such peg will continue to be in place in the future. Our exposure to foreign exchange risk primarily relates to the limited cash denominated in currencies other than the functional currencies of each entity and limited revenue contracts dominated in H.K. dollars in certain Hong Kong operating entities. We do not believe that we currently have any significant direct foreign exchange risk and have not hedged exposures denominated in foreign currencies or any other derivative financial instruments.

If we are exposed to foreign currency exchange risk as our results of operations, cash flows maybe subject to fluctuations in foreign currency exchange rates. For example, if a significant portion of our clinical trial activities may be conducted outside of the United States, and associated costs may be incurred in the local currency of the country in which the trial is being conducted, which costs could be subject to fluctuations in currency exchange rates. We currently do not engage in hedging transactions to protect against uncertainty in future exchange rates between particular foreign currencies and the U.S. dollar. A decline in the value of the U.S. dollar against currencies in countries in which we conduct clinical trials could have a negative impact on our research and development costs. Foreign currency fluctuations are unpredictable and may adversely affect our financial condition, results of operations and cash flows.

Our investments are subject to risks that could result in losses.

We had unrestricted cash of $8.13 million, $3.50 million and $5.19 million as of December 31, 2021, 2020 and 2019, respectively. We may invest our cash in a variety of financial instruments. All of these investments are subject to credit, liquidity, market and interest rate risk. Such risks, including the failure or severe financial distress of the financial institutions that hold our cash, cash equivalents and investments, may result in a loss of liquidity, impairment to our investments, realization of substantial future losses, or a complete loss of the investments in the long-term, which may have a material adverse effect on our business, results of operations, liquidity and financial condition. While we believe our cash position does not expose us to excessive risk, future investments may be subject to adverse changes in market value.

We are exposed to risks associated with our computer hardware, network security and data storage.

Similar to all other computer network users, our computer network system is vulnerable to attack of computer virus, worms, trojan horses, hackers or other similar computer network disruptive problems. Any failure in safeguarding our computer network system from these disruptive problems may cause breakdown of our computer network system and leakage of confidential information of the Company. Any failure in the protection of our computer network system from external threat may disrupt our operation and may damage our reputation for any breach of confidentiality to our customers, which in turn may adversely affect our business operation and performance. In the event that our confidential information is stolen and misused, we may become exposed to potential risks of losses from litigation and possible liability.

In addition, we are highly dependent on our IT infrastructure to store research data and information and manage our business operations. We do not backup all data on a real-time basis and the effectiveness of our business operations may be materially affected by any failure in our IT infrastructure. If our communications and IT systems do not function properly, or if there is any partial or complete failure of our systems, we could suffer financial losses, business disruption or damage to our reputation.

Business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations, and those of our research institution collaborators, CROs, suppliers and other contractors and consultants, could be subject to supply chain disruptions, earthquakes, power shortages, telecommunications failures, damage from computer viruses, material computer system failures, water shortages, floods, hurricanes, typhoons, fires, extreme weather conditions, medical epidemics and other natural or man-made disasters or business interruptions. In addition, we partially rely on our research institution collaborators for conducting research and development of our drug candidates, and they may be affected by government shutdowns or withdrawn funding. The occurrence of any of these business disruptions could seriously harm our operations and financial condition and increase our costs and expenses. We rely on contract manufacturers to produce and process our drug candidates. Our ability to obtain clinical supplies of our drug candidates could be disrupted if the operations of these suppliers are affected by a man-made or natural disaster or other business interruption. A large portion of our contract manufacturer's operations is located in a single facility. Damage or extended periods of interruption to our corporate or our contract manufacturer's development or research facilities due to fire, natural disaster, power loss, communications failure, unauthorized entry or other events could cause us to cease or delay development of some or all of our drug candidates.

Although we do not currently conduct any business in the PRC, we may in the future; in doing so we would be exposed to various risks related to doing business in the PRC.

Although we currently do not conduct any business in the PRC, we are the exclusive licensee to certain PRC patents directed to our drug candidates, and we intend to file application for certain products in the PRC. The pharmaceutical industry in the PRC is subject to comprehensive government regulation and supervision, encompassing the approval, registration, manufacturing, packaging, licensing and marketing of new drugs. (See "Item 4. Information on the Company – B. Business Overview – Regulations"). In recent years, the regulatory framework in the PRC regarding the pharmaceutical industry has undergone significant changes, and we expect that it will continue to undergo significant changes. Any such changes or amendments may result in increased compliance costs on our business or cause delays in or prevent the successful development or commercialization of our drug candidates in the PRC and reduce the current benefits that we believe are available to us from developing and manufacturing drugs in the PRC. Chinese authorities have become increasingly vigilant in enforcing laws in the pharmaceutical industry and any failure by us or our partners to maintain compliance with applicable laws and regulations or obtain and maintain required licenses and permits may result in the suspension or termination of our business activities in the PRC. We believe our strategy and approach is aligned with the PRC government's policies, but we cannot ensure that our strategy and approach will continue to be aligned.

If in the future, we commence business or operation in the PRC, changes in the political and economic policies of the PRC government may materially and adversely affect our business, financial condition and results of operations and may result in our inability to sustain our growth and expansion strategies. Once we start doing business in the PRC, our financial condition and results of operation in the PRC could be materially and adversely affected by government control over capital investments or changes in tax regulations that are applicable to us, and consequently have a material adverse effect on our businesses, financial condition and results of operations.

If the U.S. Public Company Accounting Oversight Board, or the PCAOB, is unable to inspect our auditors as required under the Holding Foreign Companies Accountable Act, the SEC will prohibit the trading of our Class A Ordinary Shares. A trading prohibition for our Class A Ordinary Shares, or the threat of a trading prohibition, may materially and adversely affect the value of your investment. Additionally, the inability of the PCAOB to conduct inspections of our auditors would deprive our investors of the benefits of such inspections.

The U.S. Holding Foreign Companies Accountable Act, or the HFCA Act, was enacted into law on December 18, 2020. Under the HFCA Act, if the SEC determines that we have filed audit reports issued by a registered public accounting firm that has not been subject to inspection by the PCAOB for three consecutive years (beginning with this annual report on Form 20-F), the SEC will prohibit our securities, including our Class A Ordinary Shares, from being traded on a U.S. national securities exchange, including NASDAQ, or in the over-the-counter trading market in the U.S. Furthermore, on June 22, 2021, the U.S. Senate passed the Accelerating Holding Foreign Companies Accountable Act ("HFCAA"), which, if enacted, would amend the HFCA Act and require the SEC to prohibit an issuer's securities from trading on any U.S. stock exchanges if its auditor is not subject to PCAOB inspections for two consecutive years instead of three, thus reducing the time period for triggering the prohibition on trading. On September 22, 2021, the PCAOB adopted a final rule implementing the HFCAA, which provides a framework for the PCAOB to use when determining, as contemplated under the HFCAA, whether the Board is unable to inspect or investigate completely registered public accounting firms located in a foreign jurisdiction because of a position taken by one or more authorities in that jurisdiction. On November 5, 2021, the SEC approved the PCAOB's Rule 6100, Board Determinations Under the Holding Foreign Companies Accountable Act. Rule 6100 provides a framework for the PCAOB to use when determining, as contemplated under the HFCAA, whether it is unable to inspect or investigate completely registered public accounting firms located in a foreign jurisdiction because of a position taken by one or more authorities in that jurisdiction. On December 2, 2021, the SEC issued amendments to finalize rules implementing the submission and disclosure requirements in the HFCAA The rules apply to registrants that the SEC identifies as having filed an annual report with an audit report issued by a registered public accounting firm that is located in a foreign jurisdiction and that PCAOB is unable to inspect or investigate completely because of a position taken by an authority in foreign jurisdictions. The process for implementing trading prohibitions pursuant to the HFCA Acts will be based on a list of registered public accounting firms that the PCAOB has been unable to inspect and investigate completely as a result of a position taken by a non-U.S. government, or the Relevant Jurisdiction, and such identified auditors, the PCAOB Identified Firms. The first list of PCAOB Identified Firms was included in a release by the PCAOB on December 16, 2021, or the PCAOB December 2021 Release. The SEC will review annual reports filed with it for fiscal years beginning after December 18, 2020 to determine if the auditor used for such reports was so identified by the PCAOB, and such issuers will be designated as "Commission Identified Issuers" on a list to be published by the SEC. If an issuer is a Commission Identified Issuer for three consecutive years (which will be determined after the third such annual report), the SEC will issue a trading order that will implement prohibitions described above.

Our current independent accounting firm, Marcum Bernstein & Pinchuk LLP, whose audit report is included in this annual report on Form 20-F, is headquartered in Manhattan, New York, and was not included in the list of PCAOB Identified Firms in the PCAOB December Release. Our ability to retain an auditor subject to PCAOB inspection and investigation, including but not limited to inspection of the audit working papers related to us, may depend on the relevant positions of U.S. and Chinese regulators. Marcum Bernstein & Pinchuk LLP's audit working papers related to us are located in China. With respect to audits of companies with operations in China, such as the Company, there are uncertainties about the ability of our auditor to fully cooperate with a request by the PCAOB for audit working papers in China without the approval of Chinese authorities. If in the future Marcum Bernstein & Pinchuk LLP is included in the list of PCAOB Identified Firms and we are unable to retain a PCAOB-registered auditor subject to PCAOB inspection and investigation, a trading prohibition for our Class A Ordinary Shares could be issued shortly after our filing of the second consecutive annual report on Form 20-F for which we have retained a PCAOB Identified Firm.

If our Class A Ordinary Shares are subject to a trading prohibition under the HFCA Act, the price of our Class A Ordinary Shares may be adversely affected, and the threat of such a trading prohibition would also adversely affect their price. If we are unable to be listed on another securities exchange that provides sufficient liquidity, such a trading prohibition may substantially impair your ability to sell or purchase our Class A Ordinary Shares when you wish to do so. Furthermore, if we are able to maintain a listing of our Class A Ordinary Shares on a non-U.S. exchange, investors owning our Class A Ordinary Shares may have to take additional steps to engage in transactions on that exchange, including establishing non-U.S. brokerage accounts.

The HFCA Act also imposes additional certification and disclosure requirements for Commission Identified Issuers, and these requirements apply to issuers in the year following their listing as Commission Identified Issuers. The additional requirements include a certification that the issuer is not owned or controlled by a governmental entity in the Relevant Jurisdiction, and the additional requirements for annual reports include disclosure that the issuer's financials were audited by a firm not subject to PCAOB inspection, disclosure on governmental entities in the Relevant Jurisdiction's ownership in and controlling financial interest in the issuer, the names of Chinese Communist Party, or CCP, members on the board of the issuer or its operating entities, and whether the issuer's article's include a charter of the CCP, including the text of such charter.

In addition to the issues under the HFCA discussed above, the PCAOB's inability to conduct inspections in China and Hong Kong prevents it from fully evaluating the audits and quality control procedures of the independent registered public accounting firm, consequently, investors would be deprived of the benefits of such PCAOB inspections. Our current independent registered public accounting firm, Marcum Bernstein & Pinchuk LLP, is headquartered in Manhattan, New York, and has been inspected by the PCAOB on a regular basis with the last inspection in 2020. However, in the event it is later determined that the PCAOB is unable to inspect or investigate completely our auditor because of a position taken by an authority in a foreign jurisdiction, then such lack of inspection could cause trading in our securities to be prohibited under the HFCA Act, and ultimately result in a determination by a securities exchange to delist our Class A Ordinary Shares.

The SEC could take the position that we are an "investment company" subject to the extensive requirements of the Investment Company Act of 1940. Such a characterization and the associated compliance requirements could have a material adverse effect on our business, financial condition, and results of operations.

Our business had historically included passive healthcare related investments in early stage companies primarily in the United States. Although we are in the process of liquidating those securities that remain in our portfolio, we still hold some such investments and these are included as assets of our Company on a consolidated basis. As part of the Restructure, we resolved to exit such portfolio investments over an appropriate timeframe and focus our resources on our current business. Since the date of the Restructure, we have not held ourselves out as an investment company and we do not believe we are an "investment company" under the Investment Company Act of 1940. If the SEC or a court, however, were to disagree with us, we could be required to register as an investment company. This would subject us to disclosure and accounting rules geared toward investment companies, rather than operating companies, which may limit our ability to borrow money, issue options, issue multiple classes of stock and debt, and engage in transactions with affiliates, and may require us to undertake significant costs and expenses to meet the disclosure and regulatory requirements to which we would be subject as a registered investment company.

If we are classified as a passive foreign investment company for U.S. federal income tax purposes, United States holders of our Class A Ordinary Shares may be subject to adverse United States federal income tax consequences.

A non-U.S. corporation will be a passive foreign investment company ("PFIC") for U.S. federal income tax purposes, for such year, if either

- At least 75% of its gross income for such year is passive income; or
- The average percentage of our assets (determined at the end of each quarter) during such year which produce passive income or which are held for the production of passive income is at least 50%.

Passive income generally includes dividends, interests, rents and royalties (other than rents or royalties derived from the active conduct of a trade or business) and gains from the disposition of passive assets.

A separate determination must be made after the close of each taxable year as to whether a non-U.S. corporation is a PFIC for that year. For purposes of the PFIC analysis, in general, a non-U.S. corporation is deemed to own its pro rata share of the gross income and assets of any entity in which it is considered to own at least 25% of the equity by value. Based on the current and anticipated value of our assets, we believe we were a PFIC for U.S. federal income tax purposes for our taxable year ending December 31, 2021, and we may be a PFIC for U.S. federal income tax purposes for our current taxable year ending December 31, 2022.

In determining whether we are a PFIC, cash and investments are considered by the U.S. Internal Revenue Service ("IRS") to be a passive asset. During our taxable year ending December 31, 2021, we believe that the amount of restricted and unrestricted cash we had on hand and investments were greater than 50% of our total assets. The composition of our assets during the current taxable year may cause us to continue to be classified as a PFIC. The determination of whether we will be a PFIC for our current taxable year or a future year may depend in part upon how quickly we spend our liquid assets, and on the value of our goodwill and other unbooked intangibles not reflected on our balance sheet, which may depend upon the market value of our Class A Ordinary Shares from time to time. Further, while we will endeavor to use a classification methodology and valuation approach that is reasonable, the IRS may challenge our classification or valuation of our goodwill and other unbooked intangibles for purposes of determining whether we are a PFIC in the current or one or more future taxable years.

If we are a PFIC for any taxable year during which a U.S. Holder owns our Class A Ordinary Shares or warrants, certain adverse U.S. federal income tax consequences could apply to such U.S. Holder. As discussed under "Taxation – Material U.S. Federal Income Tax Considerations for U.S. Holders – Passive Foreign Investment Company Rules", a U.S. Holder may be able to make certain tax elections that would lessen the adverse impact of PFIC status; however, in order to make such elections the U.S. holder will usually have to have been provided information about the company by us, and there is no assurance that the company will provide such information.

For a more detailed discussion of the application of the PFIC rules to us and the consequences to U.S. holders if we were determined to be a PFIC. (See "Item 10. Additional Information – E. Taxation – Material U.S. Federal Income Tax Considerations for U.S. Holders – Passive Foreign Investment Company Rules")

Our results of operation may be negatively affected should the 2019-nCov virus (Coronavirus) continue to spread on a wider scale.

Our business could be adversely affected by the effects of a widespread outbreak of contagious disease, including the outbreak of respiratory illness caused by a novel coronavirus. Any outbreak of contagious diseases, and other adverse public health developments, particularly in China, could have a material and adverse effect on our business operations. These could include disruptions or restrictions on our ability to travel or to distribute our products, as well as temporary closures of our facilities or the facilities of our suppliers or customers.

The COVID-19 pandemic continues to rapidly evolve. The extent to which the outbreak impacts our business, preclinical studies and clinical trials will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the ultimate geographic spread of the disease, the duration of the pandemic, travel restrictions and social distancing in various countries, business closures or business disruptions and the effectiveness of actions taken to contain and treat the disease. If we or any of the third parties with whom we engage were to experience shutdowns, undergo the compulsory universal testing by the HKSAR Government or other business disruptions, our ability to conduct our business in the manner and on the timelines presently planned could be materially and negatively impacted.

In addition, the trading prices for our Class A Ordinary Shares and other biopharmaceutical companies have been highly volatile as a result of the COVID-19 pandemic. As a result, we may face difficulties raising capital through sales of our securities or such sales may be on unfavorable terms.

The outbreak of the novel coronavirus disease, COVID-19, or other pandemic, epidemic or outbreak of an infectious disease may materially and adversely impact our preclinical studies and clinical trials.

As a result of the COVID-19 outbreak, or similar pandemics, we have and may in the future experience disruptions that could materially and adversely impact our manufacturing, preclinical development activities, preclinical studies and planned clinical trial. Potential disruptions include but are not limited to:

- delays or difficulties in enrolling patients in our clinical trials, should the relevant clinical trials be approved;
- delays or difficulties in initiating or expanding clinical trials, including delays or difficulties with clinical site initiation and recruiting clinical site investigators and clinical site staff;
- increased rates of patients withdrawing from our clinical trials following enrollment as a result of contracting COVID-19 or other health conditions or being forced to quarantine;
- diversion of healthcare resources away from the conduct of clinical trials, including the diversion of hospitals serving as our clinical trial sites and hospital staff supporting the conduct of our clinical trials;
- interruption of key clinical trial activities, such as clinical trial site data monitoring, due to limitations on travel imposed or recommended by governments, employers and others or interruption of clinical trial subject visits and study procedures, which may impact the integrity of subject data and clinical study endpoints;
- interruption or delays in the operations of the FDA or other regulatory authorities, which may impact review and approval timelines for regulatory submission and trial initiation;

- interruption or delays in our CROs and collaborators meeting expected deadlines or complying with regulatory requirements related to preclinical development activities, preclinical studies and planned clinical trials;

- delays or disruptions in preclinical experiments and investigational new drug application-enabling or clinical trial application-enabling studies due to restrictions of on-site staff and unforeseen circumstances at contract research organizations and vendors;

- interruption of, or delays in receiving, supplies of our product candidates from our contract manufacturing organizations due to staffing shortages, production slowdowns or stoppages and disruptions in delivery systems;

- limitations on our ability to recruit and hire key personnel due to our inability to meet with candidates because of travel restrictions and "shelter in place" orders;

- limitations on employee resources that would otherwise be focused on the conduct of our preclinical studies and clinical trials, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people; and

- interruption or delays to our sourced discovery and clinical activities.

Risks Related to Our Corporate Structure

Our CEO has control over key decision making as a result of his control of a majority of our voting shares.

Our Founder, CEO, and our Executive Director, Mr. Ian Huen, and his affiliates, over which he is deemed to have control and/or have substantial influence, has voting rights with respect to an aggregate of 20,464,543 ordinary shares, on an as converted basis (4,403,074 Class A Ordinary Shares and 16,061,469 Class B Ordinary Shares), representing approximately 69% of the voting power of our outstanding ordinary shares as of the date hereof. As a result, Mr. Huen has the ability to control the outcome of matters submitted to our shareholders for approval, including the election of directors and any merger, consolidation, or sale of all or substantially all of our assets. In addition, Mr. Huen has the ability to control the management and affairs of our company as a result of his position as our CEO and his ability to control the election of our directors. Additionally, in the event that Mr. Huen controls our company at the time of his death, control may be transferred to a person or entity that he designates as his successor. As a board member and officer, Mr. Huen owes a fiduciary duty to our shareholders and must act in good faith in a manner he reasonably believes to be in the best interests of our shareholders. As a shareholder, even a controlling shareholder, Mr. Huen is entitled to vote his shares, and shares over which he has voting control as a result of voting agreements, in his own interests, which may not always be in the interests of our shareholders generally.

As a "controlled company" under the rules of the NASDAQ Global Market, we may choose to exempt our company from certain corporate governance requirements that could have an adverse effect on our public shareholders.

Our directors and officers beneficially own a majority of the voting power of our outstanding Class A Ordinary Shares. Under the Rule 4350(c) of the NASDAQ Global Market, a company of which more than 50% of the voting power is held by an individual, group or another company is a "controlled company" and may elect not to comply with certain corporate governance requirements, including the requirement that a majority of our directors be independent, as defined in the NASDAQ Global Market Rules, and the requirement that our compensation and nominating and corporate governance committees consist entirely of independent directors. Although we do not intend to rely on the "controlled company" exemption under the Nasdaq listing rules, we could elect to rely on this exemption in the future. If we elect to rely on the "controlled company" exemption, a majority of the members of our board of directors might not be independent directors and our nominating and corporate governance and compensation committees might not consist entirely of independent directors. Accordingly, during any time while we remain a controlled company relying on the exemption and during any transition period following a time when we are no longer a controlled company, you would not have the same protections afforded to shareholders of companies that are subject to all of the NASDAQ Global Market corporate governance requirements. Our status as a controlled company could cause our Class A Ordinary Share to look less attractive to certain investors or otherwise harm our trading price.

Risks Related to our Securities

Class A Ordinary Shares eligible for future sale may adversely affect the market price of our Class A Ordinary Shares if the shares are successfully listed on NASDAQ or other stock markets, as the future sale of a substantial amount of outstanding Class A Ordinary Shares in the public marketplace could reduce the price of our Class A Ordinary Shares.

The market price of our Class A Ordinary Shares could decline as a result of sales of substantial amounts of our Class A Ordinary Shares in the public market, or the perception that these sales could occur. In addition, these factors could make it more difficult for us to raise funds through future offerings of our Class A Ordinary Shares. An aggregate of 13,260,446 Class A Ordinary Shares are outstanding as of the date of this annual report. 8,657,445 of the Class A Ordinary Shares are freely transferable without restriction or further registration under the Securities Act. The remaining Class A Ordinary Shares will be "restricted securities" as defined in Rule 144. These Class A Ordinary Shares may be sold without registration under the Securities Act to the extent permitted by Rule 144 or other exemptions under the Securities Act.

A sale or perceived sale of a substantial number of our Ordinary Shares may cause the price of our Class A Ordinary Shares to decline.

If our shareholders sell substantial amounts of our Class A Ordinary Shares in the public market, the market price of our Class A Ordinary Shares could fall. Moreover, the perceived risk of this potential dilution could cause shareholders to attempt to sell their shares and investors to short our Class A Ordinary Shares. These sales also may make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem reasonable or appropriate.

Issuances by us of additional securities, could affect ownership and voting rights over us. In addition, the issuance of preferred shares, or options or warrants to purchase those preferred shares, could negatively impact the value of the Ordinary Shares as the result of preferential dividend rights, conversion rights, redemption rights and liquidation provisions granted to the stockholders of such preferred shares.

From time to time, we may issue in public or private sales additional securities to third party investors. Such securities may provide holders with ownership and voting rights that could provide the holders thereof with substantial influence over our business. Any preferred shares that may be issued shall have such rights, preferences, privileges and restrictions as may be designated from time-to-time by our board, including preferential dividend rights, voting rights, conversion rights, redemption rights and liquidation provisions. There cannot be any assurance that we will not issue preferred securities with rights and preferences that are more beneficial than those provided to our Ordinary Shares.

We have not paid dividends in the past and do not expect to pay dividends in the future, and any return on investment may be limited to the value of our shares.

We have never paid any cash dividends on our Class A Ordinary Shares and do not anticipate paying any cash dividends on our Class A Ordinary Shares in the foreseeable future, and any return on investment may be limited to the value of our Class A Ordinary Shares. We plan to retain any future earnings to finance growth.

Our dividend policy is subject to the discretion of our Board of Directors and will depend on, among other things, our earnings, financial condition, capital requirements and other factors. There is no assurance that our Board of Directors will declare dividends even if we are profitable. Under Cayman Islands law, dividends may be declared and paid only out of funds legally available therefor, namely out of either profit or our share premium account, and provided further that a dividend may not be paid if this would result in our Company being unable to pay its debts as they fall due in the ordinary course of business and the realizable value of assets of our Company will not be less than the sum of our total liabilities, other than deferred taxes as shown on our books of account, and our capital.

Our Class B Ordinary Shares have greater voting power than our Class A Ordinary Shares and certain existing shareholders have substantial influence over our Company and their interests may not be aligned with the interests of our other shareholders.

We have a dual-class voting structure consisting of Class A Ordinary Shares and Class B Ordinary Shares. Under this structure, holders of Class A Ordinary Shares are entitled to one vote per share, and holders of Class B Ordinary Shares are entitled to ten votes per share, which can cause the holders of Class B Ordinary Shares to have an unbalanced, higher concentration of voting power. Our management team as a group beneficially owns over 18 million Class B Ordinary Shares representing approximately 77% voting power. As a result, until such time as their collective voting power is below 50%, our management team as a group of controlling shareholders have substantial influence over our business, including decisions regarding mergers, consolidations and the sale of all or substantially all of our assets, election of directors and other significant corporate actions. They may take actions that are not in the best interests of us or our other shareholders. These corporate actions may be taken even if they are opposed by our other shareholders. Further, concentration of ownership of our Class B Ordinary Shares may discourage, prevent or delay the consummation of change of control transactions that shareholders may consider favorable, including transactions in which shareholders might otherwise receive a premium for their shares. Future issuances of Class B Ordinary Shares may also be dilutive to the holders of Class A Ordinary Shares. As a result, the market price of our Class A Ordinary Shares could be adversely affected.

Shareholders who hold shares of Class B Ordinary Shares, including our executive officers and their affiliates, hold approximately 94% of the voting power of our outstanding ordinary shares. Because of the ten-to-one voting ratio between our Class B and Class A Ordinary Shares, the holders of our Class B Ordinary Shares will collectively continue to control a majority of the combined voting power of our Ordinary Shares and therefore be able to control all matters submitted to our shareholders for approval, so long as the Class B Ordinary Shares represent at least 9.1% of all outstanding shares of our Ordinary Shares.

Raising additional capital may cause dilution to our shareholders, restrict our operations or require us to relinquish rights to our technology or drug and diagnostics technology candidates.

We may seek additional funding through a combination of equity offerings, debt financings, collaborations, licensing arrangements, strategic alliances and marketing or distribution arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms may include liquidation or other preferences that adversely affect your rights as a holder of our Class A Ordinary Shares. The incurrence of additional indebtedness or the issuance of certain equity securities could result in increased fixed payment obligations, and could also result in certain additional restrictive covenants, such as limitations on our ability to incur additional debt or issue additional equity, limitations on our ability to acquire or license IP rights and other operating restrictions that could adversely impact our ability to conduct our business. In addition, issuance of additional equity securities, or the possibility of such issuance, may cause the market price of our Class A Ordinary Shares to decline. In the event that we enter into collaborations or licensing arrangements to raise capital, we may be required to accept unfavorable terms, including relinquishing or licensing to another party on unfavorable terms our rights to technology or drug and diagnostics technology candidates that we otherwise would seek to develop or commercialize ourselves or potentially reserve for future potential arrangements when we might be able to achieve more favorable terms.

Since we are a Cayman Islands exempted company, the rights of our shareholders may be more limited than those of shareholders of a company organized in the United States.

Our corporate affairs are governed by our Second Amended and Restated Memorandum and Articles of Association (as may be amended from time to time) ("Memorandum and Articles"), the Companies Law (2018 Revision) of the Cayman Islands (the "Companies Law") and the common law of the Cayman Islands. The rights of shareholders to take action against the directors, actions by minority shareholders and the fiduciary responsibilities of our directors are to a large extent governed by the common law of the Cayman Islands. This common law is derived in part from comparatively limited judicial precedent in the Cayman Islands as well as from English common law, which has persuasive, but not binding, authority on a court in the Cayman Islands. Under the laws of some jurisdictions in the United States, majority and controlling shareholders generally have certain fiduciary responsibilities to the minority shareholders. Shareholder action must be taken in good faith, and actions by controlling shareholders which are obviously unreasonable may be declared null and void. Cayman Islands law protecting the interests of minority shareholders may not be as protective in all circumstances as the law protecting minority shareholders in some U.S. jurisdictions. In addition, the circumstances in which a shareholder of a Cayman Islands company may sue the company derivatively, and the procedures and defenses that may be available to the company, may result in the rights of shareholders of a Cayman Islands company being more limited than those of shareholders of a company organized in the United States. Accordingly, shareholders may have fewer alternatives available to them if they believe that corporate wrongdoing has occurred. The Cayman Islands courts are also unlikely to recognize or enforce judgments from U.S. courts based on certain liability provisions of U.S. securities laws that are penal in nature. There is no statutory recognition in the Cayman Islands of judgments obtained in the United States, although the courts of the Cayman Islands will generally recognize and enforce non-penal judgment of a foreign court of competent jurisdiction for a liquidated sum without retrial on its merits which is not obtained in a manner contrary to public policy in the Cayman Islands and in respect of which there are no concurrent proceedings in the Cayman Islands. This means, even if shareholders were to sue us successfully, they may not be able to recover anything to make up for the losses suffered.

Furthermore, our directors have the power to take certain actions without shareholder approval which would require shareholder approval under the laws of most U.S. jurisdictions. For example, the directors of a Cayman Islands company, without shareholder approval, may implement a sale of any assets, property, part of the business, or securities of the Company.

While Cayman Islands law allows a dissenting shareholder to express the shareholder's view that a court sanctioned reorganization of a Cayman Islands company would not provide fair value for the shareholder's shares, Cayman Islands statutory law does not specifically provide for shareholder appraisal rights on a merger or consolidation of a company. This may make it more difficult for you to assess the value of any consideration you may receive in a merger or consolidation or to require that the acquirer gives you additional consideration if you believe the consideration offered is insufficient. However, Cayman Islands' statutory law does provide a mechanism for a dissenting shareholder in a merger or consolidation to apply to the Grand Court for a determination of the fair value of the dissenter's shares, if it is not possible for the Company and the dissenter to agree a fair price within the time limits prescribed.

Shareholders of Cayman Islands exempted companies, such as our Company, have no general rights under Cayman Islands' law to inspect corporate records and accounts or to obtain copies of lists of shareholders. Our directors have discretion under our Memorandum and Articles to determine whether or not, and under what conditions, our corporate records may be inspected by our shareholders, but are not obliged to make them available to our shareholders. This may make it more difficult for you to obtain the information needed to establish any facts necessary for a shareholder motion or to solicit proxies from other shareholders in connection with a proxy contest.

Lastly, under the law of the Cayman Islands, there is little statutory law for the protection of minority shareholders. The principal protection under statutory law is that shareholders may bring an action to enforce the constituent documents of the corporation, our Memorandum and Articles. Shareholders are entitled to have the affairs of the company conducted in accordance with the general law and the memorandum and articles of association.

There are common law rights for the protection of shareholders that may be invoked, largely dependent on English company law, since the common law of the Cayman Islands for business companies is limited. Under the general rule pursuant to English company law known as the rule in Foss v. Harbottle, a court will generally refuse to interfere with the management of a company at the insistence of a minority of its shareholders who express dissatisfaction with the conduct of the company's affairs by the majority or the board of directors. However, every shareholder is entitled to have the affairs of the company conducted properly according to law and the constituent documents of the company. As such, if those who control the company have persistently disregarded the requirements of company law or the provisions of the company's memorandum and articles of association, then the courts will grant relief. Generally, the areas in which the courts will intervene are the following: (1) an act complained of which is outside the scope of the authorized business or is illegal or not capable of ratification by the majority; (2) acts that constitute fraud on the minority where the wrongdoers control the company; (3) acts that infringe on the personal rights of the shareholders, such as the right to vote; and (4) where the company has not complied with provisions requiring approval of a special or extraordinary majority of shareholders, which are more limited than the rights afforded minority shareholders under the laws of many states in the United States subject to limited exceptions, under Cayman Islands Law a minority shareholder may not bring a derivative action against directors. Our Cayman Islands' counsel has advised us that they are aware of one recent as yet unreported derivative action having been brought in a Cayman Islands' court. Class actions are not recognized in the Cayman Islands, but groups of shareholders with identical interests may bring representative proceedings, which are similar.

As a result, you may be limited in your ability to protect your interests if you are harmed in a manner that would otherwise enable you to sue in a United States federal court. In addition, shareholders of Cayman Islands companies may not have standing to initiate a shareholder derivative action in U.S. federal courts.

As a result of all of the above, shareholders of our Company may have more difficulty in protecting their interests in the face of actions taken by management, members of the board of directors or controlling shareholders than they would have as shareholders of a public U.S. company.

You may face difficulties in protecting your interests, and your ability to protect your rights through the U.S. federal courts may be limited because we are incorporated under Cayman Islands law, we currently conduct substantially all of our operations outside the United States and some of our directors and executive officers reside outside the United States.

We are incorporated in the Cayman Islands and currently conduct substantially all of our operations outside the United States through our subsidiaries. Some of our directors and executive officers reside outside the United States and a substantial portion of their assets are located outside of the United States. As a result, it may be difficult or impossible for you to bring an action against us or against these individuals in the Cayman Islands, the United Kingdom or in Hong Kong, in the event that you believe that your rights have been infringed under the securities laws of the United States or otherwise. Even if you are successful in bringing an action of this kind, the laws of the Cayman Islands, the United Kingdom and Hong Kong may render you unable to enforce a judgment against our assets or the assets of our directors and officers. There is no statutory recognition in the Cayman Islands of judgments obtained in the United States, the United Kingdom or Hong Kong, although the courts of the Cayman Islands will generally recognize and enforce a non-penal judgment of a foreign court of competent jurisdiction without retrial on the merits if such judgment is final, for a liquidated sum, not in the nature of taxes, a fine or penalty, is not inconsistent with a Cayman Islands' judgment in respect of the same matters, and was not obtained in a manner which is contrary to public policy. In addition, a Cayman Islands court may stay proceedings if concurrent proceedings are being brought elsewhere.

As a foreign private issuer, we are permitted to adopt certain home country practices in relation to corporate governance matters that differ significantly from the NASDAQ Global Market corporate governance listing standards. These practices may afford less protection to shareholders than they would enjoy if we complied fully with corporate governance listing standards.

As a foreign private issuer, we are permitted to take advantage of certain provisions in the NASDAQ Global Market listing rules that allow us to follow Cayman Islands law for certain governance matters. Certain corporate governance practices in the Cayman Islands may differ significantly from corporate governance listing standards as, except for general fiduciary duties and duties of care, Cayman Islands law has no corporate governance regime which prescribes specific corporate governance standards. We may follow Cayman Islands corporate governance practices in lieu of the corporate governance requirements of the Nasdaq Global Market in respect of the following. For instance, Cayman law does not require that we obtain shareholder approval to issue 20% or more of our outstanding Ordinary Shares in a private offering nor we make our interim results available to shareholders, although as a NASDAQ listed company we are required to publicly file interim results for the first six months of our fiscal year. Therefore, our shareholders may be afforded less protection than they otherwise would have under corporate governance listing standards applicable to U.S. domestic issuers.

We are an emerging growth company within the meaning of the Securities Act and will take advantage of certain reduced reporting requirements.

We are an "emerging growth company," as defined in the JOBS Act and take advantage of certain exemptions from various requirements applicable to other public companies that are not emerging growth companies including, most significantly, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act for so long as we are an emerging growth company. As a result, if we elect not to comply with such auditor attestation requirements, our investors may not have access to certain information they may deem important.

The JOBS Act also provides that an emerging growth company does not need to comply with any new or revised financial accounting standards until such date that a private company is otherwise required to comply with such new or revised accounting standards. The Company has elected to use the extended transition period for complying with new or revised accounting standard under Section 102(b)(2) of the Jobs Act, that allows the Company to delay the adoption of new or revised accounting standards that have different effective dates for public and private companies until those standards apply to private companies.

Item 4. INFORMATION ON THE COMPANY

A. History and Development of the Company

Aptorum was incorporated under the laws of the Cayman Islands on September 13, 2010. Our share capital is $100,000,000.00 divided into 60,000,000 Class A Ordinary Shares with a nominal or par value of $1.00 each and 40,000,000 Class B Ordinary Shares with a nominal or par value of $1.00 each.

APTUS CAPITAL LIMITED, which has since been renamed to AENEAS CAPITAL LIMITED, was always under the direct ownership of Jurchen and not under the ownership chain of Aptorum Group. However, Aptus Asia Financial Holdings Limited ("AAFH"), which has since been renamed to Aeneas Group Limited, was transferred out of the Aptorum Group on November 10, 2017 to be held directly by Jurchen Investment Corporation and that subsequently, APTUS CAPITAL LIMITED was then transferred to be under AAFH.

On May 4, 2017, Mr. Huen transferred all of the ordinary shares in the Company he owned (in the amount of 22,307,596) to Jurchen, a company incorporated in the British Virgin Islands and wholly-owned by Mr. Huen. On October 13, 2017, as part of the Conversions (as defined below) the ordinary shares held by Jurchen were redesignated as 2,230,760 Class A Ordinary Shares and 20,076,836 Class B Ordinary Shares.

On February 21 and March 1, 2017, the Company's board of directors and shareholders resolved to restructure the Company from an investment fund with management shares and non-voting participating redeemable preference shares to a holding company with operating subsidiaries, respectively (the "Restructuring Plan").

According to the Restructuring Plan, the 256,571.12 issued participating shares with par value of $0.01 ("Participating Shares") were redeemed and 4,743,418.88 unissued Participating Shares were cancelled; following such redemption and cancellation, we no longer have any Participating Shares authorized or issued. Additionally, the Company authorized a class of securities consisting of 100,000,000 ordinary shares, par value $1.00 per share and issued 25,657,110 ordinary shares to our original investors.

During the period March 1, 2017 through October 13, 2017, an aggregate of 2,207,025 ordinary shares were issued at a price of approximately $3.90 per share in a private placement we described as a "Series A" offering. Each investor of the Series A offering, in addition to a subscription agreement, signed a shareholder agreement, which set forth the basic governance terms of the Company, as well as our capital structure. The shareholders agreement was terminated in October 2017.

On October 13, 2017, ordinary resolutions were passed at an extraordinary general meeting of the Company approving (the "Conversions"): (i) converting 72,135,865 of authorized but unissued ordinary shares into 54,573,620 authorized but unissued Class A Ordinary Shares, par value of $1.00 per share and 17,562,245 authorized but unissued Class B Ordinary Shares, par value of $1.00 per share, respectively; (ii) converting 24,930,839 ordinary shares held by three shareholders into an aggregate of 2,493,085 Class A Ordinary Shares and 22,437,754 Class B Ordinary Shares; and (iii) converting 2,933,296 ordinary shares held by 24 shareholders into an aggregate 2,933,296 Class A Ordinary Shares. Following these issuances, we had 27 shareholders of record.

On October 19, 2017, we changed our name from APTUS Holdings Limited to our current name, Aptorum Group Limited.

On March 23, 2018, Jurchen transferred 446,152 Class A Ordinary Shares and 4,015,367 Class B Ordinary Shares to CGY Investments Limited, a company incorporated in Hong Kong and which we deem Mr. Darren Lui jointly controls and/or of which he has substantial influence on the disposition rights and voting rights of such shares. Following this transfer, Jurchen owns approximately 33% and 72% of our Class A Ordinary Shares and Class B Ordinary Shares, respectively.

On December 17, 2018, the Company consummated its IPO of 761,419 Class A Ordinary Shares. The Registration Statement was declared effective by the U.S. Securities and Exchange Commission on December 3, 2018 (the "Effective Date"). The shares were sold at a price of $15.80 per share, generating gross proceeds to the Company of approximately $12,030,420.

On February 28, 2020, the Company consummated a Registered Direct Offering of 1,351,350 Class A Ordinary Shares and warrants to purchase up to 1,351,350 Class A Ordinary Shares. The shares were sold at a price of $7.40 per share, generating gross proceeds to the Company of approximately $10 million. The warrants will be exercisable immediately following the date of issuance for a period of seven years at an initial exercise price of $7.40.

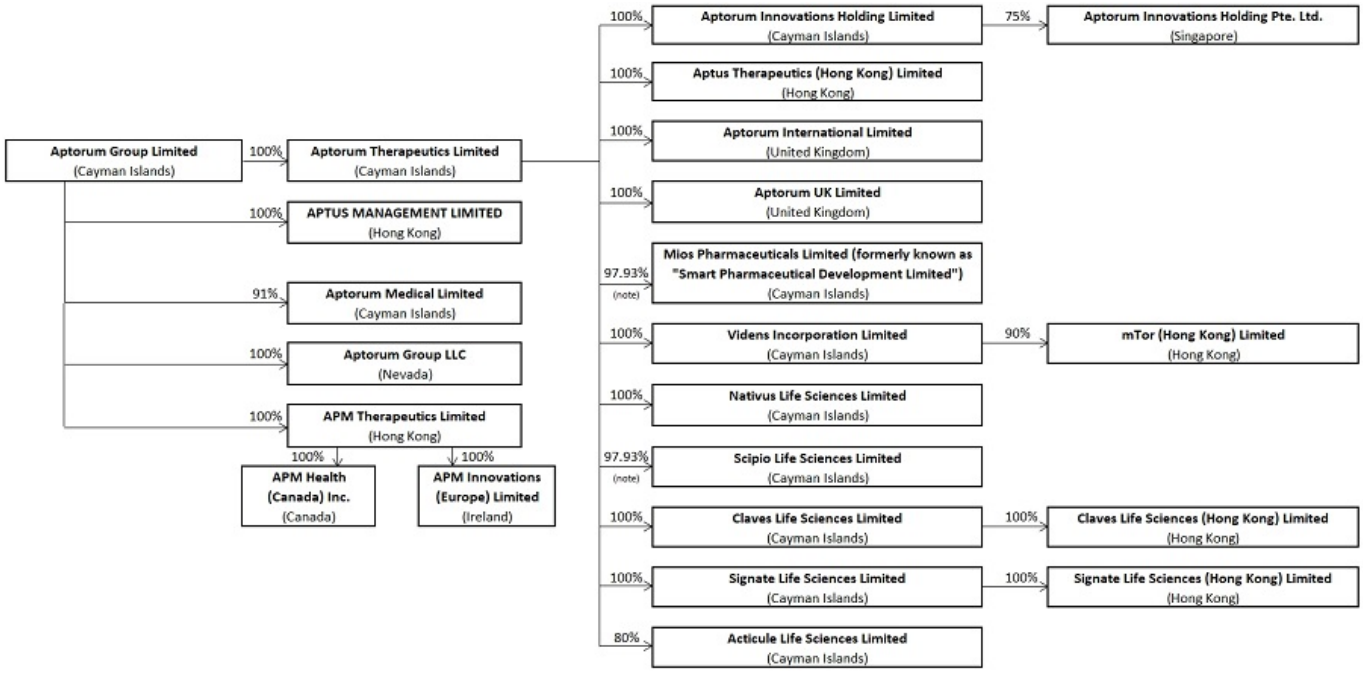
On October 2, 2020, the Group completed a public offering, issuing 2,769,231 Class A Ordinary Shares and warrants to purchase an aggregate of 2,769,231 Class A Ordinary Shares, for gross proceeds of approximately $9 million. The warrants have an exercise price of $3.25 per Class A Ordinary Share, are exercisable upon issuance and will expire five years from the date of issuance.

On March 26, 2021, the Company entered into an at the market offering agreement (the "Sales Agreement"), with H.C. Wainwright & Co., LLC, acting as our sales agent (the "Sales Agent"), relating to the sale of our Class A Ordinary Shares, offered pursuant to the prospectus supplement and the accompanying prospectus to the registration statement on Form F-3 (File No. 333-235819) (such offering, the "ATM Offering", or "At The Market Offering"). In accordance with the terms of the Sales Agreement, we may offer and sell shares of our Class A Ordinary Shares having an aggregate offering price of up to $15,000,000 from time to time through the Sales Agent under such prospectus supplement and the accompanying prospectus. As of the date of this annual report, we have not yet issued any Class A Ordinary Shares pursuant to the ATM Offering.

On May 26, 2021, the Company entered into a private placement shares purchase agreement with Jurchen, issuing 1,387,925 Class A Ordinary Shares at $2.882 per share, representing a 10% premium to the last closing price of the Company's Class A Ordinary Shares on the NASDAQ stock exchange on that date. The Company received aggregate gross proceeds of $4,000,000 from the purchase of these shares. Following the purchase, Mr. Huen's total shareholding represented 55.52% of the total issued share capital of the Company.

Over the past three years, we have invested approximately $1.2 million towards our principal capital expenditures, which include laboratory equipment, premises, leasehold improvements, and medical and other equipment.

The following diagram illustrates our corporate structure as of the date of this annual report:



Note: Both Mios Pharmaceuticals Limited ("Mios") and Scipio Life Sciences Limited ("Scipio") issued Class A and Class B ordinary shares to various parties; for each such entity, each Class A ordinary share is entitled to 1 vote and 1 share of economic interest of the respective company, while each Class B ordinary share is entitled to 10 votes and 0.001 share of economic interest of the respective company. As of the date of this annual report, we hold 97.93% economic interest and 36.17% voting power in Mios, and 97.93% economic interest and 35.06% voting power in Scipio.

Emerging Growth Company Status

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act (the "JOBS Act"), and we are eligible to take advantage of certain exemptions from various reporting and financial disclosure requirements that are applicable to other public companies, that are not emerging growth companies, including, but not limited to, (1) not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, (2) reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and (3) exemptions from the requirements of holding a non-binding advisory vote on executive compensation and shareholder approval of any golden parachute payments not previously approved. We intend to take advantage of these exemptions.

In addition, Section 107 of the JOBS Act also provides that an emerging growth company can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act, for complying with new or revised accounting standards. As a result, an emerging growth company can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies.

We could remain an emerging growth company for up to five years, or until the earliest of (1) the last day of the first fiscal year in which our annual gross revenues exceed $1.07 billion, (2) the date that we become a "large accelerated filer" as defined in Rule 12b-2 under the Exchange Act, which would occur if the market value of our Ordinary Shares that is held by non-affiliates exceeds $700 million as of the last business day of our most recently completed second fiscal quarter and we have been publicly reporting for at least 12 months, or (3) the date on which we have issued more than $1 billion in non-convertible debt during the preceding three-year period.

Foreign Private Issuer Status

We are a foreign private issuer within the meaning of the rules under the Exchange. As such, we are exempt from certain provisions applicable to United States domestic public companies. For example:

- we are not required to provide as many Exchange Act reports, or as frequently, as a domestic public company;
- for interim reporting, we are permitted to comply solely with our home country requirements, which are less rigorous than the rules that apply to domestic public companies;

- we are not required to provide the same level of disclosure on certain issues, such as executive compensation;
- we are exempt from provisions of Regulation FD aimed at preventing issuers from making selective disclosures of material information;
- we are not required to comply with the sections of the Exchange Act regulating the solicitation of proxies, consents or authorizations in respect of a security registered under the Exchange Act; and
- we are not required to comply with Section 16 of the Exchange Act requiring insiders to file public reports of their share ownership and trading activities and establishing insider liability for profits realized from any "short-swing" trading transaction.

B. Business Overview

Overview

We are a clinical stage biopharmaceutical company dedicated to the discovery, development and commercialization of therapeutic assets to treat diseases with unmet medical needs, particularly in oncology (including orphan oncology indications) and infectious diseases. The pipeline of Aptorum is also enriched through (i) the establishment of drug discovery platforms that enable the discovery of new therapeutics assets through, e.g. systematic screening of existing approved drug molecules, and microbiome-based research platform for treatments of metabolic diseases; and (ii) the co-development of a novel molecular-based rapid pathogen identification and detection diagnostics technology with Accelerate Technologies Pte Ltd, commercialization arm of the Singapore's Agency for Science, Technology and Research.

In addition to the above main focus, we are also pursuing therapeutic projects in neurology, gastroenterology, metabolic disorders, women's health and other disease areas. We also have projects focused on natural supplements for women undergoing menopause and experiencing related symptoms. We also opened a medical clinic, AML Clinic, in June 2018.

Our goal is to develop a broad range of novel and repurposed therapeutics and diagnostics technology across a wide range of disease/therapeutic areas. Key components of our strategy for achieving this goal include: (for details of our strategy, See "Business Overview – Our Strategy")

- Developing therapeutic and diagnostic innovations across a wide range of disease/therapeutic areas;
- Selectively expanding our portfolio with potential products that may be able to attain orphan drug designation and/or satisfy current unmet medical needs;
- Collaborating with leading academic institutions and CROs;
- Expanding our in-house pharmaceutical development center;
- Leveraging our management's expertise, experience and commercial networks;
- Obtaining and leveraging government grants to fund project development.

We have devoted a substantial portion of the proceeds from our offerings, to our Lead Projects. Our Lead Projects are ALS-4, SACT-1 and RPIDD. In January 2022, we announced that we completed Phase 1 clinical trial for ALS-4 and Phase 1 clinical trial for assessing relative bioavailability and food effect of SACT-1. No serious adverse events were observed and there were no relevant clinical changes in respect of vital signs. We expect to be able to submit IND application to the US FDA in 2022 seeking to (i) initiate a Phase 2 clinical study to assess the efficacy of ALS-4 in patients and (ii) initiate our planned Phase 1b/2a trial for SACT-1, subject to regulatory review. We also commenced clinical validation of our molecular based RPIDD and will continue to undergo validations during 2022, in parallel with its pre-commercialization process in 2022.

Our current business consists of "therapeutics" and "non-therapeutics" segments. However, our focus is on the therapeutics segments. Because of the risks, costs and extended development time required for successful drug development, we have determined to pursue projects within our non-therapeutics segments, such as AML Clinic, to provide some interim revenue, as well as diagnostics technology and natural supplements that may be brought to market and generate revenue more quickly.

Therapeutics Segment. In our therapeutics segment ("Aptorum Therapeutics Group"), we are currently seeking to develop various drug molecules (including projects seeking to use extracts or derivatives from natural substances to treat diseases) and certain technologies for the treatment of human disease conditions to tackle unmet needs, in particular, two of our Lead Projects targeting infectious disease and cancer (including orphan oncology indications). In addition to our main areas of focus above, we are also pursuing therapeutic projects in neurology, gastroenterology, metabolic disorders, women's health and other disease areas. Aptorum Therapeutics Group is operated through Aptorum's wholly-owned subsidiary, Aptorum Therapeutics Limited, a Cayman Islands exempted company with limited liability, whose principal place of business is in Hong Kong and whose subsidiaries (who we sometimes refer to herein as project companies) are based in the United Kingdom, Singapore and Hong Kong.

Non-Therapeutics Segment. The non-therapeutics segment ("Aptorum Non-Therapeutics Group") encompasses three businesses: (i) diagnostics projects including a novel molecular-based rapid pathogen identification and detection diagnostics ("RPIDD") technology, (ii) natural supplements including NativusWell®, and (iii) AML Clinic. RPIDD technology is currently under co-development with A*STAR. The core objectives of RPIDD are to rapidly and accurately identify and detect existing or emerging unknown pathogens (including DNA/RNA-based viruses such as coronavirus, antibiotic-resistant bacteria, fungi, etc.), in a cost-effective, unbiased and broad-spectrum manner, through liquid biopsy (patients' blood samples and is potentially adaptable for other sample types), genome sequencing and artificial intelligence driven software analytics. A key objective is also to develop RPIDD to leverage existing and emerging Next-Generation Sequencing platforms for pathogenic genome sequencing analysis. The sale of natural supplements is operated through Nativus Life Sciences Limited ("Nativus"), a subsidiary of Aptorum Therapeutics Limited. The production of Aptorum Group's dioscorea opposita bioactive nutraceutical tablets has commenced production in Canada and will be marketed under the brand name NativusWell®; once ready for sale, we plan to sell NativusWell® online and in physical healthcare stores. The outpatient clinic is operated through our subsidiary, Aptorum Medical Limited. Effective as of March 2018, we leased office space in Central, Hong Kong as the home to AML Clinic. AML Clinic commenced operations under the name of Talem Medical in June 2018.

Prior to March 2017, the Company had pursued passive healthcare related investments in early stage companies primarily in the United States. However, we have since ceased pursuing further passive investment operations and intend to exit all such portfolio investments over an appropriate timeframe to focus resources on our current business.

On September 25, 2020, Aptorum, via its subsidiaries, enters into a series of transactions with Accelerate Technologies Pte. Ltd.'s ("Accelerate Technologies"), the commercialization arm of the Singapore Agency for Science, Technology and Research ("A*STAR"), in relation to the research and development of novel molecular-based rapid pathogen identification and detection diagnostics ("RPIDD") technology through its subsidiaries. Specifically, Aptorum Innovations Holding Pte. Limited, one of the Company's subsidiaries, entered into an Exclusive Licence Agreement with Accelerate Technologies to co-develop the RPIDD technology. The term of the Exclusive Licence Agreement is described in Exhibit 4.62 on Form 20-F filed with the SEC on April 19, 2021. Furthermore, Accelerate Technologies, the inventors of the RPIDD technologies in A*STAR ("Founding Scientists"), Aptorum Innovations Holding Pte. Limited, and Aptorum Innovations Holding Limited ("AIHL"), a wholly owned subsidiary of the Company, entered into a Share Subscription & Shareholders Agreement on the same day to subscribe ordinary shares of Aptorum Innovations Holding Pte. Limited. The shares are subscribed and issued in two tranches, the first tranche has taken place at closing of the Share Subscription & Shareholders Agreement, while the second tranche will take place after the certain first milestone is met. The total number of shares subscribed by the shareholders under the Share Subscription & Shareholders Agreement is around 2.7 million. After the two tranches of subscription, Aptorum, Accelerate Technologies and the Founding Scientists are expected to control 71.23%, 14.25% and 9.53% of the share of Aptorum Innovations Holding Pte. Limited respectively, with 4.99% of the shares reserved for its employee share plan.

On December 30, 2020, Aptorum Innovations Holding Limited, or AIHL, one of the Company's wholly-owned subsidiaries, entered into an Evaluation Agreement with Illumina Inc ("Illumina"). Pursuant to the agreement, AIHL will evaluate the data and performance of Illumina's sequencing technology based on the workflow of AIHL's molecular rapid pathogen identification and detection diagnostics technology ("RPIDD"), at AIHL's Singapore based evaluation site.

Our Strategy

Although we plan to continue the development and improvement of a broad range of novel therapeutics and diagnostics across a wide range of disease/therapeutic areas, over the next 24-36 months we plan to concentrate on development of our Lead Projects, maintaining our AML Clinic and sale of natural supplements.

We believe that execution of this strategy will position the Company to catalyze the development and improvement of a broad range of novel and repurposed therapeutics and diagnostics across a wide range of disease/therapeutic areas. Failure to achieve positive results in at least one of the programs for a Lead Project could have a material adverse effect on the Company's prospects and business.

To achieve this goal, we are implementing the following strategies:

- **Developing therapeutic and diagnostic innovations across a wide range of disease/therapeutic areas.** We are currently developing drug candidates in several disease/therapeutic areas. We believe that by diversifying our research efforts, it would increase the likelihood that at least one of our projects will achieve clinical success and therefore add value to the Company. As of date of this annual report, the Company is developing 12 projects covering therapeutic assets, diagnostic assets, and natural supplements, in broad range of areas across infectious diseases, cancers (including rare oncology indications), neurology, gastroenterology, metabolic disorders and women's health. The 12 projects are comprised of 8 exclusively licensed projects (including Lead Project ALS-4 being exclusively licensed from the University of Hong Kong and RPIDD being exclusively licensed from A*STAR) and 7 proprietary projects developed by our scientists (including Lead Project SACT-1). Our initial focus will be on developing our Lead Projects, but intend to continue developing our other current projects and may seek new licensing opportunities where we determine that the market potential justifies the additional commitment of our limited resources.

- **Selectively expanding our portfolio with potential products that may be able to attain orphan drug designation and/or satisfy current unmet medical needs.** We have selected innovations for development which we believe are of superior scientific quality, whilst taking into account the potential market size and demand for same, for example, taking into consideration whether the relevant product can satisfy significant unmet medical needs. In particular, Aptorum Group Limited has established a Scientific Advisory Board, which helped us to select our current projects and which we expect will provide input from a scientific perspective towards any future opportunities for acquiring or licensing life science innovations. We intend to continue expanding our line of projects under development, and subject to our financial and other resource limitations, exploring acquisitions or licenses of additional products which may be able to attain orphan drug designations (e.g., rare types of cancer) or satisfy significant unmet medical needs and that show strong preclinical and/or early clinical data to provide promising opportunities for clinical and commercial success.

- **Collaborating with leading academic institutions and CROs.** In building and developing our product portfolio, we believe that accessing external innovation, expertise and technology through collaboration with leading academic institutions and CROs is a vital and cost-efficient strategy. We have established strong relationships with leading academic institutions around the world and expect to continue to strengthen our collaborations by, for example, seeking to provide their affiliated Principal Investigators resources through sponsorship to conduct further research in specialty fields of interest and association with personnel connected to our current project companies, in exchange for obtaining for the Company the first right to negotiate for an exclusive license to any resulting innovations. In addition, we have entered and will continue to actively source arrangements with pharmaceutical companies, in most cases in roles as contract research organizations, to streamline the development of our projects. This may include outsourcing part of the preclinical, clinical studies and clinical supplies manufacturing to externally accredited cGLP, cGMP and cGCP standard contract research organizations or laboratories in order to attain the required studies for submission to the regulatory authorities as part of the clinical development plan. (See "Item 4. Information on the Company – B. Business Overview – Arrangements with Other Parties")

- **Expanding our in-house pharmaceutical development center.** We believe collaborations between the R&D Center and the scientists engaged in work for our project companies will enhance clinical and commercial potential of the projects. In addition, we will assist the project companies by engaging external pharmaceutical companies and/or contract research organizations to outsource any part of the preclinical or clinical development work that cannot be performed by the R&D Center in order to obtain the resources necessary for our development process.

- **Leveraging our management's expertise, experience and commercial networks.** We believe the combination of our management's expertise and experience, with their academic and commercial networks make us an effective platform for advancing healthcare innovations towards clinical studies and commercialization in key global markets. We have assembled a management team with global experience and an extensive record of accomplishments in medical research, consulting and financing, and identification and acquisition of pharmaceutical and biopharmaceutical drug candidates. Our Head of Research and Development also has extensive experiences in drug development. We also employ key management personnel with banking and financial experience, which enhances our capability to establish the most efficient financial structure for the development of our programs.

- **Obtaining and leveraging government grants to fund project development.** Governments across the world pays close attention to the development of the biotechnology sector and provides support and funding. We intend to aggressively seek government support from the governments in the United States, the United Kingdom, Hong Kong, Singapore and elsewhere for our product development and to facilitate the development of some of our projects.

Arrangements with Other Parties

As mentioned above, part of our business model includes collaborating with research entities such as academic institutions and CROs, as well as highly regarded experts in their respective fields. We engage these entities and researchers either for purposes of exploring new innovations or advancing preclinical studies of our existing licensed drug candidates. Although the financial cost of these arrangements does not represent a material expense to the Company, the relationships we can access through, specifically, sponsored research arrangements ("SRAs") with academic institutions and organizations can provide significant value for our business; for example, we may decide whether to continue development of certain early-staged projects and/or out-license a project based on the data and results from research governed by SRAs. However, as of the date of this annual report, we do not consider the particulars of any of our SRAs to be material to the success of our current business plans.

Our drug discovery programs are based upon licenses from universities and are mainly conducted in universities via SRAs. As for the development of our drug candidates, our R&D Center conducts part of the CMC work. However, since our current facilities are not cGMP, cGLP or cGCP qualified, we will have to rely on CROs to conduct that type of work, if and when our drug candidates reach the level of development that requires such qualification.

Lead Projects, Natural Supplements and Other Projects under Development

We are actively operating and managing the development of our drug candidates through various subsidiaries. Each candidate is being researched in a subsidiary with a medical/scientific area of focus related to the drug candidate in development. We refer to these as our "Project Companies" and their products or areas of focus as our Lead Projects (i.e., ALS-4, SACT-1 and RPIDD), our natural supplements (i.e., NativusWell®) or Other Projects under Development (as defined below). The selection of a drug candidate is based on our estimate of the market potential for that candidate, the scientific expertise required to develop it, and our overall corporate strategy, including our ability to commit personnel and future investment to that candidate.

To pursue a number of our current projects, our Project Companies have entered into standard license agreements with various universities and licensing entities customized to the nature of each project. These license agreements largely contain the same terms, as is typically seen in license agreements for an early-stage life science invention; such terms include a worldwide license with licensed field comprising indications in the intended treatment areas, having upfront payments, certain royalty rates, sublicensing royalties, as well as provisions for payments upon occurrence of development and/or regulatory milestones. Under the license agreements, the Project Company must also adhere to certain diligence obligations (which may include specific diligence) and the types of activities or achievements that will satisfy those diligence obligations. Additionally, our Project Company may or may not be required to obtain prior consent from the licensor to sublicense the invention. The license terms of our Lead Projects are discussed in detail below.

Generally speaking, pharmaceutical development consists of preclinical and clinical phases. The preclinical phase can further sub-divided into the following stages:

- Target Identification & Selection: The target is the naturally existing cellular or modular structure that appears to have an important role in a particular disease pathway and will be targeted by the drug that will subsequently be developed. Target validation techniques for different disease areas can be very different but typically include from in vitro and in silico methods through to the use of whole animal models.

- Lead Discovery: Following "Target Identification & Selection," compound screening assays are developed as part of the Lead Discovery. 'Lead' molecules can mean slightly different things to different researches or companies, but in this annual report, we refer to Lead Discovery as the process of identifying one or more small molecules with the desired activity against the identified targets. Leads can be identified through one or more approaches, which can depend on the target and what, if any, previous knowledge exists.

- Lead Optimization: In this stage of the drug discovery process, the aim is to produce a preclinical drug candidate by maintaining the desired and favorable properties in the lead compounds, while repairing or reducing deficiencies in their structures. For example, to optimize the chemical structures to improve, among others, efficacy, reduce toxicity, improve metabolism, absorption and pharmacokinetic properties.

- CTA-Enabling Studies: Includes all the essential studies such as GLP toxicology studies, pharmacology and efficacy, pharmacokinetics, in vitro metabolism, CMC studies, and the data of which are used for CTA submission.

- IND-Enabling Studies: Includes all the essential studies such as GLP toxicology studies, pharmacology and efficacy, pharmacokinetics, in vitro metabolism, CMC studies, and the data of which are used for IND submission.

- In vitro validation: At this stage, the efficacy and safety of a drug candidate are assessed at cellular levels.

- In vivo validation: At this stage, the efficacy, safety and pharmacokinetic of a drug candidate are assessed in animal models.

- IND Preparation and Submission: Preparation of a package of documents for different sections such as CMC, clinical, nonclinical, etc. and getting them reviewed, approved and final checked and followed by submission to regulatory agencies.

Human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- **Phase 1.** Phase 1 includes the initial introduction of an investigational new drug into humans. These studies are closely monitored and may be conducted in patients, but are usually conducted in healthy volunteer subjects. These studies are designed to determine the metabolic and pharmacologic actions of the drug in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness. During Phase 1, sufficient information about the drug's pharmacokinetics and pharmacological effects should be obtained to permit the design of well-controlled, scientifically valid, Phase 2 studies. Phase 1 studies also evaluate drug metabolism, structure-activity relationships, and the mechanism of action in humans. These studies also determine which investigational drugs are used as research tools to explore biological phenomena or disease processes. The total number of subjects included in Phase 1 studies varies with the drug, but is generally in the range of twenty to eighty.

- **Phase 2.** Phase 2 includes the early controlled clinical studies conducted to obtain some preliminary data on the effectiveness of the drug for a particular indication or indications in patients with the disease or condition. This phase of testing also helps determine the common short-term side effects and risks associated with the drug. Phase 2 studies are typically well-controlled, closely monitored, and conducted in a relatively small number of patients, usually involving several hundred people.

- **Phase 3.** Phase 3 studies are expanded controlled and uncontrolled trials. They are performed after preliminary evidence suggesting effectiveness of the drug has been obtained in Phase 2, and are intended to gather the additional information about effectiveness and safety that is needed to evaluate the overall benefit-risk relationship of the drug. Phase 3 studies are designed to provide an adequate basis for extrapolating the results to the general population and transmitting that information in the physician labeling. Phase 3 studies usually include several hundred to several thousand people.

Our non-therapeutics projects can be sub-divided into the following stages:

- Development and Experimentation: Early development work for proof-of-concept.

- Product Optimization: The practice of making changes or adjustments to a product to make it more desirable.

- Clinical Validation: Confirming the performance of a technology using clinical/patient samples.

- Pre-commercialization preparation: The logistics that need to be accomplished before commercialization.

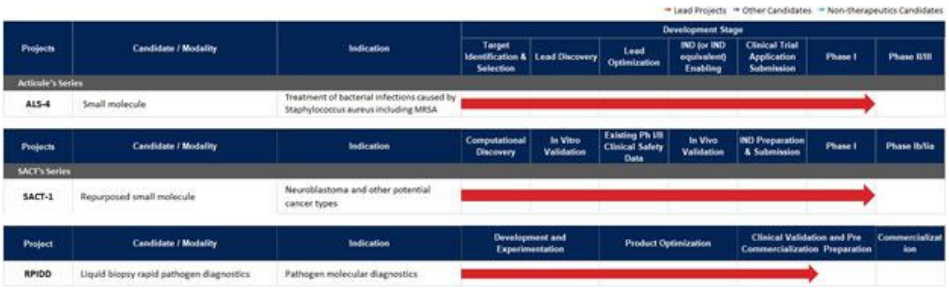
- Formulation: Preparation of a marketed dosage form from active ingredients and excipients/additives.

- Commercialization: The process of introducing a new product or production method into commerce—making it available on the market.

Another subsidiary, Aptorum Medical Limited ("AML"),[1] is our vehicle for developing our business of delivering medical services in the form of AML Clinic.

We anticipate allocating approximately 20% of our resources to develop projects other than our Lead Projects (such other projects being referred to herein as "Other Projects under Development"), with a strong focus on NativusWell®, and AML Clinic. The production of Aptorum Group's dioscorea opposita bioactive nutraceutical tablets has commenced production in Canada and will be marketed under the brand name NativusWell®; once ready for sale, we plan to sell it at online stores and in physical healthcare stores. AML Clinic is expected to provide us with a modest amount of revenue. Even if NativusWell® achieves commercial sales, of which there can be no assurance, revenue from these products alone will not be sufficient for us to carry out all of our plans, but it will assist with name recognition and supplement our income while we develop our Lead Projects.

Lead Projects



After consideration of various factors, such as time and resources required for further development, potential success rate and market size, the Group decided to focus the majority of its resources on ALS-4 and SACT-1 and RPIDD as the current Lead Projects. The Group will continue to invest some of its resources to develop other projects, including those previously classified as Lead Projects.

[1] Clark Cheng, our Chief Medical Officer and an Executive Director, owns 9% of Aptorum Medical Limited as of the date of this annual report.

ALS-4: Small molecule for the treatment of bacterial infections caused by Staphylococcus aureus including but not limited to Methicillin-resistant Staphylococcus aureus ("MRSA")

Just as certain strains of viruses, such as human immunodeficiency virus ("HIV") and influenza have developed resistance to drugs developed to treat them, certain bacteria such as *Staphylococcus aureus*, *Mycobacterium tuberculosis* and *Pseudomonas aeruginosa* have become "superbugs", having developed resistance to many, if not all, of the existing drugs available to treat them, rendering those treatments ineffective in many instances. MRSA is one such bacterium, a gram-positive bacterium that is genetically different from other strains of Staphylococcus aureus. Staphylococcus aureus and MRSA can cause a variety of problems ranging from skin infections and sepsis to pneumonia and bloodstream infections. It is estimated that about one out of every three people (33%) carry Staphylococcus aureus in their nose, usually without any illness; about two in a hundred (2%) carry MRSA (source: https://www.cdc.gov/mrsa/tracking/index.html). Both adults and children may carry MRSA.

Most MRSA infections occur in people who have been in hospital or other health care settings, such as nursing homes and dialysis centers (source: https://www.mayoclinic.org/diseases-conditions/mrsa/symptoms-causes/syc-20375336), which is known as Healthcare-Associated MRSA ("HA-MRSA"). HA-MRSA infections are typically associated with invasive procedures or devices, such as surgeries, intravenous tubing or artificial joints. Another type of MRSA infection, known as Community-Associated MRSA ("CA-MRSA"), has occurred in wider community among healthy people. It often begins as a painful skin boil and spreads by skin-to-skin contact. About 85% of serious, invasive MRSA infections are healthcare associated infections (https://www.cdc.gov/media/pressrel/2007/r071016.htm). The incidence of CA-MRSA varies according to population and geographic location. In the U.S., more than 94,000 people develop serious MRSA infection and about 19,000 patients die as a result each year (https://www.cdc.gov/media/pressrel/2007/r071016.htm). According to the US Centers for Disease Control and Prevention ("CDC"), Staphylococcus aureus, including MRSA, caused about 11% of healthcare-associated infections in 2011 (source: http://www.healthcommunities.com/mrsa-infection/incidence.shtml). Each year in the U.S., around one out of every twenty-five hospitalized patients contracts at least one infection in the hospital (N Engl J Med. 2014, 27;370(13):1198-208). In the U.S., there were over 80,000 invasive MRSA infections and 11,285 related deaths in 2011 (source: https://edition.cnn.com/2013/06/28/us/mrsa-fast-facts/index.html). Indeed, severe MRSA infections most commonly occur during or soon after inpatient medical care. More than 290,000 hospitalized patients are infected with Staphylococcus aureus and of these staphylococcal infections, approximately 126,000 are related to MRSA (source: http://www.healthcommunities.com/mrsa-infection/incidence.shtml).

ALS-4 is a small drug molecule which appears to target the products produced by bacterial genes that facilitate the successful colonization and survival of the bacterium in the body or that cause damage to the body's systems. These products of bacterial genes are referred to as "virulence expression." Targeting bacterial virulence is an alternative approach to antimicrobial therapy that offers promising opportunities to overcome the emergence and increasing prevalence of antibiotic-resistant bacteria.

Professor Richard Kao from The University of Hong Kong (who is also the Founder and Principal Investigator of Acticule and Inventor of ALS-1, ALS-2, ALS-3 and ALS-4) initiated a high throughput approach for screening compounds which are active against virulence expression, which resulted in the discovery of ALS-1, ALS-2, ALS-3 and ALS-4.

ALS-4 targets an enzyme essential for Staphylococcus aureus (including MRSA) survival in vivo. This enzyme is involved in the production of Staphyloxanthin, a carotenoid pigment produced by Staphylococcus aureus including MRSA, and is responsible for the characteristic golden color. This pigment has proven to be an important factor in promoting bacterial invasion as well as rendering the bacteria resistant to attack from reactive oxygen species (ROS) and neutrophils. In other words, pigmented bacteria have increased resistance to the host's immune defenses. ALS-4 may have particular value if it can be shown to be an effective therapy in situations where a Staphylococcus aureus infection is resistant to available antibiotics (i.e., where the pathogen is MRSA).

In a study by the inventor, Prof. Richard Kao, ALS-4 demonstrates potent activity against Staphylococcus aureus pigment formation in vitro, as indicated in Figure 1, with an IC_{50} (IC_{50} is defined as the concentration of a drug which inhibits half of the maximal response of a biochemical process. In this case, inhibition of the formation of the golden pigment is the response) equal to 20 nM.

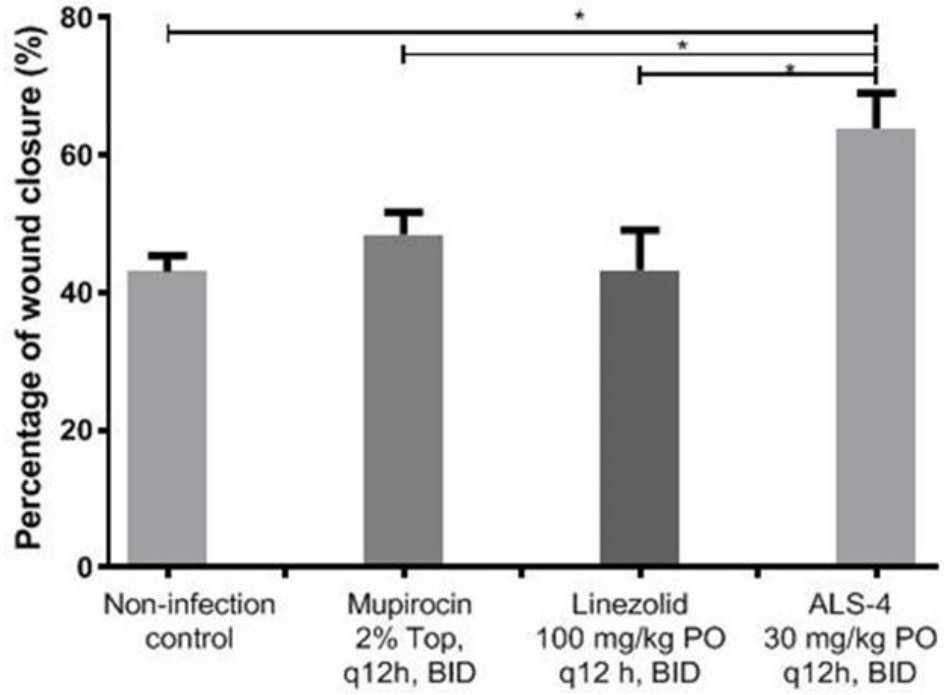
Figure 1

Figure 1: In vitro pigment inhibition by compound ALS-4: Inhibition of staphyloxathin (the golden pigment in *S. Aureus*) in the presence of increasing concentrations of ALS-4

Efficacy of ALS-4 in a MRSA Wound Infection Mouse Model

A study conducted by a third-party contract research organization, assessed ALS-4's effect in the healing of open wounds infected with MRSA in a mouse model. Compared with topical dosing of 2% Mupirocin and oral dosing of Linezolid at 100mg/kg twice a day, oral dosing of ALS-4 at 30mg/kg twice a day showed statistically significant improvement in wound healing. Specifically, at the end of the study on Day 7, ALS-4 exhibited 63.8% of wound closure compared with 48.4% for oral Linezolid and 43.2% for topical Mupirocin 2%. The results are further illustrated in the graph below.

Figure 2



*Unpaired student's t-test, $p<0.05$

Figure 2: Result of study on ALS-4's effect in the healing of open wounds infected with MRSA in a mouse model

Efficacy of ALS-4 in a Bacteraemia Mouse Model

In a further round of *in vivo* studies, conducted by a third-party contract research organization, in a non-lethal MRSA bacteraemia mouse model, the mice were orally administered with different doses of ALS-4 from 0.3 to 30mg/kg twice a day for 7 days, compared to those who received vancomycin only group (3mg/kg of vancomycin administered intravenously) and a no treatment control group.

At the conclusion of the study on Day 7, ALS-4 brought a statistically significant reduction in bacterial counts in major organs such as the kidneys, lungs, liver and spleen compared with the no drug control and vancomycin only groups (unpaired student's t-test, $p<0.05$). This is in addition to the previous *in vivo* results announced in February 2020, whereby ALS-4 demonstrated on a statistically significant basis better survival rates (56% vs 0% control group) in the lethal MRSA bacteraemia rat model (Figure 3a) and higher reduction of bacterial load (by 99.5% against the control group) in the non-lethal MRSA bacteraemia rat model (Figure 3b).

Figure 3a

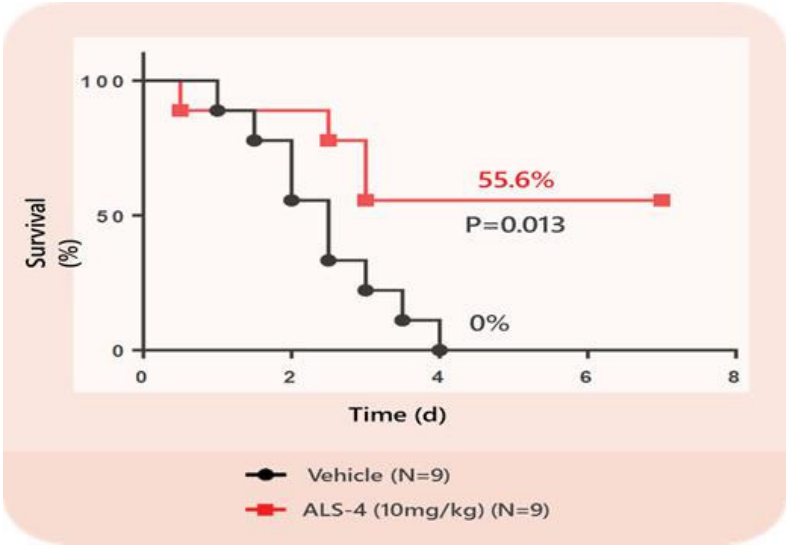


Figure 3a: Oral Formulation of ALS-4 in an MRSA Survival Study

Figure 3b

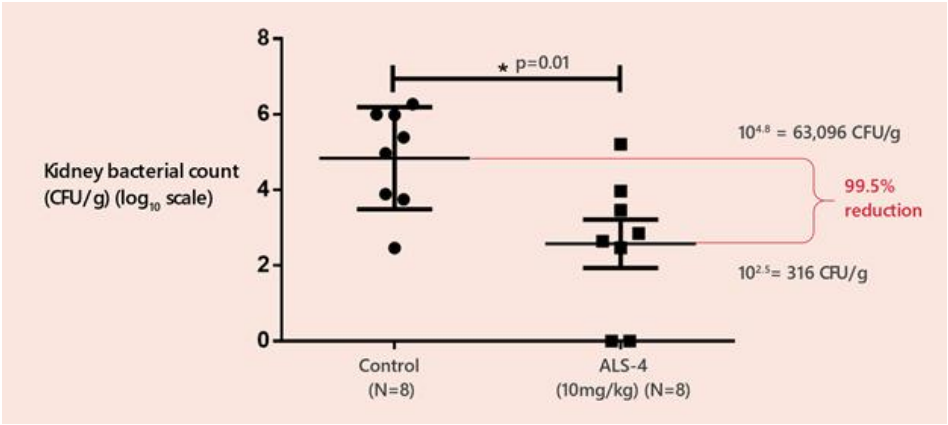


Figure 3b: Oral Formulation of ALS-4 in a Non-Lethal Bacteremia Model
CFU = Colony Forming Unit, a unit used to estimate the number of viable bacteria in a sample

A Clinical Trial Application ("CTA") was submitted with the Public Health Agency of Canada (Health Canada) to conduct a Phase 1 clinical trial of ALS-4, an orally administered small molecule drug for the treatment of infections caused by Staphylococcus aureus including Methicillin-resistant Staphylococcus aureus (MRSA) in Q4 2020. ALS-4 received clearance from Health Canada regarding the CTA to initiate a Phase 1 clinical study in January 2021. In March 2021, we announced dosing the first human subject in its Phase 1 clinical trial evaluating ALS-4. In January 2022, we further announced the completion of our Phase I clinical trial for ALS-4. The first-in-human Phase 1 trial was a randomized, double-blinded, placebo-controlled, single and multiple ascending dose study designed to evaluate safety, tolerability, and pharmacokinetics of orally administered ALS-4 in healthy male and female adult volunteers. The single-ascending dose studies (SAD) and multiple-ascending dose studies (MAD) have been completed for a total of 72 healthy subjects and no subjects were dropped from the studies. There were no serious adverse events observed and no relevant clinical changes in respect of vital signs.

We are on track to submit an IND application to the US FDA in 2022 seeking to initiate a Phase 2 clinical study to assess the efficacy of ALS-4 in patients.

Patent License

On October 18, 2017, the Company's subsidiary, Acticule, entered into an exclusive license agreement with Versitech Limited, the licensing entity of HKU, for ALS-4. Subsequently on June 7, 2018, the parties entered into a first amendment to the exclusive license agreement, and on July 10, 2019, the parties entered into a second amendment to the license agreement.

On January 11, 2019, Acticule and Versitech Limited entered into a second license agreement for ALS-4, where Acticule exclusively licensed the intellectual property rights on certain HKU-owned improvements to the original licensed invention.

Under the exclusive license agreements, we were granted an exclusive, royalty-bearing, sublicensable licenses to develop, make, have made, use, sell, offer for sale and import products that are covered by the licensed patents (as described below). The territory of the licenses is worldwide and the field of the licenses is for treatment or prevention of bacterial infections caused by Staphylococcus aureus including MRSA and bacterial virulence.

We paid an upfront fee upon entering into the license agreements. We are required to pay less than 10% of the net sales of the licensed products sold by us or our affiliates as royalties, as well as a low teens percentage of sublicense royalties that we receive from our sublicensees, if any. In addition, we agreed to pay to the licensor aggregate regulatory milestones of up to US$1 million subject to the following achievements: submission of investigational new drug application; completion of phase 1, 2 and 3 clinical trials; and submission of new drug application; grant of regulatory approval. We also agreed to pay to the licensor aggregate sales milestones of up to US$7.8 million subject to the following achievement: first commercial sale; and annual net sales exceeding US$100 million in one jurisdiction.

Pursuant to the license agreements, Acticule became the exclusive licensee of 2 pending U.S. non-provisional patent applications and 2 PCT applications (now expired). Prior to the expiration of the PCT applications, we filed national phase applications in member states of the EPO, in PRC and 12 other jurisdictions. The claimed inventions are described as: "Compounds Affecting Pigment Production and Methods for Treatment of Bacterial Diseases."

Two (2) US non-provisional patent applications have been granted by United States Patent and Trademark Office on June 22, 2021 and July 6, 2021 respectively. In addition, one (1) new non-provisional application was filed on June 21, 2021.

Acticule has the right to grant sublicenses to third parties under the license agreements without prior approval from Versitech Limited and to assign the agreements to any successor to the business related to the licenses. In the event that Acticule makes an improvement to the licensed technologies, so long as the improvement does not incorporate any licensed patents, Acticule will be the owner to such improvement, subject to a non-exclusive royalty-free license being granted back to Versitech Limited for academic and research purposes only.

The exclusive license agreements shall be in effect until the expiration of all licensed patents (please refer to the patent expiration dates under "Item 4. Information on the Company – B. Business Overview – Intellectual Property"). Acticule may terminate the licenses at any time with 6-month written notice in advance. Either party may terminate the agreements upon a material breach by other party.

SACT-1: A Repurposed Drug for the Treatment of Neuroblastoma

Drug repurposing is a strategy for identifying new indications for approved or investigational drugs that are outside the scope of the original medical uses. It is often viewed as a lower-cost method for drug commercialization, as it is based on already-approved drugs (which has been proven to be safe for human use by the respective governing regulatory agency) and explores new target indications. (Ashburn, T. T. & Thor, K. B. Drug repositioning: identifying and developing new uses for existing drugs. Nat. Rev. Drug Discov. 3, 673–683, 2004).

One of the advantages of drug repurposing is a lower development risk due to safety and toxicity, as well as other properties related to water solubility, absorption, distribution and metabolism, as the safety and CMC profiles of marketed drugs are usually well-established. Due to the same reason, the development time is also shortened because there is no need to repeat the whole spectrum of the safety assessment. As a result, the drug repurposing approach appears to be attractive due to its superior risk management, smaller capital investment and quicker financial return. (Sudeep Pushpakom, et. al. Drug repurposing: progress, challenges and recommendations. Nat. Rev. Drug Discov. 18, 41-58, 2019)

The cost of bringing a repurposed drug is estimated to be around US$300 million, which is only one-tenth of the development cost for a new drug. (Nosengo, N. Can you teach old drugs new tricks? Nature. 534, 314-316, 2016).

In summary, drug repurposing offers the following advantages:

- Well-established safety profiles: The development risk for new indications can be substantially reduced by applying existing drugs that are approved or have been shown to be safe in large scale late-stage trials. Since safety accounts for approximately 30% of drug failures in clinical trials, this is a key advantage that repositioned drugs can harness to great effect. (The benefits of drug repositioning. (n.d.). Retrieved from https://www.ddw-online.com/the-benefits-of-drug-repositioning-1779-201104/)

- Time-saving: As repositioned drugs can rely on existing data, including efficacy and toxicity studies, the process is usually faster than de novo development. Developing a new chemical entity (NCE) can take 10 to 17 years, depending on indications. (Roin, B. N. Solving the Problem of New Uses, 2013). For a drug repositioning company, the development process from compound identification to launch can be around 3 to 8 years. (Walker, N. (2017, December 07). Accelerating Drug Development Through Repurposing, Repositioning and Rescue. Retrieved from https://www.pharmoutsourcing.com/Featured-Articles/345076-Accelerating-Drug-Development-Through-Repurposing-Repositioning-and-Rescue/)

- Cost-saving: Along with time-saving, money-saving is also a key benefit. The cost to relaunch a repositioned drug averages $8.4 million, whereas to relaunch a new formulation of an existing drug in its original indication costs an average $41.3 million. Given that the average cost of launching a new chemical entity (NCE) is more than $1.3 billion, successfully bringing a repositioned drug to market seems to cost approximately 160 times less than the current standard of NCE development. Even if this differential is off by a hundred times or more, from the purely financial perspective, repositioning is in a completely different league of investment needed to create a new drug product in the market. (https://www.ddw-online.com/the-benefits-of-drug-repositioning-1779-201104/)

- Potential for out-licensing: Pharmaceutical companies are said to be exploring new models to out-license some of their clinical drug candidates that may have been shelved for pure business reasons unrelated to safety or efficacy, even though they have met their endpoints and have proven themselves to be safe. If such drugs were to be repositioned, the pharmaceutical company increases the attractiveness of these drugs and gives itself more options to find interested buyers. (https://www.ddw-online.com/the-benefits-of-drug-repositioning-1779-201104/)

- Lower failure rate: According to BCC Research, approval rates for repurposed drugs are close to 30%, which is greater than the approval rate for new drug applications. (Front Oncol. 2017; 7: 273)

One of the major limitations of the current drug repurposing and repositioning practice is that there is a lack of a systematic way to identify and reinvestigate drugs that are approved and/or have failed approval.

SACT-1 is the first repurposed drug candidate to be developed under the Smart-ACT® drug discovery platform. SCAT-1 is one of the Company's proprietary technologies. Our first targeted indication is neuroblastoma. Neuroblastoma is a rare form of cancer, and classified as an orphan disease, that forms in certain types of nerve tissue and most frequently in the adrenal glands as well as spine, chest, abdomen or neck, predominantly in children, especially for those aged 5 years and below. For the high-risk group, which is close to 20% (Annu Rev Med. 2015; 66: 49–63.) of total new patient population per year, the 5-year survival rate of this condition is around 40-50% as observed by the American Cancer Society (https://www.cancer.org/cancer/neuroblastoma/detection-diagnosis-staging/survival-rates.html). The current high drug treatment cost for high risk patients can average USD200,000 per regimen (all 6 cycles) (https://www.cadth.ca/sites/default/files/pcodr/Reviews2019/10154DinutuximabNeuroblastoma_fnEGR_NOREDACT-ABBREV_Post_26Mar2019_final.pdf). In addition, most pediatric patients often do not tolerate or survive the relevant chemotherapy stage which, subject to further clinical studies, may be positively addressed by the SACT-1 candidate due to the potential synergistic effects when applied with standard chemotherapy.

In our studies, SACT-1 has been shown to be effective against numerous neuroblastoma cell lines, of which 2 are MYCN-amplified cells, which represent the high-risk neuroblastoma patient group. In addition, by using a bliss score as a quantitative measure of the extent of drug interaction, Aptorum Group has seen a high and robust synergism between SACT-1 and traditional chemotherapy in vitro (Figure 4), indicating a potential efficacy enhancement/dose reduction of the chemotherapy.

Figure 4

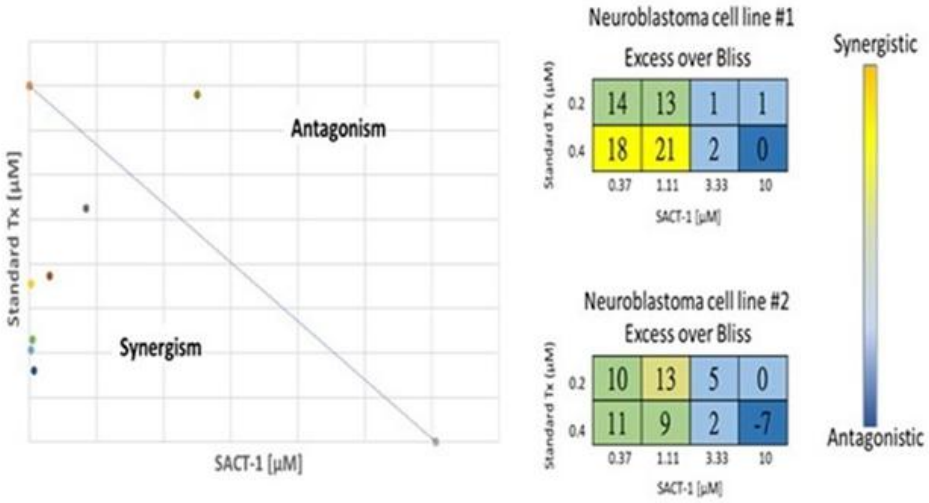


Figure 4: synergism between SACT-1 and traditional chemotherapy in vitro

In addition, in our study, the maximum tolerable dose of SACT-1 in a rodent model was determined to be higher than 400mg/kg. Compared with the MTD of standard chemotherapy such as paclitaxel (20-30mg/kg) (Clin Cancer Res. 5(11):3632-8) and cisplatin (6mg/kg) (BMC Cancer 17: 684 (2017)), the safety profile of SACT-1 appears to be very impressive. Based on our internal observations of pre-existing information from approved products, (subject to FDA's approval and on a case-by-case basis, a 505(b)(2) Application can rely in part on existing information from approved products (such as the FDA's previous findings on safety and efficacy) or products in literature (such as data available). However, typically speaking, the applicant is nonetheless required to carry out a Phase 1 bridging study to compare the Reference Listed Drug and reference the established safety and efficacy information), SACT-1 also exhibits a well-established safety profile: at 150mg/day, the death rate was 0% in prior clinical studies with no dosage related adverse events (Table 1). In addition, the pharmacokinetic profile of SACT-1 has also been reported (Table 2).

Table 1: Safety Profiles of SACT-1 in Human Clinical Trials

SACT-1	25mg/day (N=93)	75mg/day (N=95)	150mg/day (N=91)
Median treatment duration, weeks	101	100	100
Adverse events (AE)			
Any grade 2-4 AE at least possibly related to SP055	20%	20%	21%
AEs leading to discontinuation	9%	12%	14%
Any serious AE	13%	14%	10%
Deaths	0%	2%	0%

Table 2: The pharmacokinetic Profile of SACT-1 in Humans

SCAT-1 pharmacokinetic parameter in humans	(N=19)
t_{max}, h	5
C_{max}, ng/ml	~300
AUC_{last}, ng·h/ml	~10,000
AUC_{inf}, ng·h/ml	~11,000
$t_{1/2,term}$, h	~48

We have developed a pediatric formulation of SACT-1 to better address the needs of neuroblastoma patients who are exclusively children younger than 5. Positive data from our latest internal *in vivo* studies show significant activity against neuroblastoma tumor reduction when treated with the compound SACT-1 in combination with standard of care (SOC) chemotherapy.

Separately, we also screened SACT-1 for its *in vitro* activity against over 300 cancer cell lines and showed positive results in a number of cancer types including in particular colorectal cancer, leukemia and lymphoma, etc. Similar to our previous findings against neuroblastoma cell lines, SACT-1 exhibits similar anti-tumor efficacy across one or more other major cancer types, including but not limited to colorectal cancer, leukemia and lymphoma cell lines. As a result, in addition to treating neuroblastoma, SACT-1 may have potential applications in the treatment of other cancers. Based on this discovery, we plan to carry out further *in vivo* studies to study the efficacy of SACT-1 over other types of cancers to maximize the potential of SACT-1. Based on the initial 22 day data of a recent study we conducted in a xenograft mouse model of neuroblastoma, SACT-1 was orally administered daily at 60mg/kg in combination of SOC chemotherapy brought a statistically significant tumor shrinkage (unpaired student's t-test, $p<0.01$) from Day 15 to Day 22, compared to the control group which received SOC only. The combination reduced the tumor size by up to 54.2% in the first 22 days compared with the control (SOC only). SACT-1 appears to be effective in accelerating the effect of the SOC in early time points (from Day 1 - 7 vs control). This further supports our earlier *in vitro* observation that SACT-1 promotes tumor DNA damage and tumor cell death.

Figure 5

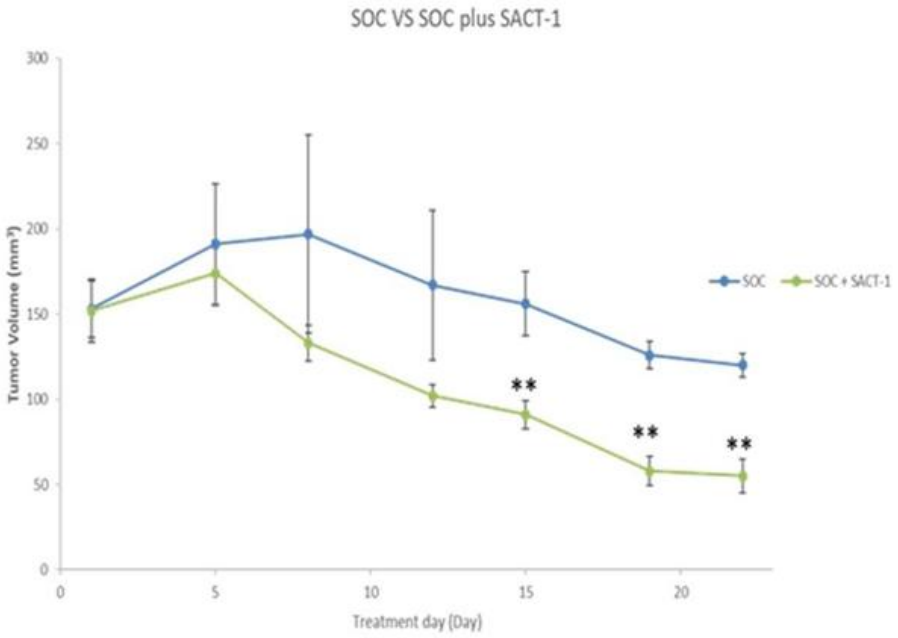


Figure 5: 22 days data of *in vivo* studies in a xenograft mouse model of neuroblastoma

** Unpaired student's t-test, $p<0.01$, n=8 (based on initial 22 days period)

In September 2021, we announced that we received clearance from the US FDA regarding the IND application to initiate clinical trials of SACT-1. In January 2022, we further announced that the completion of our Phase I clinical trial for assessing relative bioavailability and food effect of SACT-1, and no serious adverse events were observed. SACT-1's Phase 1 clinical trial is an Open-label Randomized, Single Cross Over Bioavailability and Food Effect Study of SACT-1 in healthy adult volunteers. In additions, the US FDA has granted Orphan Drug Designation to SACT-1 in January 2022.

We are on track to submit an IND application to the US FDA in 2022 seeking to initiate our planned Phase 1b/2a trial for SACT-1.

Patent License

In January 2022, the US Patent and Trademark Office has granted the first patent regarding Aptorum's SACT-1 (through Aptorum's subsidiary) repurposed drug for the treatment of various cancers including but not limited to neuroblastoma (US Patent 11,166,952 B2).

RPIDD: A novel molecular-based rapid pathogen identification and detection diagnostics technology

Infectious disease diagnostic standard of care (SOC) often involves techniques that are slow (e.g., bacterial culturing takes several days) or expensive (e.g., current pathogen diagnostic sequencing solutions are not comprehensive, are expensive, and often inaccessible to physicians). Although infectious disease diagnosis capabilities have been improving in recent years, there are still issues with the public health capacity to control infectious disease threats.

Infectious disease diagnostic standard of care (SOC) does not necessarily provide the physician a comprehensive diagnosis or report. Most point of care diagnostic solutions, while rapid, screen only for a single pathogen and only focus on common and widespread pathogens (e.g., HIV). Thus, for infectious disease patients in developed nations that present with an uncommon, novel or emerging pathogen threat, diagnosis is often slow (2-5 days) and inconclusive leaving time for pathogen spread and increased patient suffering and/or death.

RPIDD is a rapid infectious disease diagnostic test that we believe will be potentially able to identify all pathogens in a patient's sample, both known and unknown, by employing Next Generation Sequencing (NGS). The goal of RPIDD is to cost-effectively return a 99% accurate result within 24-48 hours. Our internal results show that, in principle, RPIDD can identify pathogens such as viruses (e.g. COVID-19/SARS-CoV-2) or any other known or emerging infectious disease event in one test (e.g., DNA or RNA-based pathogens). With these properties, RPIDD is expected to track the infectome landscape (e.g., tracking mutations), rapidly identify antibiotic resistant microbials in the process, and be more affordable than current NGS-based diagnostic platforms, which will make it a superior product to those currently on the market.

Preliminary data from our internal studies, which have not been verified or confirmed by third parties, presented below demonstrate additional points of innovation and proof of concept feasibility data.

Case Study #1: We examined a bio banked blood sample from a patient with a diagnosed Hepatitis B infection (Figure 6). Our technology successfully detected the presence of Hepatitis B, as well as additional pathogens.

Figure 6

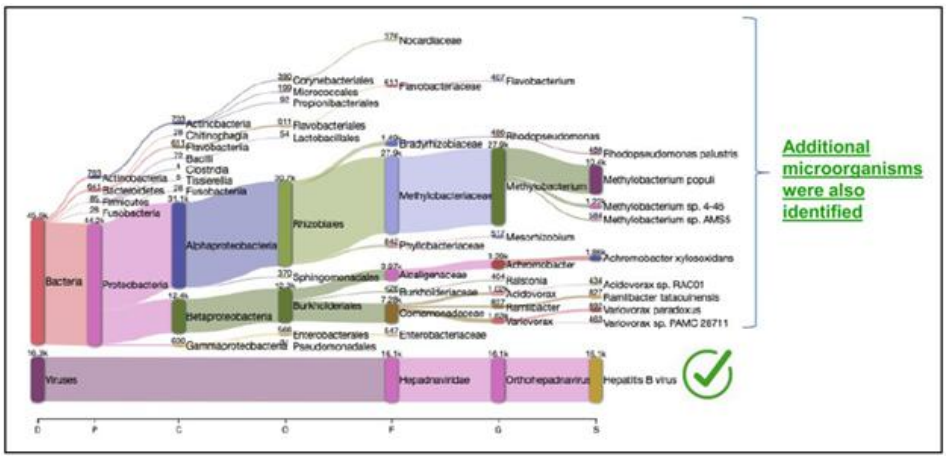


Figure 6: Aptorum's technology successfully confirmed a known Hepatitis B diagnosis in a bio banked sample.

Case Study #2: A patient was undergoing chemotherapy and developed a severe lung infection that was refractory to first-line antibiotics but eventually responded to the traditional trial and error approach. Using our technology, we found that 10% of all reads came from Leuconostoc, a Gram+ bacteria (Figure 7). Importantly, Leuconostoc was not identified by physicians, demonstrating that our technology can identify pathogens that allude a traditional diagnosis.

Figure 7

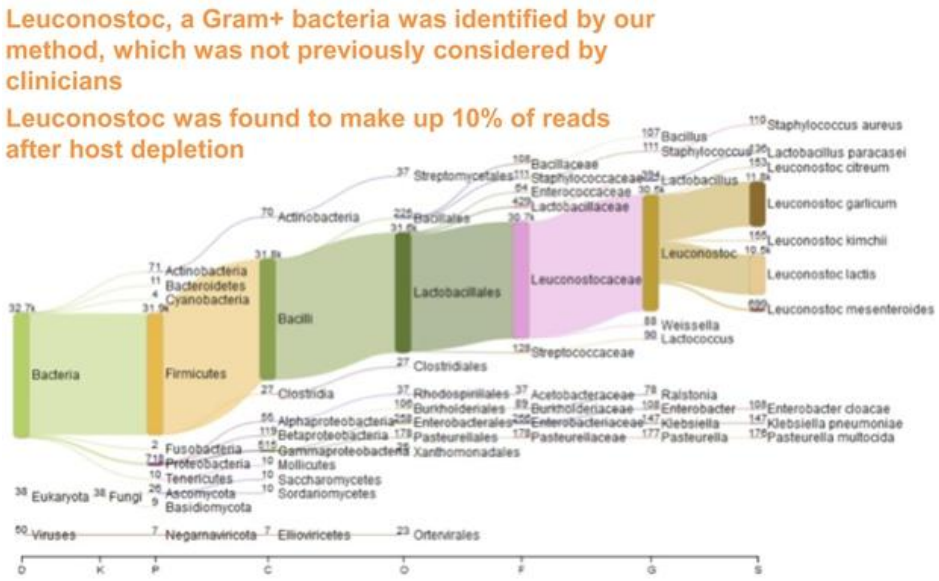


Figure 7: Aptorum's technology identified pathogen(s) that allude the traditional diagnostic approach.

RPIDD has the revolutionary potential to cover simultaneously over 1300 pathogens due to the unbiased approach in analyzing pathogen genome information and caters to patients who are infected with multi-strains of pathogen. The technology can be updated through our software analytics on an ongoing basis as further pathogenic genome sequences are updated through public databases, ensuring that it is up-to-date on new and emerging pandemic threats.

RPIDD is currently undergoing Clinical Validation to confirm the performance of RPIDD using clinical/patient samples. RPIDD will continue to undergo validations during 2022, in parallel with its pre-commercialization process in 2022.

Patent License and Application

On September 25, 2020, the Company's subsidiary, Aptorum Innovations Holding Pte. Limited, entered into an exclusive licence agreement with Accelerate Technologies Pte Ltd, the commercialization arm of the Singapore's Agency for Science, Technology and Research ("A*STAR"), to co-develop novel molecular-based rapid pathogen identification and detection diagnostics ("RPIDD") technology. No upfront fee or royalty on net sales is payable under the license agreements, although we are required to pay a mid-teens to mid-twenties percentage of sublicense revenue that we receive from our sublicensees, if any. In addition, we agreed to pay to the licensor aggregate development milestones of up to US$250,000. When specific development milestone is reached, we are also required to satisfy certain diligence obligations, including recruitment of staff, establishment of relationship with potential customers and exercise commercially reasonable efforts in selling the Licensed Products.

We filed two (2) US provisional patent applications and one (1) Singapore patent application was filed in 2021, but subsequently abandoned. In addition, one (1) US non-provisional patent application was filed on October 8, 2021 and we entered a Paris Convention (PCT) application on February 24, 2022. The claimed inventions are described as: “Unbiased And Simultaneous Amplification Method For Preparing A Double-Stranded DNA Library From A Sample Of More Than One Type Of Nucleic Acid.”

Statistical Significance

The term statistical significance is to define the probability that a measured difference between two groups (e.g. two treatment groups, treatment versus control groups) is the result of a real difference in the tested variations and not the result of chance. It means that the result of a test does not appear randomly or by chance, but because of a specific change that is tested, so it can be attributed to a specific cause.

The confidence level indicates to what percentage the test results will not commit a type 1 error, the false positive. A false positive occurs when a change in the result is due to randomness (or other noise) and not the change in variations. At a 95% confidence level ($p = 0.05$), there is a 5% chance that the test results are due to a type 1 error. 95% has become the standard and usually be the minimum confidence level for the tests. To make the test more stringent, a 99% confidence level ($p = 0.01$) is also commonly employed, which means that there is a 1% chance that the test results are due to a type 1 error.

In other words, a p value represents the confidence level. For example, if the p-value for a test is < 0.05, it means that there is less than 5% chance the difference between two groups is due to random error or by chance. If the p-value is < 0.01, it means that there is less than 1% chance the difference between two groups is due to random error or by chance.

We employed statistical testing to compare different treatment groups in animal studies simply for proof of concept and to aid internal decision making for further development. We do not intend to use this standard for any regulatory submission. The US FDA or other regulatory agencies may not necessarily employ the same statistical standard to assess the efficacy in clinical trials, the results of which would be submitted for regulatory approval. Although a p-value of 0.05 has become the standard, the US FDA or other regulatory agencies may also individualize their efficacy standard for different clinical programs based on the indications, the purpose of a clinical trial, among others.

FDA Application Status

As of the date of this annual report, we received CTA and IND approvals for ALS-4 and SACT-1 from Health Canada and US FDA to initiate human clinical trial. We have not submitted other applications for IND to the FDA or other regulatory agencies.

Other Projects under Development

The following provides additional detail regarding Other Projects under Development. As noted elsewhere in this report, based on certain criteria, we sometimes cease work on certain projects to focus on projects we believe are more promising. We have discontinued the development of certain candidates because patent applications protecting such technologies could not be obtained from USPTO, so we decided to focus our capital and efforts on other candidates. We typically discontinue the development of a candidate because the expected result could not be generated, so we focus our capital and efforts on our other candidates. The patents and patent applications covering the Other Projects are either owned by the Company or have been in-licensed.

On April 20, 2021, the Company’s subsidiary, Aptorum Therapeutics Limited, entered into an Option Agreement with Yale University to evaluate the certain classes of autoimmune anti-inflammatory drug. The agreement ends on July 14, 2022.

SACT-COV19: Drug repurposing for the treatment of infections caused by COVID-19

SACT-COV19 is a drug repurposing program for the treatment of infections caused by COVID-19. We have completed initial screening under the Smart-ACT® platform to select, out of more than 2,600 small drug molecules that were previously approved for other indications, at least 3 potential candidates for further preclinical investigation against the new coronavirus disease, COVID-19. We are collaborating with Toronto based Covar Pharmaceuticals and University of Oxford, and have also entered into agreement with the University of Hong Kong's Microbiology Department to conduct further preclinical investigation of the selected candidates prior to seeking approval from regulatory agencies to initiate clinical trials on suitable candidates.

Drug candidates from the SACT-COV19 program are currently undergoing in vitro validation.

ALS-1: Small molecule intended for the treatment of viral infections caused by Influenza virus A

Professor Richard Kao, the Inventor of ALS-1, was the first to identify viral nucleoproteins (NP) as an effective drug target (Nature Biotechnology. 28:600-605) We are exploring ALS-1 as a potential treatment for viral infections caused by Influenza virus A.

It is our hypothesis that Influenza A NP is an essential protein for the proliferation of the influenza virus. ALS-1 targets NP and triggers the aggregation of NP and this prevents the aggregated NP from entering the nucleus. In an animal study published by the inventor, Prof. Richard Kao, in Nature Biotechnology (28 (6): 600, 2010), after treating with ALS-1, 50% of the mice receiving two doses of ALS-1 (100 µl of 2.3 mg/ml ALS-1) per day for 7 days survived for more than 21 days compared with 100% mortality in the treatment-free control group within 7 days. In addition, about a 10x reduction of viral load in the lungs of the ALS-1-treated mice was observed compared to the untreated control group. The animal study results suggest that ALS-1 has the potential to be developed into a useful anti-influenza therapeutic.

ALS-1 is designed to target a broad range of NP variants, a novel therapeutic target. Compared with the currently marketed antiviral drugs for which the viruses have acquired extensive resistance, ALS-1 acts on a completely different therapeutic target.

ALS-1 is currently undergoing Lead Optimization to optimize its drug-like properties.

ALS-2/ 3: Small molecules for the treatment of bacterial infections caused by Staphylococcus aureus including MRSA

ALS-2/3 is a potential class of next generation small molecules targeting bacterial virulence for the treatment of bacterial infections caused by Staphylococcus aureus including MRSA. In a recent paper published by the inventor, Professor Richard Kao from The University of Hong Kong (also the Founder and Principal Investigator of Acticule), in PNAS (115(310: 8003, 2018), ALS-2/3 suppresses the expression of multiple virulence factors in Staphylococcus aureus simultaneously. In a lethal infection mouse model, compared with the vehicle group, ALS-2/3 protected against Staphylococcus aureus for all the mice in the group, with significant differences between the treatment and control groups [P = 0.0057, by log-rank (Mantel-Cox) test].

ALS-2/3 small molecules are currently at the Lead Optimization stage to optimize its drug-like properties.

NLS-1: A Derivative of Epigallocatechin-3-Gallate ("Pro-EGCG") for the treatment of Endometriosis

NLS-1, a drug molecule derived from natural products (green tea), is currently under development for the treatment of endometriosis, a disease in which the tissue that normally lines the uterus (endometrium) grows outside the uterus.

NLS-1 acts as an anti-angiogenic to offer a potential novel treatment of endometriosis. In a paper published by the inventors in Angiogenesis (16:59, 2013), NLS-1 brought a statistically significantly reduction in the lesion size and weight compared with EGCG and the control without any treatment in an experimental endometriosis mouse model (Student t-test, $p < 0.05$). In addition, the inhibition by NLS-1 in all of the angiogenesis parameters was statistically significantly greater than that by EGCG (Student t-test, $p < 0.05$). In addition, NLS-1 significantly (Student t-test, $p < 0.05$) reduces the lesion size in both prevention and treatment group compared with both saline and EGCG groups. Moreover, NLS-1 also had better bioavailability and greater antioxidation and anti-angiogenesis capacities compared with EGCG. As a follow-up study in an animal model of endometriosis, orally administered NLS-1 reduced the lesion size significantly better than oral EGCG ($p<0.05$-0.001 at week 3- 8, ANOVA) and other hormone-based therapy such as intramuscular GnRH analog ($p<0.05$ at week 4-8, ANOVA) and other synthetic anti-angiogenesis agents such as intraperitoneal PTK787 ($p<0.05$-0.01 at week 4-8, ANOVA). Regarding safety, there was no signs of stress to NLS-1 administration were observed during the treatment period. No significant weight change was observed over the course of the experiment. Histological examination revealed no obvious reproductive effects on ovarian follicles and endometrial glands under NLS-1 treatments. Also, vascularization of the ovaries and the uterus was not affected in the NLS-1 treatment group.

We are currently undergoing some activities to enable NLS-1 to enter IND-enabling studies. Besides, we are exploring possibilities to develop a non-drug formulation for NLS-1.

On May 6, 2021, we announced that we entered into an agreement with Exeltis ("Exeltis") (a division of the global pharmaceutical group Insud Pharma) to develop, manufacture and commercialize NLS-1 in the following territories: the European Union and Latin America (with an option to expand the collaboration to the United States). This novel candidate is intended to target woman's health and gynecological conditions, such as endometriosis or related conditions. Under this agreement, Aptorum Group will retain the development rights in other jurisdictions in the world, as well as the right to develop the novel candidate into a drug product. Commercialization of the product is subject to relevant regulatory approvals in their respective jurisdictions.

Aptorum Medical Limited - AML Clinic

Incorporated in August 2017, Aptorum Medical Limited is a Hong Kong-based company incorporated in Cayman Islands focused on delivering premium healthcare and clinic services. AML can draw on the expertise of many of the region's most experienced medical practitioners, and is committed to providing a comprehensive cross-functional facility for healthcare professionals to practice evidence-based medicine and offer high-quality medical services to their patients. We also intend that AML will offer to conduct clinical trials of both the Company's and third parties' new drug products.

Effective as of March 2018, we leased office space in Central, Hong Kong, the commercial and financial heart of Hong Kong, as the home to AML Clinic. We operate the AML Clinic under the name of Talem Medical. AML Clinic commenced operation in June 2018.

The renovated medical center is staffed by our group of medical professionals and offers state-of-the-art facilities. Initially we expect to focus our expertise on treatment of chronic diseases resulting from modern sedentary lifestyles and an aging population.

Natural supplement

NLS-2: NativusWell®, a Bioactive Ingredient (DOI) in Chinese Yam for the Relief of Menopausal Symptoms as a Natural Supplement.

NativusWell® (NLS-2) is a natural supplement made with the bioactive ingredient extracted Chinese yam powder containing "DOI", which is Aptorum Group's non-hormonal approach intended to meet certain growing consumer nutritional trends and concerns. It is estimated that 1.2 billion women worldwide will be menopausal or postmenopausal by the year 2030[1]. The global woman's health supplement market for menopausal symptoms is projected to reach over USD$50bn by 2025 with a CAGR rate of 16.4% (2016-2025)[2]. Initially, the supplement will be commercialized and sold in Hong Kong; the Company is seeking regulatory clearance to market the product in other major jurisdictions. We previously entered into a regional distribution and marketing agreement, but have since decided to commercialize NLS-2 through our own efforts.

1 World Health Technical Report Series. Research on the Menopause in the 1990's. Geneva, Switzerland: World Health Organization; 1996.

2 https://www.grandviewresearch.com/press-release/global-isoflavones-market

The production of Aptorum Group's dioscorea opposita bioactive nutraceutical tablets has commenced production in Canada and will be marketed under the brand name NativusWell®; once ready for sale, we intend to sell it online and in physical healthcare stores.

NativusWell® tablets are natural, non-hormonal supplements containing DOI. The yam powder with DOI utilizes a non-hormonal approach that is intended to boost the general wellness of women undergoing menopause. Third party scientific studies indicate that DOI, the naturally occurring bioactive ingredient in Chinese yam, appears to stimulate estradiol biosynthesis, induce estradiol and progesterone secretion and increase bone density, thereby potentially counteracting the progression of osteoporosis[3], one of the common symptoms associated with menopause[4].

Competition

Our industry is highly competitive and subject to rapid and significant change. While we believe that our development and commercialization experience, scientific knowledge and industry relationships provide us with competitive advantages, we face competition from pharmaceutical and biotechnology companies, including specialty pharmaceutical companies, and generic drug companies, academic institutions, government agencies and research institutions.

There are a number of large pharmaceutical and biotechnology companies that currently market and sell drugs or are pursuing the development of drugs for the diagnosis and treatment of diseases for which we are developing products or technology. Moreover, a number of additional drugs are currently in clinical trials and may become competitors if and when they receive regulatory approval.

[3] https://www.ke.hku.hk/story/innovation/the-magic-of-chinese-yam-for-treatment-of-menopausal-syndrome; see also, Scientific Reports, 5-10179.

[4] https://www.everydayhealth.com/menopause/osteoporosis-and-menopause.aspx

Many of our competitors have longer operating histories, better name recognition, stronger management capabilities, better supplier relationships, a larger technical staff and sales force and greater financial, technical or marketing resources than we do. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Our commercial opportunity could be reduced or eliminated if our competitors develop or market products or other novel therapies that are more effective, safer or less costly than our current drug candidates, or any future drug candidates we may develop, or obtain regulatory approval for their products more rapidly than we may obtain approval for our current drug candidates or any such future drug candidates. Our success will be based in part on our ability to identify, develop and manage a portfolio of drug candidates that are safer and more effective than competing products.

Inflation

Inflation affects us by generally increasing our cost of labor and research and development costs, the way it does to all labor and research costs. However, we do not anticipate that inflation will materially affect our business in the foreseeable future.

Seasonality

We believe our operation and sales do not experience seasonality.

Employees

As of the date of this annual report, we have 26 full-time employees. Of these, 9 are engaged in research and development and laboratory operations, 13 are engaged in general and administrative functions and 4 are engaged in the clinic operation. As of the date of annual report, 25 of our employees are located in Asia and 1 of our employees is located in Europe. In addition, we have engaged and may continue to engage 56 independent contracted consultants and advisors to assist us with our operations. None of our employees are represented by a labor union or covered by a collective bargaining agreement. We have never experienced any employment related work stoppages, and we consider our relations with our employees to be good.

Intellectual Property

The technologies underlying our various research and development projects are the subject of various patents and patent applications claiming, in certain instances, composition of matter and, in other instances, methods of use. Prosecution, maintenance and enforcement of these patents, as well as those on any future protectable technologies we may acquire, are and will continue to be an important part of our strategy to develop and commercialize novel medicines, as described in more detail below. Through entering into license agreements with their owners, we have obtained exclusive rights to these patents, applications and related know-how in the U.S. and certain other countries to develop, manufacture and commercialize the products using or incorporating the protected inventions that are described in this annual report and that are expected to contribute significant value to our business. The technologies protected by these patents may also for the basis for the development of other products.

In addition to licensed intellectual property, our in-house science team has been actively developing our own proprietary intellectual property. No non-provisional patent application has yet been filed in the Company's own name for the Lead Projects. We have, however, filed a number of provisional applications to establish earlier filing dates for certain of our other ongoing researches, the specifics of which are currently proprietary and confidential.

The U.S. patent system permits the filing of provisional and non-provisional patent applications (i.e., a regular patent application). A non-provisional patent application is examined by the USPTO, and can mature into a patent once the USPTO determines that the claimed invention meets the standards for patentability. On the other hand, a provisional patent application is not examined for patentability, and automatically expires 12 months after its filing date. As a result, a provisional patent application cannot mature into a patent.

Provisional applications are often used, among other things, to establish an earlier filing date for a subsequent non-provisional patent application. The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained.

The effective filing date of a non-provisional patent application is used by the USPTO to determine what information is prior art when it considers the patentability of a claimed invention. If certain requirements are satisfied, a non-provisional patent application can claim the benefit of the filing date of an earlier filed provisional patent application. As a result, the filing date accorded by the provisional patent application may supersede information that otherwise could preclude the patentability of an invention.

A provisional patent application is not eligible to become an issued patent unless, among other things, we file a non-provisional patent application within 12 months of the filing date of the provisional patent application. If we do not timely file a non-provisional patent application claiming priority to said provisional application, we may lose our priority date with respect to our provisional patent applications. Further, if any (self or by others) publication of the invention is made after such priority date, and if we do not file a non-provisional application claiming priority to said provisional application, our invention may become unpatentable.

Moreover, we cannot predict whether such future patent applications will result in the issuance of patents that effectively protect any of our product candidates or will effectively prevent others from commercializing competitive products.

We do not expect to incur material expenses in the prosecution of the provisional applications or other licensed patent applications. We expect to fund the patent costs from our cash and restricted cash.

The value of our drug products will depend significantly on our ability to obtain and maintain patent and other proprietary protection for those products, preserve the confidentiality of our trade secrets and operate without infringing the valid and enforceable patents and proprietary rights of other parties.

As of the date hereof, we are the patentee of a number of provisional and non-provisional patent applications, both on our proprietarily developed projects and improvement to our in-licensed projects.

The following table sets forth a list of our patent rights under the exclusive licenses as of the date of this annual report related to our Lead Projects, ALS-4 and RPIDD; on the other hand, our other Lead Project, SACT-1 is a proprietary technology not subject to any license agreement:

Project Company / Project name	License Agreement	Licensor(s)	Licensee	Licensed / IP Rights	Patent Expiration Dates
Acticule / ALS-4	Exclusive Patent License Agreement, dated October 18, 2017 First Amendment to Exclusive License Agreement, dated June 7, 2018 Second Amendment to Exclusive License Agreement dated July 10, 2019 Exclusive Patent License Agreement dated January 11, 2019	Versitech Limited	Acticule Life Sciences Limited	Exclusive licensee: 2 pending U.S. applications (16/867,540 and 17/006,985), 1 pending European applications (EP18835238.9), 1 pending PRC application (CN201880048674.5), 12 pending applications in other foreign jurisdictions including Australia, Brazil, Canada, Chile, Eurasia, Hong Kong, Israel, Japan, Korea, Malaysia, New Zealand, Singapore	The licensed IP rights include granted patents in the U.S. and pending patent applications in the U.S., Europe, PRC and other foreign jurisdictions. The U.S. patents will expire in 2038; any other patent based on the pending application, if granted, will have a 20-year patent term from 2018.
RPIDD	Exclusive Patent License Agreement, dated September 25, 2020	Accelerate Technologies Pte Ltd	Aptorum Innovations Holding Pte. Ltd	Exclusive licensee: 4 U.S. patents US7635566, US8241850, US9920355, US10472667, 1 European patent EP3224374, 1 Great Britain patent GB2532749	The U.S. patents will expire in 2028, 2029 and 2035 respectively. The UK patent will expire in 2034.

Because of the extensive time required for clinical development and regulatory review of a drug we may develop, it is possible that, before any of our drug candidates can be commercialized, any related patent may expire or remain in force for only a short period following commercialization, thereby reducing any advantage of any such patent. If appropriate, the Company may seek to extend the period during which it has exclusive rights to a product by pursuing patent term extensions and marketing exclusivity periods that are available from the regulatory authorities of certain countries (including the United States) and the EPO.

Even though the Company has certain patent rights, the ability to obtain and maintain protection of biotechnology and pharmaceutical products and processes such as those we intend to develop and commercialize involves complex legal and factual questions. No consistent policy regarding the breadth of claims allowed in such patents has emerged to date in the U.S. The scope of patent protection outside the United States is even more uncertain. Changes in the patent laws or in interpretations of patent laws in the United States and other countries have diminished (and may further diminish) our ability to protect our inventions and enforce our IP rights and, more generally, could affect the value of IP.

While we have already secured rights to a number of issued patents directed to our drug candidates, we cannot predict the breadth of claims that may issue from the pending patent applications and provisional patents that we have licensed or that we have filed. Substantial scientific and commercial research has been conducted for many years in the areas in which we have focused our development efforts, which has resulted in other parties having a number of issued patents, provisional patents and pending patent applications relating to such areas. The patent examiner in any particular jurisdiction may take the view that prior issued patents and prior publications render our patent claims "obvious" and therefore unpatentable or require us to reduce the scope of the claims for which we are seeking patent protection.

In addition, patent applications in the United States and elsewhere generally are not available to the public until at least 18 months from the priority date, and the publication of discoveries in the scientific or patent literature frequently occurs substantially later than the date on which the underlying discoveries were made. Therefore, patent applications relating to drugs similar to our drug candidates may have already been filed, which (if they result in issued patents) could restrict or prohibit our ability to commercialize our drug candidates.

The biotechnology and pharmaceutical industries are characterized by extensive litigation regarding patents and other IP rights. Our ability to prevent competition for our drug candidates and technologies will depend on our success in obtaining patents containing substantial and enforceable claims for those candidates and enforcing those claims once granted. With respect to any applications which have not yet resulted in issued patents, there can be no assurance that meaningful claims will be obtained. Even issued patents may be challenged or invalidated. If others have prepared and filed patent applications in the United States that also claim technology to which we have filed patent applications or otherwise wish to challenge our patents, we may have to participate in interferences, post-grant reviews, inter parties reviews, derivation or other proceedings in the USPTO and other patent offices to determine issues such as priority of claimed invention or validity of such patent applications as well as our own patent applications and issued patents. Patents may also be circumvented, and our competitors may be able to independently develop and commercialize similar drugs or mimic our technology, business model or strategy without infringing our patents. The rights granted under any issued patents may not provide us with proprietary protection or competitive advantages against competitors with similar technology.

We may rely, in some limited circumstances, on unpatented trade secrets and know-how to protect aspects of our technology. However, it is challenging to monitor and prevent the disclosure of trade secrets. We seek to protect our proprietary trade secrets and know-how, in part, by entering into confidentiality agreements with consultants, scientific advisors and contractors and invention assignment agreements with our employees. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, giving our competitors knowledge of our trade secrets and know-how, and we may not have adequate remedies for any such breach, in which case our business could be adversely affected. Our trade secrets will not prevent our competitors from independently discovering or developing the same know-how. Although our agreements with our consultants, contractors or collaborators require them to provide us only original work product and prohibit them from incorporating or using IP owned by others in their work for us, if they breach these obligations, disputes may arise as to the rights in any know-how or inventions that arise from their work.

Our commercial success will also depend in part on not infringing the proprietary rights of other parties. Although we seek to review the patent landscape relevant to our technologies on an ongoing basis, we may become aware of a new patent which has been issued to others with claims covering or related to aspects of one of our drug candidate. The issuance of such a patent could require us to alter our development plans for that candidate, redesign the candidate, obtain a license from the patent holder or cease development. Our inability to obtain a license to proprietary rights that we may require to develop or commercialize any of our drug candidates would have a material adverse impact on us.

Trademarks

As of the date of this annual report, we own trademark registrations covering the trade names and logos of Aptorum and our subsidiaries, including but not limited to "APTORUM", "APTORUM THERAPEUTICS," "VIDENS LIFE SCIENCES," "ACTICULE LIFE SCIENCES,", "CLAVES LIFE SCIENCES", "NATIVUS LIFE SCIENCES", "TALEM," in jurisdictions Hong Kong, EU and the United Kingdom and PRC. Furthermore, we are in the process of applying for registration of trademarks in jurisdictions including the U.S., EU, the United Kingdom, and PRC.

We also own certain unregistered trademark rights.

All other trade names, trademarks and service marks of other companies appearing in this annual report are the property of their respective holders. Solely for convenience, the trademarks and trade names in annual report are referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. We do not intend our use or display of other companies' trademarks and trade names to imply a relationship with, or endorsement or sponsorship of us by, any other companies.

Regulations

Government authorities in the United States at the federal, state and local level and in other countries extensively regulate, among other things, the research and clinical development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing, pricing, export and import of drug products ("Regulated Products"), such as those we are developing. Generally, before a new Regulated Product can be marketed, considerable data demonstrating its quality, safety and efficacy must be obtained, organized to address the requirements of and in the format specific to each regulatory authority, submitted for review and approved by the regulatory authority. This process is very lengthy and expensive, and success is uncertain.

Regulated Products are also subject to other federal, state and local statutes and regulations in the United States and other countries, as applicable. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable regulatory requirements at any time during the product development process, approval process or after approval, may subject an applicant to administrative or judicial sanctions. These sanctions could include, among other actions, the regulatory authority's refusal to approve pending applications, withdrawal of an approval, clinical holds, untitled or warning letters, voluntary product recalls or withdrawals from the market, product seizures, total or partial suspension of production or distribution, injunctions, disbarment, fines, refusals of government contracts, restitution, disgorgement, or civil or criminal penalties. Any such administrative or judicial enforcement action could have a material adverse effect on us.

As AML Clinic and part of the Company's principal place of business is in Hong Kong, the Company is subject to various Hong Kong laws and regulation covering its business activities there, described in further detail below. Also, the Company anticipates that, if it obtains marketing approval for any of its drug candidates, it intends to focus its marketing and sales efforts primarily in three regions: the United States, Canada, Europe and PRC. The regulatory framework for each of these regions is described below.

U.S. Drug Development Process

The process of obtaining regulatory approvals and maintaining compliance with appropriate federal, state and local statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process, or after approval, may subject an applicant to administrative or judicial sanctions or lead to voluntary product recalls. Administrative or judicial sanctions could include the FDA's refusal to approve pending applications, withdrawal of an approval, a clinical hold, untitled or warning letters, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement or civil or criminal penalties. The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of non-clinical laboratory tests, preclinical studies according to cGLP and manufacturing of clinical supplies according to cGMP;
- submission to the FDA of an IND, which must become effective before human clinical trials may begin;
- approval by an independent IRB, at each clinical site before each trial may be initiated;
- performance of adequate and well-controlled human clinical trials according to cGCP, to establish the safety and efficacy of the proposed product for its intended use;
- preparation and submission to the FDA of an NDA, for a drug;
- satisfactory completion of an FDA advisory committee review, if applicable;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product, or components thereof, are produced to assess compliance with cGMP; and
- payment of user fees and the FDA review and approval of the NDA.

The testing and approval process requires substantial time, effort and financial resources and we cannot be certain that any approvals for our drug candidates, or any future drug candidates we may develop, will be granted on a timely basis, if at all.

Once a drug candidate is identified for development, it enters the non-clinical testing stage. Non-clinical tests include laboratory evaluations of product chemistry, toxicity, formulation and stability, as well as preclinical studies. An IND sponsor must submit the results of the non-clinical tests, together with manufacturing information, analytical data and any available clinical data or literature, to the FDA as part of the IND prior to commencing any testing in humans. An IND sponsor must also include a protocol detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated if the initial clinical trial lends itself to an efficacy evaluation. Some non-clinical testing may continue even after the IND is submitted. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA raises concerns or questions related to a proposed clinical trial and places the trial on a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. Clinical holds also may be imposed by the FDA at any time before or during clinical trials due to safety concerns or non-compliance, and may be imposed on all products within a certain class of products. The FDA also can impose partial clinical holds, for example, prohibiting the initiation of clinical trials for certain duration or for certain doses.

All clinical trials must be conducted under the supervision of one or more qualified investigators in accordance with cGCP regulations. These regulations include the requirement that all research subjects provide informed consent in writing before their participation in any clinical trial. Further, an IRB representing each institution participating in a clinical trial must review and approve the plan for any clinical trial before it commences at that institution, and the IRB must conduct continuing review and reapprove the study at least annually. An IRB is responsible for protecting the rights of clinical trial subjects and considers, among other things, whether the risks to individuals participating in the clinical trial are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the information regarding the clinical trial and the consent form that must be provided to each clinical trial subject or his or her legal representative and must monitor the clinical trial until completed. Each new clinical protocol and any amendments to the protocol must be submitted to the FDA for review, and to the IRBs for approval. Protocol detail, among other things, includes the objectives of the clinical trial, testing procedures, sublease selection and exclusion criteria, and the parameters to be used to monitor subject safety.

Human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- **Phase 1.** Phase 1 includes the initial introduction of an investigational new drug into humans. These studies are closely monitored and may be conducted in patients, but are usually conducted in healthy volunteer subjects. These studies are designed to determine the metabolic and pharmacologic actions of the drug in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness. During Phase 1, sufficient information about the drug's pharmacokinetics and pharmacological effects should be obtained to permit the design of well-controlled, scientifically valid, Phase 2 studies. Phase 1 studies also evaluate drug metabolism, structure-activity relationships, and the mechanism of action in humans. These studies also determine which investigational drugs are used as research tools to explore biological phenomena or disease processes. The total number of subjects included in Phase 1 studies varies with the drug, but is generally in the range of twenty to eighty.

- **Phase 2.** Phase 2 includes the early controlled clinical studies conducted to obtain some preliminary data on the effectiveness of the drug for a particular indication or indications in patients with the disease or condition. This phase of testing also helps determine the common short-term side effects and risks associated with the drug. Phase 2 studies are typically well-controlled, closely monitored, and conducted in a relatively small number of patients, usually involving several hundred people.

- **Phase 3.** Phase 3 studies are expanded controlled and uncontrolled trials. They are performed after preliminary evidence suggesting effectiveness of the drug has been obtained in Phase 2, and are intended to gather the additional information about effectiveness and safety that is needed to evaluate the overall benefit-risk relationship of the drug. Phase 3 studies are designed to provide an adequate basis for extrapolating the results to the general population and transmitting that information in the physician labeling. Phase 3 studies usually include several hundred to several thousand people.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and safety reports must be submitted to the FDA and clinical investigators within 15 calendar days for serious and unexpected suspected adverse events, any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator's brochure, or any findings from other studies or animal or in vitro testing that suggest a significant risk in humans exposed to the drug candidate. Additionally, a sponsor must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction no later than 7 calendar days after the sponsor's receipt of the information. There is no assurance that Phase 1, Phase 2 and Phase 3 testing can be completed successfully within any specified period, or at all. The FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the product has been associated with unexpected serious harm to subjects.

Concurrent with clinical trials, companies usually complete additional preclinical studies and must also develop additional information about the chemistry and physical characteristics of the product and finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product drug and, among other things, the manufacturer must develop methods for testing the identity, strength, quality and purity of the final product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product drug does not undergo unacceptable deterioration over its shelf life.

The results of product development, non-clinical studies and clinical trials, together with other detailed information regarding the manufacturing process, analytical tests conducted on the product, proposed labeling and other relevant information, are submitted to the FDA as part of an NDA requesting approval to market the new drug. The FDA reviews all NDAs submitted within 60 days of submission to ensure that they are sufficiently complete for substantive review before it accepts them for filing. If the submission is accepted for filing, the FDA begins an in-depth substantive review.

The approval process is lengthy and difficult and the FDA may refuse to approve an NDA if the applicable regulatory criteria are not satisfied or may require additional clinical data or other data and information. Even if such data and information are submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive, and the FDA may interpret data differently than we interpret the same data. The FDA will issue a complete response letter if the agency decides not to approve the NDA in its present form. The complete response letter usually describes all of the specific deficiencies that the FDA identified in the NDA that must be satisfactorily addressed before it can be approved. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical trials. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, or withdraw the application or request an opportunity for a hearing.

If after such review a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. Any products for which we receive the FDA approval would be subject to continuing regulation by the FDA, including, among other things, record-keeping requirements, reporting of adverse experiences with the product, providing the FDA with updated safety and efficacy information, product sampling and distribution requirements, complying with certain electronic records and signature requirements and complying with the FDA promotion and advertising requirements. In addition, the FDA may require post-approval studies, including Phase 4 clinical trials, to further assess a product's safety and effectiveness after NDA approval and may require testing and surveillance programs to monitor the safety of approved products that have been commercialized. The FDA also may conclude that an NDA may only be approved with a Risk Evaluation and Mitigation Strategy designed to mitigate risks through, for example, a medication guide, physician communication plan, or other elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools.

Post-Approval Requirements

Any products for which we receive the FDA approval are subject to continuing regulation by the FDA, including, among other things, record-keeping requirements, reporting of adverse experiences with the product, providing the FDA with updated safety and efficacy information, product sampling and distribution requirements, complying with certain electronic records and signature requirements and complying with the FDA promotion and advertising requirements. The FDA strictly regulates labeling, advertising, promotion and other types of information on products that are placed on the market. Products may be promoted only for the approved indications and in accordance with the provisions of the approved label. Further, manufacturers must continue to comply with cGMP requirements, which are extensive and require considerable time, resources and ongoing investment to ensure compliance. In addition, changes to the manufacturing process generally require prior the FDA approval before being implemented and other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further the FDA review and approval.

The FDA may withdraw a product approval if compliance with regulatory requirements is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product may result in restrictions on the product's marketing or even complete withdrawal of the product from the market. Further, the failure to maintain compliance with regulatory requirements may result in administrative or judicial actions, such as fines, untitled or warning letters, holds on clinical trials, product seizures, product detention or refusal to permit the import or export of products, refusal to approve pending applications or supplements, restrictions on marketing or manufacturing, injunctions or consent decrees, or civil or criminal penalties, or may lead to voluntary product recalls.

Patent Term Restoration and Marketing Exclusivity

Because drug approval can take an extended period of time, there may be limited remaining life for the patents covering the approved drug, meaning that the company has limited time to use the patents to protect the sponsor's exclusive rights to make, use and sell that drug. In such a case, U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Act. The Hatch-Waxman Act permits a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date.

In addition, the FDCA provides a five-year period of non-patent marketing exclusivity within the United States to the first applicant to gain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an abbreviated new drug application ("ANDA") or a 505(b)(2) Application submitted by another company for another version of such drug where the applicant does not own or have a legal right of reference to all the data required for approval.

In the future, if appropriate, we intend to apply for restorations of patent term and/or marketing exclusivity for some of our products; however, there can be no assurance that any such extension or exclusivity will be granted to us.

Disclosure of Clinical Trial Information

Sponsors of clinical trials of the FDA-regulated products, including drugs are required to register and disclose certain clinical trial information, which is publicly available at www.clinicaltrials.gov. Information related to the product, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to disclose the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed until the new product or new indication being studied has been approved. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs.

Pharmaceutical Coverage, Pricing and Reimbursement

Much of the revenue generated by new Regulated Products depends on the willingness of third-party payors to reimburse the price of the product. Significant uncertainty exists as to the coverage and reimbursement status of any products for which we may obtain regulatory approval. In the United States, sales of any products for which we may receive regulatory approval for commercial sale will depend in part on the availability of coverage and reimbursement from third-party payors. Third-party payors include government authorities, managed care providers, private health insurers and other organizations. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the reimbursement rate that the payor will pay for the product. Third-party payors may limit coverage to specific products on an approved list, or formulary, which is not required to include all of the FDA-approved products for a particular indication. Moreover, a payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

Third-party payors are increasingly challenging the price and examining the medical necessity and cost- effectiveness of medical products and services, in addition to their safety and efficacy. To obtain coverage and reimbursement for any product that might be approved for sale, we may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of any products, in addition to the costs required to obtain regulatory approvals. Our product candidates may not be considered medically necessary or cost-effective. If third-party payors do not consider a product to be cost-effective compared to other available therapies, they may not cover the product after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow a company to sell its products at a profit.

The U.S. government and state legislatures have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Adoption of government controls and measures, and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals.

Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future. Unfavorable coverage or reimbursement policies regarding any of the Company's products would have a material adverse impact on the value of that product.

Other Healthcare Laws and Compliance Requirements

If we obtain regulatory approval of our products, we may be subject to various federal and state laws targeting fraud and abuse in the healthcare industry. These laws may impact, among other things, our proposed sales, marketing and education programs. In addition, we may be subject to patient privacy regulation by both the federal government and the states in which we conduct our business.

Patient Protection and the Affordable Care Act

The Affordable Care Act, enacted in March 2010, includes measures that have or will significantly change the way health care is financed in the United States by both governmental and private insurers. Among the provisions of the Affordable Care Act of greatest importance to the pharmaceutical industry are the following:

- The Medicaid Drug Rebate Program requires pharmaceutical manufacturers to enter into and have in effect a national rebate agreement with the Secretary of the Department of Health and Human Services as a condition for states to receive federal matching funds for the manufacturer's outpatient drugs furnished to Medicaid patients. The Affordable Care Act increased pharmaceutical manufacturers' rebate liability on most branded prescription drugs from 15.1% of the average manufacturer price to 23.1% of the average manufacturer price, added a new rebate calculation for line extensions of solid oral dosage forms of branded products, and modified the statutory definition of average manufacturer price. The Affordable Care Act also expanded the universe of Medicaid utilization subject to drug rebates by requiring pharmaceutical manufacturers to pay rebates on Medicaid managed care utilization and expanding the population potentially eligible for Medicaid drug benefits.

- In order for a pharmaceutical product to receive federal reimbursement under the Medicare Part B and Medicaid programs or to be sold directly to U.S. government agencies, the manufacturer must extend discounts to entities eligible to participate in the 340B drug pricing program. The Affordable Care Act expanded the types of entities eligible to receive discounted 340B pricing.

- The Affordable Care Act imposed a requirement on manufacturers of branded drugs to provide a 50% discount off the negotiated price of branded drugs dispensed to Medicare Part D patients in the coverage gap (i.e., the "donut hole").

- The Affordable Care Act imposed an annual, non-deductible fee on any entity that manufactures or imports certain branded prescription drugs, apportioned among these entities according to their market share in certain government healthcare programs, although this fee does not apply to sales of certain products approved exclusively for orphan indications.

In addition to these provisions, the Affordable Care Act established a number of bodies whose work may have a future impact on the market for certain pharmaceutical products. These include the Patient-Centered Outcomes Research Institute, established to oversee, identify priorities in, and conduct comparative clinical effectiveness research, the Independent Payment Advisory Board, which has authority to recommend certain changes to the Medicare program to reduce expenditures by the program, and the Center for Medicare and Medicaid Innovation within the Centers for Medicare and Medicaid Services, to test innovative payment and service delivery models to lower Medicare and Medicaid spending.

These and other laws may result in additional reductions in healthcare funding, which could have a material adverse effect on customers for our product candidates, if we gain approval for any of them. Although we cannot predict the full effect on our business of the implementation of existing legislation or the enactment of additional legislation pursuant to healthcare and other legislative reform, we believe that legislation or regulations that would reduce reimbursement for, or restrict coverage of, our products could adversely affect how much or under what circumstances healthcare providers will use our product candidates if we gain approval for any of them.

Canadian Regulation

In Canada, our pharmaceutical product candidates and our research and development activities are primarily regulated by the *Food and Drugs Act* and the rules and regulations thereunder, which are enforced by Health Canada. Health Canada regulates, among other things, the research, development, testing, manufacture, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, post-approval monitoring, marketing and import and export of pharmaceutical products. Drug approval laws require licensing of manufacturing facilities, carefully controlled research and testing of products, government review and approval of experimental results prior to giving approval to sell drug products. Regulators also typically require that rigorous and specific standards such as Good Manufacturing Practices (GMP), Good Laboratory Practices, or GLP, and Good Clinical Practices, or GCP, are followed in the manufacture, testing and clinical development, respectively, of any drug product. The processes for obtaining regulatory approvals in Canada, along with subsequent compliance with applicable statutes and regulations, require the expenditure of substantial time and financial resources.

The principal steps required for drug approval in Canada is as follows:

Preclinical Toxicology Studies

Non-clinical studies are conducted *in vitro* and in animals to evaluate pharmacokinetics, metabolism and possible toxic effects to provide evidence of the safety of the drug candidate prior to its administration to humans in clinical studies and throughout development. Such studies are conducted in accordance with applicable laws and GLP.

Initiation of Human Testing

In Canada, the process of conducting clinical trials with a new drug cannot begin until we have received a NOL (No objection Letter) from Health Canada, typically within 30 days (during Covid the 30 days extended to 45 days) of a CTA submission. Similar regulations apply in Canada to a CTA as to an IND in the United States. Once approved, two key factors influencing the rate of progression of clinical trials are the rate at which patients can be enrolled to participate in the research program and whether effective treatments are currently available for the disease that the drug is intended to treat. Patient enrollment is largely dependent upon the incidence and severity of the disease, the treatments available and the potential side effects of the drug to be tested and any restrictions for enrollment that may be imposed by regulatory agencies.

Clinical Trials

Similar regulations apply in Canada regarding clinical trials as in the United States. In Canada, Research Ethics Boards, or REBs, instead of IRBs, are used to review and approve clinical trial plans. Clinical trials involve the administration of an investigational new drug to human subjects under the supervision of qualified investigators in accordance with current Good Clinical Practices, or cGCP, requirements, which include review and approval by REBs. Clinical trials are conducted under protocols detailing, among other things, the objectives of the trial, the trial procedures, the parameters to be used in monitoring safety and the efficacy criteria to be evaluated and a statistical analysis plan. Human clinical trials are typically conducted in three sequential phases, as discussed above in similar context to government regulation in the United States.

The manufacture of investigational drugs for the conduct of human clinical trials is subject to current Good Manufacturing Practice, or cGMP, requirements. Investigational drugs and active pharmaceutical ingredients imported into Canada are also subject to regulation by Health Canada relating to their labeling and distribution. Post authorization requirements include reporting of serious adverse events and clinical trial site inspection program. Phase 1, Phase 2 and Phase 3 clinical trials are subject to a clinical trial application (CTA) for each phase of study. Furthermore, in Canada, Health Canada or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an REB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the REB's requirements or if the drug has been associated with unexpected serious harm to subjects. Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group regularly reviews accumulated data and advises the study sponsor regarding the continuing safety of trial subjects, potential trial subjects and the continuing validity and scientific merit of the clinical trial. We may also suspend or terminate a clinical trial based on evolving business objectives or competitive climate.

New Drug Submission (NDS)

Upon successful completion of Phase 3 clinical trials, in Canada the company sponsoring a new drug then assembles all the preclinical and clinical data and other testing relating to the product's pharmacology, chemistry, manufacture, and controls, and submits it to Health Canada as part of a New Drug Submission, or NDS. The NDS is then reviewed by Health Canada for approval to market the drug.

As part of the approval process, an additional application for a Drug Establishment License (DEL) 90 days prior the NDS submission to Health Canada to initiate review and inspection of the facility or the facilities at which the drug is manufactured are compliant with GMP requirements. Health Canada will not approve the product unless compliance with cGMP—a quality system regulating manufacturing—is satisfactory and the NDS contains data that provide substantial evidence that the drug is safe and effective in the indication studied. In addition, before approving an NDS, Health Canada will typically inspect one or more clinical sites to assure compliance with GCP.

The testing and approval process for an NDS requires substantial time, effort and financial resources, and may take several years to complete. Data obtained from preclinical and clinical testing are not always conclusive and may be susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. Health Canada may not grant approval of an NDS on a timely basis, or at all. In Canada, NDSs are subject to user fees and these fees are typically increased annually to reflect inflation.

Even if Health Canada approves a product candidate, the relevant authority may limit the approved indications for use of the product candidate, require that contraindications, warnings or precautions be included in the product labeling, including a black box warning, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess a drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms.

Health Canada may prevent or limit further marketing of a product based on the results of post-marketing studies or surveillance programs. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes, and additional labeling claims, are subject to further testing requirements, notification, and regulatory authority review and approval. Further, should new safety information arise, additional testing, product labeling or regulatory notification may be required.

European Union Regulation

Regulation in the European Union

The process governing approval of medicinal products in the EU generally follows the same lines as in the United States. It entails satisfactory completion of pharmaceutical development, non-clinical studies and adequate and well-controlled clinical trials to establish the safety and efficacy of the medicinal product for each proposed indication. It also requires the submission to relevant competent authorities for clinical trials authorization and to the European Medicines Authority, or EMA, for a marketing authorization application, or MAA, and granting of a marketing authorization by these authorities before the product can be marketed and sold in the EU.

Clinical Trial Approval

Pursuant to the currently applicable Clinical Trials Directive 2001/20/EC and the Directive 2005/28/EC on cGCP, a system for the approval of clinical trials in the EU (the equivalent of the IND process in the United States) has been implemented through national legislation of the EU member states. Under this system, an applicant must obtain approval from the competent national authority of an EU member state in which the clinical trial is to be conducted or in multiple EU member states if the clinical trial is to be conducted in a number of EU member states. Furthermore, the applicant may only start a clinical trial at a specific study site after the independent ethics committee has issued a favorable opinion. The clinical trial application, or CTA, must be accompanied by an investigational medicinal product dossier with supporting information prescribed by Directive 2001/20/EC and Directive 2005/28/EC and corresponding national laws of the EU member states and further detailed in applicable guidance documents.

In April 2014, the EU adopted a new Clinical Trials Regulation (EU) No 536/2014, which is set to replace the current Clinical Trials Directive 2001/20/EC. It is expected that the new Clinical Trials Regulation will apply in 2019. It will overhaul the current system of approvals for clinical trials in the EU. Specifically, the new regulation, which will be directly applicable in all EU member states, aims at simplifying and streamlining the approval of clinical trials in the EU. For instance, the new Clinical Trials Regulation provides for a streamlined application procedure using a single entry point and strictly defined deadlines for the assessment of clinical trial applications.

Marketing Authorization

To obtain a marketing authorization for a product under the EU regulatory system (the equivalent of the NDA process in the United States), an applicant must submit an MAA, either under a centralized procedure administered by the EMA or one of the procedures administered by competent authorities in EU member states (decentralized procedure, national procedure, or mutual recognition procedure). A marketing authorization may be granted only to an applicant established in the EU. Regulation (EC) No. 1901/2006 provides that prior to obtaining a marketing authorization in the EU, an applicant must demonstrate compliance with all measures included in an EMA-approved Pediatric Investigation Plan, or PIP, covering all subsets of the pediatric population, unless the EMA has granted a product-specific waiver, class waiver, or a deferral for one or more of the measures included in the PIP.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all EU member states. Pursuant to Regulation (EC) No. 726/2004, the centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases, including products for the treatment of cancer. For products with a new active substance indicated for the treatment of other diseases and products that are highly innovative or for which a centralized process is in the interest of patients, the centralized procedure may be optional.

Under the centralized procedure, the Committee for Medicinal Products for Human Use, or the CHMP, established by the EMA is responsible for conducting the assessment of a product to define its risk/benefit profile. Under the centralized procedure, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops when additional information or written or oral explanation is to be provided by the applicant in response to questions of the CHMP. Accelerated evaluation may be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and, in particular, from the viewpoint of therapeutic innovation.

If the CHMP accepts such a request, the time limit of 210 days will be reduced to 150 days, but it is possible that the CHMP may revert to the standard time limit for the centralized procedure if it determines that it is no longer appropriate to conduct an accelerated assessment.

Periods of Authorization and Renewals

A marketing authorization is valid for five years, in principle, and it may be renewed after five years on the basis of a reevaluation of the risk benefit balance by the EMA or by the competent authority of the authorizing Member State. To that end, the marketing authorization holder must provide the EMA or the competent authority with a consolidated version of the file in respect of quality, safety and efficacy, including all variations introduced since the marketing authorization was granted, at least six months before the marketing authorization ceases to be valid. Once renewed, the marketing authorization is valid for an unlimited period, unless the European Commission or the competent authority decides, on justified grounds relating to pharmacovigilance, to proceed with one additional five-year renewal period. Any authorization that is not followed by the placement of the drug on the EU market (in the case of the centralized procedure) or on the market of the authorizing Member State within three years after authorization ceases to be valid.

Regulatory Requirements after Marketing Authorization

Following approval, the holder of the marketing authorization is required to comply with a range of requirements applicable to the manufacturing, marketing, promotion and sale of the medicinal product. These include compliance with the EU's stringent pharmacovigilance or safety reporting rules, pursuant to which post-authorization studies and additional monitoring obligations can be imposed. In addition, the manufacturing of authorized products, for which a separate manufacturer's license is mandatory, must also be conducted in strict compliance with the EMA's cGMP requirements and comparable requirements of other regulatory bodies in the EU, which mandate the methods, facilities and controls used in manufacturing, processing and packing of drugs to assure their safety and identity. Finally, the marketing and promotion of authorized products, including industry-sponsored continuing medical education and advertising directed toward the prescribers of drugs and/or the general public, are strictly regulated in the EU under Directive 2001/83EC, as amended.

Orphan Drug Designation and Exclusivity

Regulation (EC) No. 141/2000 and Regulation (EC) No. 847/2000 provide that a product can be designated as an orphan drug by the European Commission if its sponsor can establish: that the product is intended for the diagnosis, prevention or treatment of (1) a life-threatening or chronically debilitating condition affecting not more than five in ten thousand persons in the EU when the application is made, or (2) a life-threatening, seriously debilitating or serious and chronic condition in the EU and that without incentives it is unlikely that the marketing of the drug in the EU would generate sufficient return to justify the necessary investment. For either of these conditions, the applicant must demonstrate that there exists no satisfactory method of diagnosis, prevention, or treatment of the condition in question that has been authorized in the EU or, if such method exists, the drug has to be of significant benefit compared to products available for the condition.

An orphan drug designation provides a number of benefits, including fee reductions, regulatory assistance and the possibility to apply for a centralized EU marketing authorization. Marketing authorization for an orphan drug leads to a ten-year period of market exclusivity. During this market exclusivity period, neither the EMA nor the European Commission or the EU member states can accept an application or grant a marketing authorization for a "similar medicinal product." A "similar medicinal product" is defined as a medicinal product containing a similar active substance or substances as contained in an authorized orphan medicinal product, and which is intended for the same therapeutic indication. The market exclusivity period for the authorized therapeutic indication may, however, be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan drug designation because, for example, the product is sufficiently profitable not to justify market exclusivity.

PRC Regulation

In order to protect our potential market in the PRC, we have obtained an exclusive license of certain PRC patents directed to certain of the drug candidates that we are developing and are currently seeking approval of additional patent and other IP filings in the PRC. We do not otherwise conduct business in the PRC. Seeking IP approval in the PRC subjects us to some of the rules and practices of the PRC government. Since the Company intends eventually to market its products in the PRC, at least some of our drug candidates may become subject to regulatory approval and marketing authorization in the PRC.

Hong Kong Regulation

The operations of AML Clinic in Hong Kong are subject to certain general laws and regulations in relation to clinic medical professionals, trade description and safety of consumer goods, medical advertisement and importation, exportation, dealing in and sale of pharmaceutical products and drugs.

Medical Clinics Ordinance

The Medical Clinics Ordinance provides for the registration, control and inspection of medical clinics. It requires a medical clinic to be registered, with name and address and other prescribed particulars. "Medical clinic" means any premises used or intended to be used for the medical diagnosis or treatment of persons suffering from, or believed to be suffering from, any disease, injury or disability of mind or body, with specific exceptions, including private consulting rooms used exclusively by registered medical practitioners in the course of their practice on their own account and not bearing any title or description which includes the word "clinic" or "polyclinic" in the English language.

The application of registration may be refused if:

(i) the income derived or to be derived from the establishment or operation of the clinic is not, or will not be, applied solely towards the promotion of the objects of the clinic; or

(ii) any portion of such income, except payment of remuneration to employed registered medical practitioners, nurses and menial servants, will be paid by way of dividend, bonus or otherwise howsoever by way of profit to the applicant himself, or to any persons properly so employed, or to any other persons howsoever.

We do not believe that the Medical Clinic Ordinance is applicable to the business of our Company and its subsidiaries, having considered, among others, the following:

(iii) the legislative intent behind the Medical Clinics Ordinance was to provide for registration of non-profit making clinics;

(iv) the Food and Health Bureau of Hong Kong published a consultation document, "Regulation of Private Healthcare Facilities" in 2014 which specifically states that the Medical Clinics Ordinance and the Code of Practice For Clinics Registered Under The Medical Clinics Ordinance (Chapter 343 of the Laws of Hong Kong) set out the regulatory framework for non-profit-making medical clinics and that other private healthcare facilities, such as ambulatory medical centers and clinics operated by medical groups or individual medical practitioners, are not subject to direct statutory control beyond the regulation of an individual's professional practice; and

(v) our business is one which makes and intends to continue making profit as a listed entity. The payment of bonuses to some of our Hong Kong Doctors is clearly a reflection of the profit-making nature of our business.

Hence, we do not believe that AML Clinic is required to be registered under the Medical Clinics Ordinance.

Waste Disposal Ordinance

The Waste Disposal Ordinance (Chapter 354 of the Laws of Hong Kong) ("WDO") and the Waste Disposal (Clinical Waste) (General) Regulation (Chapter 354O of the Laws of Hong Kong) (the "WDR") provide for, among others, the control and regulation of the production, storage, collection and disposal of clinical waste.

Under the WDO, clinical waste means waste consisting of any substance, matter or thing generated in connection with:

- a dental, medical, nursing or veterinary practice;
- any other practice, or establishment (howsoever described), that provides medical care and services for the sick, injured, infirm or those who require medical treatment;
- dental, medical, nursing, veterinary, pathological or pharmaceutical research; or
- a dental, medical, veterinary or pathological laboratory practice,

and which consists wholly or partly of any of the materials specified in one or more of the groups listed below:

- used or contaminated sharps;
- laboratory waste;
- human and animal tissues;
- infectious materials;
- dressings; and
- such other wastes as specified by the Director of the Environmental Protection Department ("EPD") of Hong Kong.

Given the medical services provided by AML Clinic and the research works in our R&D Center may produce used or contaminated sharps such as syringes and needles as well as dressings, we are subject to WDO, WDR and the Code of Practice.

Public Health and Municipal Services Ordinance

We intend to first launch market NativusWell® (NLS-2) in Hong Kong. In Hong Kong, natural supplements are defined as "health food" products. "Health food" containing medicines are subject to the Pharmacy and Poisons Ordinance (Cap 138) and such "health food" containing Chinese medicines are regulated by the Chinese Medicine Ordinance (Cap 549), where they must meet the requirements in respect of safety, quality and efficacy before they can be registered.

For other "health food" products which cannot be classified as Chinese medicine or western medicine are regulated under the Public Health and Municipal Services Ordinance (Cap 132) as general food products. The Public Health and Municipal Services Ordinance requires the manufacturers and sellers of food to ensure that their products are fit for human consumption and comply with the requirements in respect of food safety, food standards and labelling. In addition, all prepackaged food should bear labels which correctly list out the ingredients of the food under the Food and Drugs (Composition and Labelling) Regulations (Cap 132W) under the Ordinance.

The NativusWell® (NLS-2) is made with the bioactive ingredient extracted Chinese yam powder and does not contain any western or Chinese medicine; therefore, registration is not required under the local laws for marketing in Hong Kong. We will, however, ensure the compliance of the Food and Drugs (Composition and Labelling) Regulations (Cap 132W) with by proper labelling in place.

Rest of the World Regulation

For other countries in the world, the requirements governing the conduct of clinical trials, medical product licensing, pricing and reimbursement vary from country to country. In all cases if clinical trials are required, they must be conducted in accordance with cGCP requirements and the applicable regulatory requirements and the ethical principles having their origin in the Declaration of Helsinki.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

C. Our Structure

See "Item 4. Information on the Company – A. History and Development of the Company."

D. Property, plants and equipment

We have several operating leases for offices, laboratories and clinic. Our offices are located in London, New York and Hong Kong.

Our office space in London consists of approximately 172 square feet under a lease that commenced in August 2019, last renewed in March 2022, expires in May 2022 and has a rent of $4,246 per month. Our office space in New York consists of approximately 95 square feet under a lease that commenced in February 2020, which will automatically renew until 1 month's notice for termination, and has a rent of $1,844 per month. Our facilities in Hong Kong consists of: (i) 2,021 square feet lab space under a lease that commenced in March 2020 and expires in March 2023, that carries a monthly rent of $6,348 and which is used for the center for R&D; (ii) 851 square feet office space under a lease that commenced in December 2017 and expired in December 2020, renewed in December 2020 and expires in March 2023 with a monthly rent of $2,509, (the "HKSTP Office Space"); and (iii) 3,173 square feet space under a lease that commenced in March 2018 and expires in March 2022, renewed in March 2022 and expires in March 2024 with an initial monthly rent of $31,923 (the "AML Lease", which is home to AML Clinic).

Payments under operating leases are expensed on a straight-line basis over the periods of the respective leases, and the terms of the leases do not contain rent escalation, contingent rent, and renewal or purchase options.

We believe our current facilities are sufficient to meet our needs.

Item 4A. UNRESOLVED STAFF COMMENTS

Not applicable.

Item 5. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

The following discussion of our financial condition and results of operations is based upon and should be read in conjunction with our consolidated financial statements and their related notes included in this annual report.

For purposes of Item 5, reference to the "We", "Our", "Ours" or "Group" means Aptorum Group Limited and all of its subsidiaries.

This annual report includes consolidated financial statements for the years ended December 31, 2021, 2020 and 2019. However, as permitted by Instruction 6 to Item 5 of Form 20-F, a discussion of the changes in our results of operations for the years ended December 31, 2019 and 2018 has been omitted from this annual report, but may be found in "Item 5. Operating And Financial Review And Prospects" in our annual report on Form 20-F for the year ended December 31, 2019, filed with the SEC on April 29, 2020.

This annual report contains forward-looking statements that are based on our management's beliefs and assumptions and on information currently available to us. These statements involve known and unknown risks, uncertainties and other factors which may cause our actual results, performance or achievements to be materially different from those expressed or implied by the forward-looking statements.

You can identify these forward-looking statements by words or phrases such as "may," "will," "expect," "anticipate," "aim," "estimate," "intend," "plan," "believe," "potential," "continue," "is/are likely to" or other similar expressions. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy and financial needs. These forward-looking statements include, among other things, statements relating to:

- our goals and strategies;
- our future business development, financial conditions and results of operations;
- our expectations regarding demand for and market acceptance of our products once available;
- our expectations regarding our development and commercialization of our therapeutics;
- competition in our industry; and
- relevant government policies and regulations relating to our industry.

You should thoroughly read this annual report and the documents that we refer to in this annual report with the understanding that our actual results in the future may be materially different from or worse than what we expect. We qualify all of our forward-looking statements by these cautionary statements. Other sections of this annual report include additional factors which could adversely affect our business and financial performance. Moreover, we operate in an evolving environment. New risk factors and uncertainties emerge from time to time and it is not possible for our management to predict all risk factors and uncertainties, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements. Important risks and factors that could cause our actual results to be materially different from our expectations are generally set forth in "Item 3. Key Information—D. Risk Factors" and elsewhere in this annual report. We caution you that our businesses and financial performance are subject to substantial risks and uncertainties.

The forward-looking statements made in this annual report relate only to events or information as of the date on which these statements are made in this annual report. We undertake no obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, after the date of this annual report. You should not rely upon forward-looking statements as predictions of future events.

A. Operating Results

Overview

We are a clinical stage biopharmaceutical company dedicated to the discovery, development and commercialization of therapeutic assets to treat diseases with unmet medical needs, particularly in oncology (including orphan oncology indications) and infectious diseases. The pipeline of Aptorum is also enriched through (i) the establishment of drug discovery platforms that enable the discovery of new therapeutics assets through, e.g. systematic screening of existing approved drug molecules, and microbiome-based research platform for treatments of metabolic diseases, and (ii) the co-development of a novel molecular-based rapid pathogen identification and detection diagnostics technology with Accelerate Technologies Pte Ltd, commercialization arm of the Singapore's Agency for Science, Technology and Research.

In addition to the above main focus, we are also pursuing therapeutic projects in neurology, gastroenterology, metabolic disorders, women's health and other disease areas. We also have projects focused on natural supplements for women undergoing menopause and experiencing related symptoms. We also opened a medical clinic, AML Clinic, in June 2018.

Based on our evaluation of preliminary data and our consideration of a number of factors including substantial unmet needs, benefits over existing therapies, potential market size, competition in market, the Company decides how to prioritize its resources among projects. Overall, our rationale for selecting Lead Projects is not based on any mechanical formula or rigid selection criteria, but instead focused on a combination of the factors and individual attributes of the Lead Projects themselves. See "Item 3. Key Information—D. Risk Factors— Risks Related to the Preclinical and Clinical Development of Our Drug Candidates— "Preclinical development is a long, expensive and uncertain process, and we may terminate one or more of our current preclinical development programs." and "Management has discretion to terminate the development of any of our projects at any time."

Our current business consists of "therapeutics" and "non-therapeutics" segments. However, our focus is on the therapeutics segments. Because of the risks, costs and extended development time required for successful drug development, we have determined to pursue projects within our non-therapeutics segments, such as AML Clinic, to provide some interim revenue, as well as diagnostics technology and natural supplements that may be brought to market and generate revenue more quickly.

Therapeutics Segment. In our therapeutics segment ("Aptorum Therapeutics Group"), we are currently seeking to develop various drug molecules (including projects seeking to use extracts or derivatives from natural substances to treat diseases) and certain technologies for the treatment of human disease conditions to tackle unmet needs, in particular, two of our Lead Projects targeting infectious disease and cancer (including orphan oncology indications). In addition to our main areas of focus above, we are also pursuing therapeutic projects in neurology, gastroenterology, metabolic disorders, women's health and other disease areas. Aptorum Therapeutics Group is operated through Aptorum's wholly-owned subsidiary, Aptorum Therapeutics Limited, a Cayman Islands exempted company with limited liability, whose principal place of business is in Hong Kong and whose subsidiaries (who we sometimes refer to herein as project companies) are based in the United Kingdom, Singapore and Hong Kong.

Non-Therapeutics Segment. The non-therapeutics segment ("Aptorum Non-Therapeutics Group") encompasses three businesses: (i) diagnostics projects including a novel molecular-based rapid pathogen identification and detection diagnostics ("RPIDD") technology, (ii) natural supplements including NativusWell®, and (iii) AML Clinic. RPIDD technology is currently under co-development with A*STAR. The core objectives of RPIDD are to rapidly and accurately identify and detect existing or emerging unknown pathogens (including DNA/RNA-based viruses such as coronavirus, antibiotic-resistant bacteria, fungi, etc.), in a cost-effective, unbiased and broad-spectrum manner, through liquid biopsy (patients' blood samples and is potentially adaptable for other sample types), genome sequencing and artificial intelligence driven software analytics. A key objective is also to develop RPIDD to leverage existing and emerging Next-Generation Sequencing platforms for pathogenic genome sequencing analysis. The sale of natural supplements is operated through Nativus Life Sciences Limited ("Nativus"), a subsidiary of Aptorum Therapeutics Limited. The production of Aptorum Group's dioscorea opposita bioactive nutraceutical tablets has commenced production in Canada and will be marketed under the brand name NativusWell®; once ready for sale, we intend to sell it online and in physical healthcare stores. The outpatient clinic is operated through our subsidiary, Aptorum Medical Limited. Effective as of March 2018, we leased office space in Central, Hong Kong as the home to our medical clinic ("AML Clinic"). AML Clinic commenced operations under the name of Talem Medical in June 2018.

Our goal is to develop a broad range of novel and repurposed therapeutics and diagnostics technology across a wide range of disease/therapeutic areas. Key components of our strategy for achieving this goal include: (for details of our strategy, See "Item 4. Information on the Company – B. Business Overview – Our Strategy")

- Developing therapeutic and diagnostic innovations across a wide range of disease/therapeutic areas;
- Selectively expanding our portfolio with potential products that may be able to attain orphan drug designation and/or satisfy current unmet medical needs;
- Collaborating with leading academic institutions and CROs;
- Expanding our in-house pharmaceutical development center;
- Leveraging our management's expertise, experience and commercial networks;
- Obtaining and leveraging government grants to fund project development.

We have devoted a substantial portion of the proceeds from our offerings to our Lead Projects. Our Lead Projects are ALS-4, SACT-1 and RPIDD. In January 2022, we announced that we have completed Phase 1 clinical trial for ALS-4 and Phase 1 clinical trial for assessing relative bioavailability and food effect of SACT-1. No serious adverse events observed and no relevant clinical changes in respect of vital signs. We expect to be able to submit IND application to the US FDA in 2022 seeking to (i) initiate a Phase 2 clinical study to assess the efficacy of ALS-4 in patients and (ii) initiate our planned Phase 1b/2a trial for SACT-1, subject to regulatory review. We also commenced clinical validation of our molecular based RPIDD and will continue to undergo validations during 2022, in parallel with its pre-commercialization process in 2022.

Registered Direct Offering

On February 28, 2020, we closed a Registered Direct Offering with certain non-affiliated institutional investors (the "Non-affiliated Purchasers") and Jurchen Investment Corporation, our largest shareholder and wholly owned by Mr. Ian Huen, our Chief Executive Officer (the "Affiliated Purchaser" collectively with the Non-affiliated Purchasers, the "Purchasers"). The Purchasers purchased an aggregate of 1,351,350 Class A Ordinary Shares and warrants ("Warrants") to purchase 1,351,350 Class A Ordinary Shares, for gross proceeds of approximately $10 million. The Warrants are exercisable immediately following the date of issuance for a period of seven years at an initial exercise price of $7.40. The purchase price for each Share and the corresponding Warrant is $7.40.

We agreed from the date of the purchase agreement until the date that is the later of (i) the 12 month anniversary of the closing date or (ii) one or more subsequent issuance by the Company or any of its subsidiaries of ordinary share equivalent having aggregate gross proceeds of at least $20,000,000, the Purchasers shall have the right to participate in the subsequent financing up to an amount equal to 50% of the Subsequent Financing (the "Participation Maximum") on the same terms, conditions and price provided for in the Subsequent Financing.

We also agreed certain most favored nation treatment of the all the Purchasers pursuant to which each Purchaser will have the opportunity to automatically have the same benefit if the terms and conditions with respect to this Purchase Agreement or any securities offered therein the Company offered to the other Purchasers are more favorable.

Public Offering

On July 24, 2020, our Class A Ordinary Shares began to trade on the Professional Compartment of the regulated market of Euronext Paris under the symbol "APM" and are denominated in Euros on Euronext Paris.

On October 2, 2020, the Company completed a public offering of 2,769,231 shares of Class A ordinary shares, $1.00 par value per share, and warrants to purchase up to an aggregate of 2,769,231 Class A Ordinary Shares, at a price of $3.25 per share, for gross proceeds of approximately $9 million. In connection with the Offering, the Company issued Warrants to purchase an aggregate of 2,769,231 Class A Ordinary Shares. The warrants have an exercise price of $3.25 per Class A Ordinary Share, are exercisable upon issuance and will expire five years from the date of issuance. The exercise price of the warrants is subject to adjustment for stock splits, reverse splits, and similar capital transactions as described in the form of warrants.

In connection with the public offering, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with certain investors on September 29, 2020. The Purchase Agreement contains customary representations and warranties of the Company, termination rights of the parties, and certain indemnification obligations of the Company and ongoing covenants of the Company.

At the Market Offering

On March 26, 2021, the Company entered into an at the market offering agreement (the "Sales Agreement"), with H.C. Wainwright & Co., LLC, acting as our sales agent (the "Sales Agent"), relating to the sale of our Class A Ordinary Shares, offered pursuant to the prospectus supplement and the accompanying prospectus to the registration statement on Form F-3 (File No. 333-235819) (such offering, the "ATM Offering", or "At The Market Offering"). In accordance with the terms of the Sales Agreement, we may offer and sell shares of our Class A Ordinary Shares having an aggregate offering price of up to $15,000,000 from time to time through the Sales Agent under such prospectus supplement and the accompanying prospectus. As of the date of this annual report, we have not yet issued any Class A Ordinary Shares pursuant to the ATM Offering.

Private Placement Offering

On May 26, 2021, the Company entered into a private placement shares purchase agreement with Jurchen, issuing 1,387,925 Class A Ordinary Shares at $2.882 per share, representing a 10% premium to the last closing price of the Company's Class A Ordinary Shares on the NASDAQ stock exchange on that date. The Company received aggregate gross proceeds of $4,000,000 from the purchase of these shares.

Factors Affecting our Results of Operations

Research and Development Expenses

We believe our ability to successfully develop innovative drug candidates will be the primary factor affecting our long-term competitiveness, as well as our future growth and development. Creating high quality global first-in-class or best-in-class drug candidates requires significant investment of resources over a prolonged period of time, and a core part of our strategy is to continue making sustained investments in this area. As a result of this commitment, our pipeline of drug candidates has been steadily advancing. For more information on the nature of the efforts and steps necessary to develop our drug candidates, see Item 4.B. "Business Overview—Lead Projects, Natural Supplements and Other Projects under Development."

Our drug candidates are still in development, and we have incurred and will continue to incur significant research and development costs for pre-clinical studies and clinical trials. We expect that our research and development expenses will significantly increase in future periods in line with the advancement and expansion of the development of our drug candidates.

Research and development expenses include:

- employee and consultant compensation related expenses, including salaries, benefits and share based compensation expenses;
- expenses incurred for payments to CROs, investigators and clinical trial sites that conduct our clinical studies;
- the cost of acquiring IP rights which did not meet the criteria of capitalization under the U.S. GAAP;
- cost associated with sponsored research programs with various universities and research institutions
- facilities, depreciation, and other expenses, which include office leases and other overhead expenses; and
- costs associated with patent applications.

Research and development expenses incurred totaled $10.9 million, $11.6 million and $6.9 million for the years ended December 31, 2021, 2020 and 2019, respectively, representing approximately 52.4%, 54.7% and 37.0% of our total operating expenses for the respective period.

We have been able to fund the research and development expenses for our drug candidates through a range of sources, including the proceeds raised from our public offering and follow-on offerings on Nasdaq, private placement to other investors and line of credit facilities from shareholders, related parties and banks.

This diversified approach to funding allows us to not depend on any one method of funding for our research and development activities, thereby reducing the risk that sufficient financing will be unavailable as we continue to accelerate the development of our drug candidates.

RESULTS OF OPERATIONS

Results of Operations for the Years ended December 31, 2021 and 2020

Financial statements and information are presented for the years ended December 31, 2021 and 2020.

The following table summarizes our results of operations for the years ended December 31, 2021 and 2020.

	Year Ended December 31, 2021	Year Ended December 31, 2020
Revenue		
Healthcare services income	$ 1,541,778	$ 911,509
Operating expenses		
Cost of healthcare services	(1,459,924)	(1,015,023)
Research and development expenses	(10,869,642)	(11,586,923)
General and administrative fees	(5,409,302)	(4,853,488)
Legal and professional fees	(2,617,834)	(2,854,225)
Other operating expenses	(392,511)	(877,391)
Total expenses	(20,749,213)	(21,187,050)
Other (loss) income, net		
(Loss) gain on investments in marketable securities, net	(8,031,595)	25,241,556
Loss on investments in derivatives, net	(4,289)	(199,031)
Gain on use of digital currencies	4,918	-
Gain on derecognition of non-financial assets	75,000	-
Interest expense, net	(93,601)	(243,628)
Rental income	-	30,894
Loss on disposal of subsidiaries	(3,638)	-
Sundry income	146,347	365,917
Total other (loss) income, net	(7,906,858)	25,195,708
Net (loss) income	(27,114,293)	4,920,167

Impact of COVID-19 Outbreak

On January 30, 2020, the World Health Organization declared the coronavirus outbreak a “Public Health Emergency of International Concern” and on March 10, 2020, declared it to be a pandemic. Actions taken around the world to help mitigate the spread of the coronavirus include restrictions on travel, and quarantines in certain areas, and forced closures for certain types of public places and businesses. The coronavirus and actions taken to mitigate it have had and are expected to continue to have an adverse impact on the economies and financial markets of many countries, including the geographical area in which the Group operates. While the closures and limitations on movement, domestically and internationally, are expected to be temporary, if the outbreak continues on its current trajectory the duration of the supply chain disruption could reduce the availability, or result in delays, of materials or supplies to and from the Group, which in turn could materially interrupt the Group’s business operations. There was no material negative impact on the Group’s 2021 and 2020 consolidated result of operations. However, given the speed and frequency of the continuously evolving developments with respect to this pandemic, the Group cannot reasonably estimate the magnitude of the impact to its consolidated results of operations in the future. We have taken every precaution possible to ensure the safety of our employees.

Additionally, it is reasonably possible that estimates made in the consolidated financial statements have been, or will be, materially and adversely impacted in the near term as a result of these conditions, including losses on investments; impairment losses related to long-lived assets and current obligations.

Revenue

Healthcare services income was $1,541,778 and $911,509 for the years ended December 31, 2021 and 2020, which related to the service income derived from the AML clinic. The increase in revenue was mainly due to the number of patients increased when compared to last year.

Cost of healthcare services

Cost of healthcare services was $1,459,924 and $1,015,023 for the years ended December 31, 2021 and 2020, which related to the cost incurred by the AML clinic. The increase in cost of healthcare services was mainly due to the number of patients increased when compared to last year.

Research and development expenses

The following table sets forth a summary of our research and development expenses for the years ended December 31, 2021 and 2020. The decrease in research and development expenses was mainly due to less sponsored research to universities in current period, partly offset by the increase in contracted research organizations services and consultation due to the development progress of our lead projects.

	Year Ended December 31, 2021	Year Ended December 31, 2020
Research and Development Expenses:		
Payroll expenses	$ 1,320,020	$ 1,145,550
Contracted research organizations services	4,569,538	4,184,285
Sponsored research	248,865	1,561,273
Amortization and depreciation	961,447	986,836
Consultation	3,214,824	2,906,222
Other R&D expenses	554,948	515,413
Impairment loss of intangible assets	-	200,000
Milestone payment	-	87,344
Total Research and Development Expenses	$ 10,869,642	$ 11,586,923

General and administrative fees

The following table sets forth a summary of our general and administrative expenses for the years ended December 31, 2021 and 2020. The increase in general and administration fees was mainly due to increase in bonus expenses to our directors, employees, external consultants and advisors. The increase is partly offset by a significant decrease in travelling expenses due to the outbreak of COVID-19.

	Year Ended December 31, 2021	Year Ended December 31, 2020
General and Administrative Fees:		
Payroll expenses	$ 3,951,421	$ 3,255,274
Rent and rates	288,806	366,615
Travelling expenses	21,857	140,019
Amortization and depreciation	231,131	347,824
Insurance	555,159	509,593
Advertising and marketing expenses	95,953	55,430
Other expenses	264,975	178,733
Total General and Administrative Fees	5,409,302	4,853,488

Legal and professional fees

For the years ended December 31, 2021 and 2020, the legal and professional fees were $2,617,834 and $2,854,225, respectively. The decrease in legal and professional fees was mainly due to less one-off professional services engaged during 2021.

Other operating expenses

For the years ended December 31, 2021 and 2020, the other operating expenses was $392,511 and $877,391, respectively. The decrease in other operating expenses was mainly due to an impairment loss and loss on disposal of fixed assets in 2020 while there were no such expenses in 2021, and decreased exchange loss during 2021.

Other (loss) income, net

For the years ended December 31, 2021 and 2020, the other (loss) income, net was $(7,906,858) and $25,195,708, respectively. The other loss, net in 2021 was mainly consists of loss on investment in marketable securities, net; while the other income, net in 2020 was mainly derived from gains on investment in marketable securities.

Net (loss) income attributable to Aptorum Group Limited

For the years ended December 31, 2021 and 2020, net (loss) income attributable to Aptorum Group Limited (excluding net loss attributable to non-controlling interests) was $(25,048,389) and $6,311,340, respectively.

Results of Operations for the Years ended December 31, 2020 and 2019

Financial statements and information are presented for the years ended December 31, 2020 and 2019.

The following table summarizes our results of operations for the years ended December 31, 2020 and 2019.

	Year Ended December 31, 2020	Year Ended December 31, 2019
Revenue		
Healthcare services income	$ 911,509	$ 535,166
Operating expenses		
Cost of healthcare services	(1,015,023)	(794,545)
Research and development expenses	(11,586,923)	(6,939,051)
General and administrative fees	(4,853,488)	(7,373,425)
Legal and professional fees	(2,854,225)	(3,405,705)
Other operating expenses	(877,391)	(220,891)
Total expenses	(21,187,050)	(18,733,617)
Other income (loss), net		
Gain (loss) on investments in marketable securities, net	25,241,556	(81,839)
Gain on non-marketable investments	-	1,147,190
(Loss) gain on investments in derivatives, net	(199,031)	87,599
Gain on use of digital currencies	-	46,717
Gain on extinguishment of convertible debts	-	1,198,490
Changes in fair value of warrant liabilities	-	(866,300)
Interest expense, net	(243,628)	(3,699,672)
Rental income	30,894	16,868
Sundry income	365,917	232,460
Total other income (loss), net	25,195,708	(1,918,487)
Net income (loss)	4,920,167	(20,116,938)

Revenue

Healthcare services income was $911,509 and $535,166 for the years ended December 31, 2020 and 2019, which related to the service income derived from the AML clinic. The increase in revenue was mainly due to the number of patients increased when compared to last year.

Cost of healthcare services

Cost of healthcare services was $1,015,023 and $794,545 for the years ended December 31, 2020 and 2019, which related to the cost incurred by the AML clinic. The increase in cost of healthcare services was mainly due to the number of patients increased when compared to last year.

Research and development expenses

Research and development expenses comprised of costs incurred related to research and development activities, including payroll expenses to our research and development staff, sponsored research programs with various universities and research institutions and costs in acquiring IP rights which did not meet the criteria of capitalization under the U.S. GAAP. The following table sets forth a summary of our research and development expenses for the years ended December 31, 2020 and 2019. The increase in research and development expenses was mainly due to the increase in consultation services provided by our consultants, advisors and contracted research organizations as a results of the progress of our projects' development.

	Year Ended December 31, 2020	Year Ended December 31, 2019
Research and Development Expenses:		
Payroll expenses	$ 1,145,550	$ 1,784,647
Sponsored research	1,561,273	1,403,689
Amortization and depreciation	986,836	873,239
Consultation	7,090,507	2,431,997
Other R&D expenses	515,413	445,479
Impairment loss of intangible assets	200,000	-
Milestone payment	87,344	-
Total Research and Development Expenses	11,586,923	6,939,051

General and administrative fees

The following table sets forth a summary of our general and administrative expenses for the years ended December 31, 2020 and 2019. The decrease in general and administration fees was mainly due to decrease in bonus expenses to our directors, employees, external consultants and advisors. Also there was a significant decrease in business trips and sponsoring conference in 2020 due to the outbreak of COVID-19.

	Year Ended December 31, 2020	Year Ended December 31, 2019
General and Administrative Fees:		
Payroll expenses	$ 3,255,274	$ 4,329,039
Rent and rates	366,615	490,975
Travelling expenses	140,019	797,446
Amortization and depreciation	347,824	426,378
Insurance	509,593	620,312
Advertising and marketing expenses	55,430	316,227
Other expenses	178,733	393,048
Total General and Administrative Fees	4,853,488	7,373,425

Legal and professional fees

For the years ended December 31, 2020 and 2019, the legal and professional fees were $2,854,225 and $3,405,705, respectively. The decrease in legal and professional fees was mainly due to the decrease of consultancy services engaged during 2020.

Other operating expenses

For the years ended December 31, 2020 and 2019, the other operating expenses was $877,391 and $220,891, respectively. The increase in other operating expenses was mainly due to the impairment loss and loss on disposal of fixed assets, and increased exchange loss during 2020.

Other income (loss), net

For the years ended December 31, 2020 and 2019, the other income (loss), net was $25,195,708 and $(1,918,487), respectively. The other income, net in 2020 was mainly derived from gains on investment in marketable securities. The other loss, net in 2019 was mainly consists of interest expense, net incurred by convertible debts with beneficial conversion feature.

Net income (loss) attributable to Aptorum Group Limited

For the years ended December 31, 2020 and 2019, net income (loss) attributable to Aptorum Group Limited (excluding net loss attributable to non-controlling interests) was $6,311,340 and $(18,686,762), respectively.

B. Liquidity and Capital Resources

In April 2022, the Group accepted a banking facilities agreement offered by a bank. According to the banking facilities agreement, the bank offers a revolving loan of up to $3 million to the Group. The Group may draw down from the revolving loan at any time through the day immediately preceding 12 months of the agreement effective date. Interest will be payable on demand on the outstanding loans at the rate of either Hong Kong Interbank Offered Rate ("HIBOR") plus 1.5% per annum for loan in Hong Kong Dollars, or Secured Overnight Financing Rate ("SOFR") compounded rate plus 1.5% per annum for loan in the United State Dollars. The loan will be secured by a charge over deposits of up to $3 million when the Group draw down.

The Group reported a net loss of $27,114,293 and net operating cash outflow of $14,651,633 for the year ended December 31, 2021. In addition, the Group had an accumulated deficit of $55,537,515 as of December 31, 2021. The Group's operating results for future periods are subject to numerous uncertainties and it is uncertain if the Group will be able to reduce or eliminate its net losses for the foreseeable future. If management is not able to generate significant revenues from its product candidates currently in development, the Group may not be able to achieve profitability.

The Group's principal sources of liquidity have been cash and line of credit facilities from related parties and banks. As of the date of issuance of the consolidated financial statements, the Group has approximately $4.2 million of restricted and unrestricted cash, and $15 million and $3 million, respectively, of undrawn line of credit facilities from related parties and banks. In addition, the Group will need to maintain its operating costs at a level through strictly cost control and budget to ensure operating costs will not exceed such aforementioned sources of funds in order to continue as a going concern for a period within one year after the issuance of its consolidated financial statements.

The Group believes that available cash, together with the efforts from aforementioned management plan and actions, should enable the Group to meet current anticipated cash needs for at least the next 12 months after the date that the consolidated financial statements are issued and the Group has prepared the consolidated financial statements on a going concern basis. We may, however, need additional capital in the future to fund our continued operations. If we determine that our cash requirements exceeds the amount of cash and cash equivalents we have at the time, we may seek to issue equity or debt securities or obtain credit facilities. The issuance and sale of additional equity or convertible debts would result in further dilution to our shareholders. The incurrence of indebtedness would result in increased fixed obligations and could result in operating covenants that might restrict our operations. We cannot assure you the financing will be available in amounts or on terms acceptable to us, if at all.

Condensed Summary of Cash Flows for the Years Ended December 31, 2021 and 2020

	Year Ended December 31, 2021	Year Ended December 31, 2020
Net cash used in operating activities	$ (14,651,633)	$ (15,931,913)
Net cash provided by investing activities	16,507,039	1,842,164
Net cash provided by financing activities	2,780,725	12,421,932
Net increase (decrease) in cash and restricted cash	4,636,131	(1,667,817)

Operating activities

Net cash used in operating activities amounted to $14.7 million and $15.9 million for the years ended December 31, 2021 and 2020. The decrease in net cash used in operating activities is mainly due to our decreased operating expenses by $0.5 million and the decreased in changes in other receivables and prepayment by $1.1 million.

Investing activities

Net cash provided by investing activities amounted to $16.5 million and $1.8 million for the year ended December 31, 2021 and 2020. The increase in net cash provided by investing activities was due to the proceeds from disposal of investment in marketable securities of $20.1 million in 2021, partly offset by a loan provided to a related party of $3.4 million.

Financing activities

Net cash provided by financing activities amounted to $2.8 million and $12.4 million for the year ended December 31, 2021 and 2020. The decrease in net cash provided by financing activities was due to the decrease in net proceeds from issuance of Class A Ordinary Shares and warrants by $12.8 million, partly offset by the increase in loan received from related parties of $2.5 million.

Condensed Summary of Cash Flows for the Years Ended December 31, 2020 and 2019

	Year Ended December 31, 2020	Year Ended December 31, 2019
Net cash used in operating activities	$ (15,931,913)	$ (13,382,633)
Net cash provided by (used in) investing activities	1,842,164	(108,061)
Net cash provided by (used in) financing activities	12,421,932	(7,323,371)
Net decrease in cash and restricted cash	(1,667,817)	(20,814,065)

Operating activities

Net cash used in operating activities amounted to $15.9 million and $13.4 million for the years ended December 31, 2020 and 2019. The increase in net cash used in operating activities is mainly due to our increased operating expenses by $2.5 million.

Investing activities

Net cash provided by investing activities amounted to $1.8 million for the year ended December 31, 2020. Net cash used in investing activities amounted to $0.1 million for the year ended December 31, 2019. The change from net cash used in investing activities to net cash provided by investing activities was due to the proceeds from disposal of fixed assets and investment in marketable securities of $1.0 million and $0.9 million, respectively, in 2020.

Financing activities

Net cash provided by financing activities amounted to $12.4 million for the year ended December 31, 2020. Net cash used in financing activities amounted to $7.3 million for the year ended December 31, 2019. The change from net cash used in financing activities to net cash provided by financing activities was due to the net proceeds from issuance of Class A Ordinary Shares and warrants of $16.8 million in 2020.

CAPITAL EXPENDITURES

Our capital expenditures were $0.1 million, $0.2 million and $0.9 million for the years ended December 31, 2021, 2020 and 2019, respectively. These capital expenditures were incurred primarily for investments in facilities, leasehold improvements, equipment and technology.

COMMITMENTS

The following table sets forth our contractual obligations as of December 31, 2021.

	Payment Due by Period			
	Total	less than one year	One to three years	Three to five years
	US$	US$	US$	US$
Operating lease commitments	190,459	164,458	26,001	-
Finance lease	49,358	49,358	-	-
Total	239,817	213,816	26,001	-

Operating lease commitments

We have several operating leases for office, laboratories and clinic. Operating lease commitments reflect our obligation to make payments under these operating leases.

Finance lease

Finance lease obligation reflect our outstanding payment obligations in connections with our hire purchased vehicle.

CONTINGENT PAYMENT OBLIGATIONS

We have entered into agreements with independent third parties for purchasing office and laboratory equipment. As of December 31, 2021, we had non-cancellable purchase commitments of $49,166.

We have additional contingency payment obligations under each of the license agreements, such as milestone payments, royalties, research and development funding, if certain condition or milestone is met.

Milestone payments are to be made upon achievements of certain conditions, such as Investigational New Drugs ("IND") filing or U.S. Food and Drug Administration ("FDA") approval, first commercial sale of the licensed products, or other achievements. The aggregate amount of the milestone payments that we are required to pay up to different achievements of conditions and milestones for all the license agreements signed as of December 31, 2021 are below:

	Amount
Drug molecules: up to the conditions and milestones of	
Preclinical to IND filing	$ 282,564
From entering phase 1 to before first commercial sale	22,276,410
First commercial sale	14,982,051
Net sales amount more than certain threshold in a year	70,769,231
Subtotal	$ 108,310,256
Diagnostics technology: up to the conditions and milestones of	
Before FDA approval	$ 201,155
	$ 108,511,411

For the years ended December 31, 2021, 2020 and 2019, the Group incurred $nil, $129,203 and $nil milestone payments, respectively. For the years ended December 31, 2021, 2020 and 2019, the Group did not incur any royalties or research and development funding, respectively.

C. Research and Development, Patents and Licenses, etc.

As of the date of this annual report, the Company has 8 exclusively licensed technologies in the area of neurology, infectious diseases, gastroenterology, oncology, diagnostics and natural health. In addition, the Company is actively developing 7 proprietary technologies.

For the years ended December 31, 2021, 2020 and 2019, the Group incurred $10,869,642, $11,586,923and $6,939,051, respectively, on research and development expenses.

D. Trend Information

Other than as disclosed elsewhere in this annual report, we are not aware of any material recent trends in production, sales and inventory, the state of the order book and costs and selling prices since our last fiscal year. We are also unaware of any known trends, uncertainties, demands, commitments or events for the year ended December 31, 2021 that are reasonably likely to have a material adverse effect on our revenues, net income, profitability, liquidity or capital resources, or that would cause reported financial information not necessarily to be indicative of future operating results or financial conditions.

E. Critical Accounting Estimates

Our consolidated financial statements have been prepared in accordance with U.S. GAAP, which requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenues and expenses, and related disclosures of contingent liabilities in the consolidated financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities. Changes in the economic environment, financial markets, and any other parameters used in determining such estimates could cause actual results to differ. We believe that the following estimates involve the most significant judgments used in the preparation of our financial statements. The critical accounting estimates should be read in conjunction with our risk factors as disclosed in “Item 3. Key Information—D. Risk Factors.” See note 3 to our consolidated financial statements for the year ended December 31, 2021 for more information. Out of our significant accounting policies, which are described in Note 3—Summary of Significant Accounting Policies of our consolidated financial statements included elsewhere in this Form 20-F, certain accounting policies are deemed “critical,” as they require management’s highest degree of judgment, estimates and assumptions, including (i) fair value measurement; (ii) long-term investments, (iii) impairment of long-lived assets, (iv) revenue recognition, and (v) share based compensation.

Impairment of long-lived assets

We review our long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may no longer be recoverable. When these events occur, we measure impairment by comparing the carrying value of the long-lived assets to the estimated undiscounted future cash flows expected to result from the use of the assets and their eventual disposition. The sum of the expected undiscounted cash flow is sensitive to key assumption such as projected revenue and research and development expenses, which are required management’s judgement. For the year ended December 31, 2020, we recorded $330,445 of impairment loss of buildings in other operating expenses, and $200,000 impairment loss of an unpatented license in research and development expenses. For the year ended December 31, 2021 and 2019, no impairment loss was recorded.

Share based compensation

We use the fair value method of accounting for our stock options granted to directors, employees, external consultants and advisors to measure the cost services received in exchange for the share based awards. Determining the appropriate valuation model and estimating the fair values of share option grants requires the input of subjective assumptions, including expected stock price volatility, risk-free interest rate, expected term from grant date, dividend rate, and dilution factor. The expected volatility assumption is based partially upon the historical volatility of our Class A ordinary shares, which may or may not be a true indicator of future volatility. The assumptions used in calculating the fair values of share option grants represent management’s best estimates, but these estimates involve inherent uncertainties and the application of judgment. As a result, if factors change and different assumptions are used, share-based compensation expense could be significantly different from what we recorded in the current period. Share-based compensation expense is recognized on a graded vesting basis, net of actual forfeitures in the period. In connection with the grant of share options to employees and non-employees, we recorded share-based compensation charges of $1,203,000 and $479,460, respectively, for the year ended December 31, 2021, $1,191,957 and $286,608, respectively, for the year ended December 31, 2020, and $1,180,477 and $432,355, respectively, for the year ended December 31, 2019.

Provision of income tax and valuation allowance for deferred tax asset

Significant judgment is required in determining income tax expense based on tax laws in the various jurisdictions in which we operate. In calculating our effective income tax rate, estimates are required regarding the timing and amount of taxable and deductible items which will adjust the pre-tax income or loss reported in various tax jurisdictions. Through our interpretation of local tax regulations, adjustments to pre-tax income or loss for income or loss reported in various tax jurisdictions are reflected within various tax filings. Although we believe that our estimates and judgments discussed herein are reasonable, actual results may be materially different than the estimated amounts.

We record a valuation allowance to reduce our deferred tax assets to the amount that is more likely than not to be realized. Significant judgment is required in determining the valuation allowance. In assessing the need for a valuation allowance, we consider all sources of taxable income, including projected future taxable income, reversing taxable temporary differences and ongoing tax planning strategies. If it is determined that we are able to realize deferred tax assets in excess of the net carrying value or to the extent we are unable to realize a deferred tax asset, we would adjust the valuation allowance in the period in which such a determination is made, with a corresponding increase or decrease to earnings. As of December 31, 2021 and 2020, we have made fully valuation allowance to deferred tax assets with amount of $12.6 million and $9.6 million, respectively.

Item 6. DIRECTORS, SENIOR MANAGEMENT AND EMPLOYEES

A. Directors and Senior Management

Below is a list of our directors, senior management and any employees upon whose work we are dependent as of the date of this annual report, and a brief account of the business experience of each of them. The business address for the directors and officers of Aptorum Group Limited is 17 Hanover Square, London, W1S 1BN, United Kingdom.

On August 27, 2021, Dr. Angel Ng tendered her resignation as the Company's Chief Operating Officer. Angel's resignation did not result from any disagreement regarding any matter related to the Company's operations, policies or practices.

Name	Age	Position
Executive Officers		
Ian Huen	42	Founder, Chief Executive Officer and Executive Director
Darren Lui	41	President and Executive Director
Clark Cheng	42	Chief Medical Officer and Executive Director
Sabrina Khan	40	Chief Financial Officer
Thomas Lee	49	Head of Research and Development
Non-Management Directors		
Charles Bathurst	67	Independent Non-Executive Director and Chair of Audit Committee
Mirko Scherer	53	Independent Non-Executive Director
Justin Wu	52	Independent Non-Executive Director and Chair of Compensation Committee
Douglas Arner	52	Independent Non-Executive Director and Chair of Nominating and Corporate Governance Committee

Executive Officers

MR. IAN HUEN, Founder, Chief Executive Officer and Executive Director

Mr. Ian Huen is the Founder, Chief Executive Officer and Executive Director of Aptorum Group Limited. He has over 18 years of global asset management experience and previously covered the U.S. healthcare sector as an equity research analyst at Janus Henderson Group plc (formerly known as Janus Capital). Mr. Huen was the financial advisor in the sale of Seng Heng Bank Limited (Macau) to Industrial and Commercial Bank of China in 2007 and was appointed as the vice president of the Board of General Meeting in Industrial and Commercial Bank of China (Macau) Capital Limited in March 2007 for a term of 12 years until March 2019.

As a trustee board member of the Dr. Stanley Ho Medical Development Foundation, Mr. Huen facilitates advisory, development funding, access to research resources across Asia and continues to establish relationships with leading academic institutions to propel innovations in healthcare.

Mr. Huen graduated from Princeton University with an A.B. degree in Economics in June 2001, earned a MA in Comparative and Public History from CUHK in June 2016. Mr. Huen is also a Chartered Financial Analyst ("CFA").

MR. DARREN LUI, **President and Executive Director**

Mr. Darren Lui is the President and an Executive Director of Aptorum Group Limited. Mr. Lui was previously the founder, director and responsible officer of Varengold Capital Securities Limited and Varengold Capital Asset Management Limited in Hong Kong, with subsidiaries operating brokerage, asset management, and investment businesses in Asia established since January 2015.

Prior to this, he was a Director within the Fixed Income Group of Barclays Capital, where he spent over nine years from September 2005 to February 2014 developing and establishing their London, Singapore and New York teams. From September 2002 to August 2005 he was qualified as a Chartered Accountant with Ernst & Young LLP (London), specializing in capital markets advisory.

Mr. Lui graduated with First-Class Honors from Imperial College, London with a BSc degree in Biochemistry in June 2002. He is a Chartered Accountant (ICAS), accredited with Chartered Financial Analyst designation, and an Associate of Chartered Institute of Securities & Investments (UK).

DR. CLARK CHENG, Chief Medical Officer and Executive Director, Aptorum Group Limited

Executive Director, Aptorum Medical Limited

Dr. Clark Cheng is the Chief Medical Officer and Executive Director of Aptorum Group Limited; he is also an executive director of Aptorum Medical Limited (one of the Company's subsidiaries); Dr. Cheng also serves as a director of several other of our subsidiaries. Prior to this appointment, Dr. Cheng served as the Operations Director since 2009 of Raffles Medical Group, and the company's Deputy General Manager since 2011, representing an expanded role in the region. During his employment with Raffles Medical Group, he practiced as a full-time medical administrator to mainly overlook Raffles Medical Hong Kong operations and also supported its development in the PRC headquarter.

Dr. Cheng received his medical training at the University College London, UK, in 2005 and completed his foundation year training at The Royal Free Hospital in 2007. Pursuing his career in surgery, he obtained his membership of the Royal College of Surgeons of Edinburgh in 2009 and commenced his training in Orthopaedics where he practiced as Specialist Registrar at the National University Hospital, Singapore, with special interest in Traumatology of the lower limbs. In 2011, he also obtained his Master in Business & Administration with distinction from Tippie College of Business, University of Iowa, US.

Dr. Cheng is an active member of the Singapore Chamber of Commerce, and appears regularly as a guest speaker for The Open University of Hong Kong, The Airport Authority Hong Kong and other corporate events.

MISS SABRINA KHAN, Chief Financial Officer

Miss Sabrina Khan is the Chief Financial Officer of Aptorum Group Limited; she is also the company secretary. She leads the Company's financial strategy and operations, as well as Investor Relations. She has extensive experience working at KPMG (Hong Kong) and Ernst & Young LLP (Hong Kong). She was a regional financial controller in Asia for St. James's Place Wealth Management (Hong Kong), which St. James's Place Wealth Management Group (LON: STJ) is a FTSE100 company. Prior to that, she served as the senior finance manager of Neo Derm Group, a leading medical aesthetic group in Asia, in charge of its finance-related matters and expansion in the PRC. From August 2009 to May 2013, she served as the senior finance manager of Global Cord Blood Corporation (formerly known as China Cord Blood Corporation (NYSE: CO)), which was previously a subsidiary of Golden Meditech Holdings Limited (HK: 801), where she played an important role with the NYSE listing filings, investor relations and post IPO reporting. During her employment with Global Cord Blood Corporation, she was actively involved in the issuance of convertible bonds to Kohlberg Kravis Roberts and various merger and acquisition projects, facilitated and liaised with investment banks on due diligence, deal structuring, and also involved in commercial negotiation with respect to major contract terms.

Miss Khan qualified as certified public accountant and graduated with a BBA (Hons) in Accounting & Finance at The University of Hong Kong in 2003. She was qualified as an Advanced China Certified Taxation Consultant in 2015.

DR. THOMAS LEE, Head of Research and Development

Dr. Thomas Lee serves as the Head of R&D of Aptorum Group Limited since April 1, 2019; he is also the Chairman of our Scientific Advisory Board. Dr. Lee served as Chief Executive Officer and Chief Scientific Officer of Aptorum Therapeutics Limited, a wholly-owned therapeutics subsidiary of Aptorum Group Limited from January 2018 to March 2019. Prior to that, Dr. Lee served as an Assistant Professor in the School of Pharmacy, Faculty of Medicine, The Chinese University of Hong Kong from August 2013 to January 2018. Dr. Lee's key area of research involves drug delivery with specialties including: formulation development of poorly soluble compounds, oral delivery, Nanotechnology, and similar fields.

Prior to academia, Dr. Lee accumulated big-pharma experience from the decade he spent at two multinational pharmaceutical companies in the U.S. From November 2008 to July 2013, Dr. Lee worked at Celgene Corporation as a Senior Scientist of the Formulations Research & Development. From June 2003 to November 2008, Dr. Lee worked at Novartis Pharmaceuticals Corporation, as a Principal Scientist.

Dr. Lee graduated with B.Pharm. (Hons) Degree from The Chinese University of Hong Kong in December 1995, and received his Ph.D. in Pharmaceutical Sciences (Drug Delivery) from the University of Wisconsin-Madison in the U.S in May 2003.

Independent Non-Executive Directors

MR. CHARLES BATHURST

Mr. Bathurst is an Independent Non-Executive Director of Aptorum Group Limited, chairs the Audit Committee and is a member of both the Compensation Committee and the Nominating and Corporate Governance Committee. He has over 46 years' experience of management and senior executive roles across the financial services, technology and healthcare industries. In 2011, he set up his own independent consultancy service, Summerhill Advisors Limited, advising on management structure, business development, financial reporting, internal audit controls and compliance to both emerging and multinational companies. Today he holds Non-Executive and Advisory board positions on fast-growing companies in healthcare, technology and financial services.

Prior to establishing Summerhill, he served as a Director for J.O. Hambro Investment Management from September 2008 to August 2011, where he oversaw the restructuring and commercialization of a range of in-house investment funds. He was appointed to the management board and supervised reporting teams including Business development, accounting, regulatory reporting and internal controls.

From April 2004 to March 2008, Mr. Bathurst served in multiple roles at Old Mutual Asset Managers (UK), including being a member of the senior management team and head of international sales. Duties included business development, launching new investment funds, recruitment, establishing and supervision of regulatory and financial reporting teams, as well as ensuring compliance with funds' regulatory requirements and corporate governance standards.

Prior to this, Mr. Bathurst was an advisor to Lion Capital Advisors Limited from April 2003 to March 2004, and from June 2002 to March 2003 business development consultant reporting to the board of management of LCF Rothschild Asset Management Limited.

From April 1995 to March 2002, Mr. Bathurst joined a newly formed alternative investment management team at Credit Agricole Asset Management, establishing the London Branch as the Managing Director in 1998. He was responsible for the recruitment and development strategy for marketing, sales, investment, financial reporting, compliance and regulatory controls and investor relations.

Between the period of September 1989 and December 1994, Mr. Bathurst worked for GNI, the largest futures and options execution and clearing broker on the London International Financial Futures Exchange, where he focused on marketing to European and Middle East financial institutions. In 1991, he joined a new management team to launch a series of specialist investment funds while serving as the Head of Sales and Product Development.

Mr. Bathurst graduated from the Royal Military Academy Sandhurst in November 1974 and commissioned into the British Army serving in the UK and Germany.

DR. MIRKO SCHERER

Dr. Mirko Scherer is an Independent Non-Executive Director of Aptorum Group Limited. Dr. Scherer has been serving as the Chief Executive Officer at CoFeS China (formerly known as "TVM Capital China") in Hong Kong since March 2015. CoFeS China focuses on cross-border activities in the life science industry between China and the West. CoFeS China acts as a bridge between China and the West, assisting Chinese investors and pharmaceutical companies accessing western innovations, while collaborating with innovative life science companies from the West to enter the fast-growing China market.

Dr. Scherer has served on the Board of the Frankfurt Stock Exchange from 2005 to 2007 and has been a board member of the Stichting Preferente Aandelen QIAGEN since 2004. From August 2016 through July 2018, Dr. Scherer served as a Non-Executive board member of Quantapore Inc. and from April 2015 through September 2017, he was a director of China BioPharma Capital I, (GP).

Dr. Scherer is an experienced biotechnology executive and has led numerous financing M&A and licensing transactions, in both public and private markets, in Europe and the U.S. for over 20 years. He consulted MPM Capital for the period between July 2012 and December 2014. Dr. Scherer was also a co-founder and partner of KI Kapital from November 2008 to February 2014, a company which was specialized in providing consultation in life science industry.

Prior to working in the venture capital industry, Dr. Scherer co-founded GPC Biotech (Munich and Princeton, NJ) and served as the Chief Financial Officer from October 1997 to December 2007. GPC Biotech engaged in numerous pharmaceutical alliances with companies such as Sanofi Aventis, Boehringer Ingelheim, Altana (now part of Takeda), Yakult, and Pharmion (now part of Celgene). Over the past 20 years, Dr. Scherer has established an extensive network in the U.S., European, and China's biotechnology and venture capital industry. Prior to his time at GPC Biotech, Dr. Scherer worked as a consultant from May 1993 to June 1994 at the Boston Consulting Group.

Dr. Scherer earned a Doctorate in Finance from the European Business School in Oestrich-Winkel/Germany in 1998, a MBA from Harvard Business School in June 1996, and a degree in Business Administration from the University of Mannheim/Germany in February 1993.

PROFESSOR JUSTIN WU

Professor Justin Wu is an Independent Non-Executive Director of Aptorum Group Limited. He also has been serving as the Chief Operating Officer of CUHK Medical Centre since August 2018. He served as the Associate Dean (Development) of the Faculty of Medicine at CUHK from July 2014 to June 2018 and the Associate Dean (Clinical) of the Faculty of Medicine at CUHK from December 2012 to July 2014, and has been serving a Professor in the Department of Medicine and Therapeutics since 2009, also the Director of the S. H. Ho Center for Digestive Health, a research center specializing in functional gastrointestinal diseases, reflux and motility disorders, and digestive endoscopy. Active in research publications and assessments, Professor Wu served as the International Associate Editor of American Journal of Gastroenterology ("AJG"), and Managing Editor of Journal of Gastroenterology and Hepatology ("JGH"). He is also the Secretary General of the Asian Neurogastroenterology and Motility Association ("ANMA"), and Secretary General of the Asia Pacific Association of Gastroenterology ("APAGE").

Professor Wu has won a number of awards including the Emerging Leader in Gastroenterology Award by the JGH Foundation, and the Vice Chancellor's Exemplary Teaching Award at CUHK. Aside from his expertise in gastroenterology, Professor Wu has an extensive interest in the development of Integrative Medicine in Hong Kong. He is the Founding Director of the Hong Kong Institute of Integrative Medicine, working closely with the School of Chinese Medicine to develop an integrative model at an international level. The institute aims at maximizing the strength of Western and Chinese medicine to provide a safe and effective integrative treatment to patients.

Professor Wu served as a consultant and an advisory board member for Takeda Pharmaceutical, AstraZeneca, Menarini, Reckitt Benckiser and Abbott Laboratory. He earned his Bachelor of Medicine and Bachelor of Surgery Degree (1993), and his Doctor of Medicine Degree (2000) from CUHK. Additionally, he attained Fellowships of the Royal College of Physicians of Edinburgh and London in 2007 and 2012 respectively, Fellowship of the Hong Kong College of Physicians in 2002, Fellowship of the Hong Kong Academy of Medicine in 2002, and has been an American Gastroenterological Association Fellow since 2012.

PROFESSOR DOUGLAS ARNER

Professor Douglas W. Arner is an Independent Non-Executive Director of Aptorum Group Limited. Douglas is the Kerry Holdings Professor in Law and Director and co-founder of the Asian Institute of International Financial Law at the University of Hong Kong, as well as Faculty Director and co-founder of the LLM in Compliance and Regulation, LLM in Corporate and Financial Law, and Law, Innovation, Technology and Entrepreneurship (LITE) Programmes. He served as Head of the HKU Department of Law from 2011 to 2014 and as Co-Director of the Duke University-HKU Asia-America Institute in Transnational Law from 2005 to 2016. Douglas has published eighteen books and more than 200 articles, chapters and reports on international financial law and regulation, most recently Reconceptualising Global Finance and its Regulation (Cambridge 2016) (with Ross Buckley and Emilios Avgouleas) and The RegTech Book (Wiley 2019 (Janos Barberis and Ross Buckley). His recent papers are available on SSRN at https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=524849, where he is among the top 75 authors in the world by total downloads. Professor Arner led the development of Introduction to FinTech – launched with edX in May 2018 and now with over 80,000 learners spanning the world – and the foundation of the edx-HKU Online Professional Certificate in FinTech. He is a Senior Visiting Fellow of Melbourne Law School, University of Melbourne, a non-executive director of NASDAQ and Euronext listed Aptorum Group and an Advisory Board Member of the Centre for Finance, Technology and Entrepreneurship (CFTE). Professor Arner was an inaugural member of the Hong Kong Financial Services Development Council (2013-2019) and has served as a consultant with, among others, the World Bank, Asian Development Bank, APEC, Alliance for Financial Inclusion, and European Bank for Reconstruction and Development. He has lectured, co-organised conferences and seminars and been involved with financial sector reform projects around the world. Professor Arner has been a visiting professor or fellow at Duke, Harvard, the Hong Kong Institute for Monetary Research, IDC Herzliya, McGill, Melbourne, National University of Singapore, University of New South Wales, Shanghai University of Finance and Economics, and Zurich, among others. Professor Arner is the Senior Regulatory & Strategic Advisor of Aeneas Group, a multi-disciplinary financial services institution with technology-driven growth initiatives.

He holds a BA from Drury College (where he studied literature, economics and political science) in 1992, a JD (cum laude) from Southern Methodist University in 1995, an LLM (with distinction) in banking and finance law from the University of London (Queen Mary College) in 1996, and a PhD from the University of London in 2005.

B. Compensation of Executive Directors and Executive Officers

The following table sets forth all cash compensation paid by us, as well as certain other compensation paid or accrued, in fiscal 2021 to each of the following named executive officers. The total amount was $3.8 million in 2021. A total 483,697 options were awarded to executive directors and executive officers in 2021. This amount does not include business travel, relocation, professional and business association dues and expenses reimbursed to such persons, and other benefits commonly reimbursed or paid by companies in our industry. In addition to the compensation included in the table below, which covers the fiscal year ended December 31, 2021, we issued an aggregate of 977,614 options to the persons included in the table below since January 1, 2022 through the date of this report. (See "Item 6. Directors, Senior Management and Employees – E. Share Ownership")

The base salary of Mr. Ian Huen will be adjusted to HK$223,200 (approximately US$28,615 per month) with effect from March 1, 2022.

The base salary and monthly salary paid to Dr. Clark Cheng to serve as Director of Aptorum Innovations Holding Pte. Limited remains unchanged. However, we did adjust the monthly service fee payable to ACC Medical Limited to HK$143,200 (approximately US$18,359 per month) effective from March 1, 2022. Dr. Cheng is the sole director and shareholder of ACC Medical Limited. Hence, for the purposes of this filing and disclosure, the consulting service fee and share options granted to ACC Medical Limited will be deemed as Dr. Cheng's compensation.

The base salary of Mr. Lui remains unchanged while the monthly service fee of CGY Investment Limited will be adjusted to HK$171,200 (approximately US$21,949) with effect from March 1, 2022. CGY is 50% held by Seng Fun Yee (Mr. Lui's spouse), 25% held by Mandy Lui (Mr. Lui's sister) and 25% held by Adrian Lui (Mr. Lui's brother). Mr. Lui controls and/or has substantial influence on the disposition and voting rights of the shares held by his spouse, but no such control over the shares held by his sister or brother. Hence, for the purposes of this filing and disclosure, 50% of the consulting service fee and share options will be deemed as Mr. Lui's compensation.

The Board also determined to issue Dr. Cheng and Miss Sabrina Khan a discretionary cash bonus equal to one-month and four-month of their base salary, respectively.

Name and Principal Position	Fiscal Year	Salary ($)[1]	Bonus ($)	Option Awards ($)	Non-Equity Incentive Plan Compensation ($)[9]	Change in Pension Value and Nonqualified Deferred Compensation Earnings ($)	All Other Compensation ($)	Total ($)
Ian Huen [2] (CEO)	**2021**	288,000	24,000	372,943	300,001	2,308	-	987,252
Darren Lui [3] (President)	**2021**	166,667	6,667	186,472	150,001	2,308	-	512,115
Clark Cheng [4] (CMO)	**2021**	280,610	21,982	256,398	237,501	10,158	119[6]	806,768
Sabrina Khan [5] (CFO)	**2021**	208,600	69,918	172,486	174,167	2,308	-	627,479
Thomas Lee [7] (Head of R&D)	**2021**	229,600	19,518	233,090	225,001	2,308	-	709,517
Angel Ng [8] (COO)	**2021**	92,859	6,300	23,309	36,999	1,731	-	161,198

(1) The Appointment Letters provide salaries in HKD; for purposes of this table, we used a conversion ratio of HKD7.80 to USD1.00 to determine the salary in USD.

(2) Mr. Huen is the founder and was appointed as the Chief Executive Officer of Aptorum Group on October 1, 2017. Before that, he was a director of the Company.

(3) Mr. Lui was appointed as the Chief Business Officer and President of Aptorum Group on October 1, 2017 and resigned as Chief Business Officer on October 10, 2019.

(4) Dr. Cheng was appointed as the Chief Medical Officer of Aptorum Group on January 2, 2018.

(5) Miss Khan was appointed as the Chief Financial Officer of Aptorum Group on October 16, 2017. The monthly salary of Miss Khan remains unchanged in 2022.

(6) Pursuant to Dr. Cheng's appointment letter, Dr. Cheng received a share bonus of 526 ordinary shares of AML, representing 5% of AML's issued and outstanding ordinary shares (the "Share Bonus") in 2018. Based on the Company's financial position and Dr. Cheng's performance, on each anniversary of Dr. Cheng's employment commencement date, the Share Bonus is eligible to increase by 1% of AML's then issued and outstanding ordinary share count per year up to a maximum additional amount of 5% of AML's then issued and outstanding ordinary share count by the 5th anniversary from his employment commencement date. As of the date of this annual report, Dr. Cheng received a total of 989 ordinary shares of AML, representing 9% of AML's issued and outstanding ordinary shares; during fiscal 2021, Dr. Cheng received 117 ordinary shares of AML, the cash value of which is USD117; during fiscal 2022, Dr. Cheng received 119 ordinary shares with cash value of which is USD119.

(7) Dr. Lee was appointed as the Head of Research & Development of Aptorum Group on April 1, 2019. Before that, he was the Chief Executive Officer and Chief Scientific Officer of Aptorum Therapeutics Limited, a wholly-owned therapeutics subsidiary of Aptorum Group Limited from January 2018 to March 2019. The monthly salary of Dr. Lee was adjusted to HK$154,000 (approximately US$19,744) since January 1, 2022.

(8) Dr. Ng served as the Chief Operating Officer of Aptorum Group from April 1, 2019 to November 26, 2021.

(9) Represents deferred bonuses provided to directors and executive officers, which will be vested after 1-2 years vesting period.

Compensation of Non-executive Directors

The following table sets forth information for the fiscal year ended December 31, 2021 regarding the compensation of our non-executive directors who at December 31, 2021, were not also named executive officers. A total 43,480 options were awarded to non-executive directors in 2021. In addition to the compensation included in the table below, which covers the fiscal year ended December 31, 2021, we issued an aggregate of 89,556 options to the persons included in the table below since January 1, 2022 through the date of this report.

Name	Fees Earned or Paid in Cash ($)	Stock Awards ($)	Option Awards ($)	Non-Equity Incentive Plan Compensation ($)[6]	Non-qualified Deferred Compensation Earnings ($)	All Other Compensation ($)	Total ($)
Charles Bathurst [1]	**49,200[2]**	**-**	**27,972**	**29,000**	**-**	**-**	**106,172**
Mirko Scherer [3]	**30,750**	**-**	**27,972**	**29,000**	**-**	**-**	**87,722**
Justin Wu [4]	**30,750**	**-**	**27,972**	**29,000**	**-**	**-**	**87,722**
Douglas Arner [5]	**30,750**	**-**	**27,972**	**29,000**	**-**	**-**	**87,722**

(1) Mr. Bathurst was appointed as one of our directors as of October 2017 and is entitled to receive $50,676 annually for his combined services as a director and a committee member effective from January 1, 2022.

(2) Mr. Bathurst's appointment Letter provides his salary in GBP. For purposes of this table, we used a conversion ratio of GBP0.75 to USD1.00 to determine his salary in USD; however, the ultimate amount paid is based on the actual rate as of the relevant pay day at the end of each month.

(3) Dr. Scherer was appointed as one of our directors as of October 2017 and is entitled to receive $31,673 annually for his services as a director effective from January 1, 2022.

(4) Professor Wu was appointed as one of our directors as of October 2017 and is entitled to receive $31,673 annually for his combined services as a director and a committee member effective from January 1, 2022.

(5) Professor Arner's appointment as one of our directors became effective as of April 1, 2018 and is entitled to receive $31,673 annually for his combined services as a director and a committee member effective from January 1, 2022.

(6) Represents deferred bonuses provided to directors which will be vested after 1-2 years vesting period.

2017 Share Option Plan

On October 13, 2017, we adopted the 2017 Share Option Plan (the "Option Plan") and on November 5, 2021, we amended the Option Plan. Under the Option Plan, up to an aggregate of 5,500,000 Class A Ordinary Shares (subject to subsequent adjustments described more fully below) may be issued pursuant to awards under the Option Plan. Subsequent adjustments include that on each January 1, starting with January 1, 2020, an additional number of shares equal to the lesser of (A) 2% of the outstanding number of Class A Ordinary Shares (on a fully diluted basis) on the immediate preceding December 31, and (B) such lower number of Class A Ordinary Shares as may be determined by the board of directors, subject in all cases to adjustments as provided in Section 10 of the Option Plan. Awards will be made pursuant to agreements and may be subject to vesting and other restrictions as determined by the board of directors.

We adopted the Option Plan to provide additional incentives to selected directors, officers, employees and consultants, and enable our Company to obtain and retain the services of these individuals. The Option Plan will enable us to grant options, restricted shares or other awards to our directors, employees and consultants. Awards will be made pursuant to agreements and may be subject to vesting and other restrictions as determined by the board of directors.

218,222 options were granted on March 15, 2019 to directors, employees, external consultants and advisors of the Group. One-half of each option grant vests on January 1, 2020 and expires on December 31, 2030, and the other half vests on January 1, 2021 and expires on December 31, 2031. The exercise price is $12.91 per share, which was based on the closing price of the shares traded on the NASDAQ stock exchange on the trading day preceding the grant date.

536,777 options were granted on March 16, 2020 to directors, employees, external consultants and advisors of the Group. One-half of each option grant vests on January 1, 2021 and expires on December 31, 2031 and the other half vests on January 1, 2022 and expires on December 31, 2032. The exercise price is $2.99 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date.

148,792 options were granted on June 1, 2020 to directors and employees of the Group. Nearly one-half of each option grant vests on December 1, 2020 and expires on November 30, 2030 and the remaining vests on January 1, 2021 and expires on December 31, 2031. The exercise price is US$3.11 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date.

27,473 options were granted on August 10, 2020 to Dr. Weiss, which will be vested on August 10, 2021 and expires on August 9, 2032. The exercise price is $3.64 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date.

752,185 options were granted on March 11, 2021 to directors, employees, external consultants and advisors of the Group with an exercise price of $2.76 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date. 367,950 options vest on January 1, 2022 and expire on December 31, 2032; 367,930 options vest on January 1, 2023 and expire on December 31, 2033; 9,058 options vest on June 8, 2021 and expire on June 7, 2032; and 7,247 options vest on July 14, 2021 and expire on July 13, 2032.

1,531,332 options were granted on March 8, 2022 to directors, employees, external consultants and advisors of the Group with an exercise price of $1.34 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date. 748,881 options vest on January 1, 2023 and expire on December 31, 2033; 748,868 options vest on January 1, 2024 and expire on December 31, 2034; 18,657 options vest on June 8, 2022 and expire on June 7, 2033; and 14,926 options vest on July 14, 2022 and expire on July 13, 2033.

C. Board Practices

Board of Directors

Our Board of Directors currently consists of seven members, all of whom were elected pursuant to our current Memorandum and Articles. Our nominating and governance committee and board of directors will consider a broad range of factors relating to the qualifications and background of nominees, which may include diversity and is not limited to race, gender or national origin. We have no formal policy regarding board diversity. Our nominating and governance committee's and board of directors' priority in selecting board members is identification of persons who will further the interests of our shareholders through his or her established record of professional accomplishment, the ability to contribute positively to the collaborative culture among board members, knowledge of our business, understanding of the competitive landscape and professional and personal experiences and expertise relevant to our growth strategy.

Committees of the Board of Directors

Our Board of Directors has established an audit committee, a compensation committee and a nominating and corporate governance committee, each of which operates pursuant to a separate charter adopted by our Board of Directors. The composition and functioning of all of our committees will comply with all applicable requirements of the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the NASDAQ Global Market and SEC rules and regulations. Our Board of Directors may establish other committees from time to time.

Audit Committee

Charles Bathurst, Douglas Arner and Justin Wu currently serve on the audit committee, which is chaired by Charles Bathurst. Our Board of Directors has determined that each member of the audit committee is "independent" for audit committee purposes as that term is defined in the rules of the SEC and the applicable rules of the NASDAQ Global Market. The audit committee's responsibilities include:

- selecting and appointing our independent registered public accounting firm, and approving the audit and permitted non-audit services to be provided by our independent registered public accounting firm;
- evaluating the performance and independence of our independent registered public accounting firm;
- monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements or accounting matters;
- reviewing the adequacy and effectiveness of our accounting and internal control policies and procedures;
- establishing procedures for the receipt, retention and treatment of accounting-related complaints and concerns;
- reviewing and discussing with the independent registered public accounting firm the results of our year-end audit, and recommending to our Board of Directors, based upon such review and discussions, whether our financial statements shall be included in our annual report on Form 20-F;
- reviewing all related party transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing the type and presentation of information to be included in our earnings press releases, as well as financial information and earnings guidance provided by us to analysts and rating agencies.

Audit Committee Financial Expert

We have one financial expert as of the date of this report. Our Board of Directors has determined that Mr. Charles Bathurst, Chair of our audit committee, qualifies as an "audit committee financial expert" as defined in the SEC rules and satisfies the financial sophistication requirements of The NASDAQ Global Market.

Compensation Committee

Charles Bathurst, Douglas Arner and Justin Wu currently serve on the compensation committee, which is chaired by Justin Wu. Our Board of Directors has determined that each member of the compensation committee is "independent" as that term is defined in the applicable rules of the NASDAQ Global Market. The compensation committee's responsibilities include:

- reviewing the goals and objectives of our executive compensation plans, as well as our executive compensation plans in light of such goals and objectives;
- evaluating the performance of our executive officers in light of the goals and objectives of our executive compensation plans and recommending to our Board of Directors with respect to the compensation of our executive officers;
- reviewing the goals and objectives of our general compensation plans and other employee benefit plans as well as our general compensation plans and other employee benefit plans in light of such goals and objectives;
- retaining and approving the compensation of any compensation advisors;
- reviewing all equity-compensation plans to be submitted for shareholder approval under the NASDAQ listing rules, and reviewing and approving all equity-compensation plans that are exempt from such shareholder approval requirement;
- evaluating the appropriate level of compensation for board and board committee service by non-employee directors; and
- reviewing and approving description of executive compensation included in our annual report on Form 20-F.

Nominating and Corporate Governance Committee

Charles Bathurst, Douglas Arner and Justin Wu currently serve on the nominating and corporate governance committee, which is chaired by Professor Arner. Our Board of Directors has determined that each member of the nominating and corporate governance committee is "independent" as that term is defined in the applicable rules of the NASDAQ Global Market. The nominating and corporate governance committee's responsibilities include:

- assisting our Board of Directors in identifying prospective director nominees and recommending nominees for election by the shareholders or appointment by our Board of Directors;
- advising the board of directors periodically with respect to significant developments in the law and practice of corporate governance as well as our compliance with applicable laws and regulations, and making recommendations to our Board of Directors on all matters of corporate governance and on any corrective action to be taken;
- overseeing the evaluation of our Board of Directors; and
- recommending members for each board committee of our Board of Directors.

*Scientific Advisory Board*s

We restructured the Scientific Assessment Committee into a newly formed Scientific Advisory Board. The Scientific Advisory Board shall help the Company sharpen its focus on innovation and technological advancements and address critical scientific challenges in our research and development; it will provide overall advise on the scientific development of the company. As of the date of this annual report, we have 24 members on this board.

In light of the Company's focus on developing treatment for infectious diseases, we have established a second scientific advisory board, i.e., the Infectious Diseases Scientific Advisory Board in April 2020. As of the date hereof, the Infectious Diseases Scientific Advisory Board has 4 members.

Family Relationships

There is no family relationship among any of our directors or executive officers.

Duties of Directors

Under Cayman Islands law, our directors have a duty to act honestly, in good faith and bona fide with a view to our best interests. Our directors also have a duty to exercise the care, diligence and skills that a reasonably diligent person would exercise in comparable circumstances. In fulfilling their duty of care to us, our directors must ensure compliance with our Memorandum and Articles. We have the right to seek damages if a duty owed by our directors is breached.

The functions and powers of our Board of Directors include, among others:

- appointing officers and determining the term of office of the officers;
- authorizing the payment of donations to religious, charitable, public or other bodies, clubs, funds or associations as deemed advisable;
- exercising the borrowing powers of the company and mortgaging the property of the company;
- executing checks, promissory notes and other negotiable instruments on behalf of the company; and
- maintaining or registering a register of mortgages, charges or other encumbrances of the company.

Terms of Directors and Officers

There is no Cayman Islands law requirement that a director must hold office for a certain term and stand for re-election unless the resolutions appointing the director impose a term on the appointment. The Memorandum and Articles provide that our directors will be elected annually to serve a term of one year, or until his or her earlier resignation or removal. We do not have any age limit requirements relating to our director's term of office.

Our Memorandum and Articles also provide that our directors may be removed by the directors or ordinary resolution of the shareholders, and that any vacancy on our Board of Directors, including a vacancy resulting from an enlargement of our Board of Directors (which shall not exceed any maximum number stated therein), may be filled by ordinary resolution or by vote of a majority of our directors then in office.

Employment Agreements

We have entered into agreements with our executive officers. Each of our executive officers is employed for a specified time period, which will be renewed upon both parties' agreement. We may terminate the employment for cause, at any time, without notice or remuneration, for certain acts of the executive officer, including but not limited to the commitments of any serious or persistent breach or non-observance of the terms and conditions of the employment, conviction of a criminal offense, willful disobedience of a lawful and reasonable order, fraud or dishonesty, receipt of bribery, or severe neglect of his or her duties.

Each executive officer has agreed to hold, both during and after the employment agreement expires, in strict confidence and not to use or disclose to any person, corporation or other entity without written consent, any confidential information. Each executive officer has also agreed to assign to our group all his or her all inventions, improvements, designs, original works of authorship, formulas, processes, compositions of matter, computer software programs, databases, mask works, concepts and trade secrets.

D. Employees

As of the date of this annual report, we have 26 full-time employees. Of these, 9 are engaged in research and development and laboratory operations, 13 are engaged in general and administrative functions and 4 are engaged in the clinic operation. As of the date of annual report, 25 of our employees are located in Asia and 1 of our employees is located in Europe. In addition, we have engaged and may continue to engage 56 independent contracted consultants and advisors to assist us with our operations. None of our employees are represented by a labor union or covered by a collective bargaining agreement. We have never experienced any employment related work stoppages, and we consider our relations with our employees to be good.

E. Share Ownership

The following table sets forth information with respect to the beneficial ownership, within the meaning of Rule 13d-3 under the Exchange Act, of our Ordinary Shares as of the date of this annual report.

- each of our directors and executive officers who beneficially own our Ordinary Shares; and
- each person known to us to own beneficially more than 5.0% of our Ordinary Shares.

Beneficial ownership includes voting or investment power with respect to the securities. Except as indicated below, and subject to applicable community property laws, the persons named in the table have sole voting and investment power with respect to all Ordinary Shares shown as beneficially owned by them. Percentage of beneficial ownership of each listed person is based on 13,260,446 Class A Ordinary Shares and 22,437,754 Class B Ordinary Shares outstanding as of the date of this annual report.

Information with respect to beneficial ownership has been furnished by each director, officer or beneficial owner of 5% or more of our Ordinary Shares. Beneficial ownership is determined in accordance with the rules of the SEC and generally requires that such person have voting or investment power with respect to securities. In computing the number of Ordinary Shares beneficially owned by a person listed below and the percentage ownership of such person, Ordinary Shares underlying options, warrants or convertible securities held by each such person that are exercisable or convertible within 60 days of the date of this annual report are deemed outstanding, but are not deemed outstanding for computing the percentage ownership of any other person. Except as otherwise indicated in the footnotes to this table, or as required by applicable community property laws, all persons listed have sole voting and investment power for all Ordinary Shares shown as beneficially owned by them. As of the date of the annual report, we have 3 shareholders of record holding beneficial ownership of 5% or more, none of which are located in the United States.

Unless otherwise indicated, the business address of each of the individuals is 17 Hanover Square, London, W1S 1BN, United Kingdom.

Name and Address of Beneficial Owner	Class A Ordinary Shares Beneficially Owned	Class B Ordinary Shares Beneficially Owned	Percentage of Total Class A and Class B Ordinary Shares[(1)]	Percentage of Total Voting Power[(2)]
Ian Huen[(3)]	4,403,074	16,061,469	56.11%	69.24%
Darren Lui[(4)]	330,485	2,141,333	6.91%	9.15%
Clark Cheng[(5)]	*	-	*	*
Sabrina Khan[(6)]	*	-	*	*
Thomas Lee[(7)]	*	-	*	*
Charles Bathurst[(9)]	*	-	*	*
Mirko Scherer[(10)]	*	-	*	*
Justin Wu[(11)]	*	-	*	*
Douglas Arner[(12)]	*	-	*	*
All directors and executive officers as a group (9 persons)	5,378,107	18,202,802	63.99%	78.48%
5% Beneficial Owner				
Jurchen Investment Corporation[(3)]	4,243,613	16,061,469	56.03%	69.22%
Sui Fong Isabel Huen Ng[(13)]	211,986	1,907,870	5.94%	8.12%
CGY Investments Limited[(14)]	631,270	4,015,367	12.96%	17.15%

* Less than 1% of total outstanding Ordinary Shares on an as converted basis.

(1) For each person and group included in this column, percentage ownership is calculated by dividing the number of Class A Ordinary Shares and Class B Ordinary Shares beneficially owned by such person or group, including shares that such person or group has the right to acquire within 60 days after the date of this annual report, by the sum of Class A Ordinary Shares and Class B Ordinary Shares, and the number of Class A Ordinary Shares that such person or group has the right to acquire beneficial ownership within 60 days after the date of this annual report. Following the IPO, each Class B Ordinary Share can be converted at any time on a one-for-one basis into Class A Ordinary Shares at the discretion of the holder.

(2) For each person and group included in this column, percentage of total voting power represents voting power based on both Class A Ordinary Shares and Class B Ordinary Shares beneficially owned by such person or group with respect to all of our outstanding Class A Ordinary Shares and Class B Ordinary Shares as one single class. Holders of Class A Ordinary Shares are entitled to one vote per share and holders of Class B Ordinary Shares are entitled to ten votes per share on all matters subject to a shareholders' vote.

(3) Includes 3,703,073 Class A Ordinary Shares owned by Jurchen, warrants held by Jurchen to purchase 540,540 Class A Ordinary Shares, options granted to Mr. Huen to purchase 159,461 Class A Ordinary Shares, and 16,061,469 Class B Ordinary Shares owned by Jurchen. Jurchen Investment Corporation, is a company wholly-owned by Mr. Huen. Mr. Huen maintains sole voting control over the shares held by Jurchen, the principal office address of which is at 17th Floor, Guangdong Investment Tower, 148 Connaught Road Central, Hong Kong. Does not include 72,464 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 298,508 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Mr. Huen pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(4) Includes (i) 14,850 Class A Ordinary Shares and 133,649 Class B Ordinary Shares held by DSF Investment Holdings Limited, which is 29.5% held by Mr. Lui, and 70.5% held by Eternal Clarity Holdings Limited which is wholly-owned by Mr. Lui's mother, Ms. Emily Woo, and is located at Flat A2, 11th Floor, Wing Hang Insurance Building, 11 Wing Kut Street, Hong Kong, (ii) 240,931 Class A Ordinary Shares and 2,007,684 Class B Ordinary Shares held by CGY Investments Limited, which is 50% held by Seng Fun Yee (Mr. Lui's spouse), 25% held by Mandy Lui (Mr. Lui's sister) and 25% held by Adrian Lui (Mr. Lui's brother), and (iii) options held by CGY Investments Limited to purchase 74,704 Class A Ordinary Shares. Mr. Lui only controls and/or has substantial influence on the disposition and voting rights of 29.5% of the Aptorum shares DSF owns; Mr. Lui controls and/or has substantial influence on the disposition and voting rights of the shares held by his spouse, but no such control over the shares held by his sister or brother regarding the CGY shares. Does not include 36,232 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 149,254 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to CGY Investments Limited, of which represented 50% deemed controlled by Mr. Lui, pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(5) Pursuant to his appointment letter, Dr. Cheng received 9% of Aptorum Medical Limited's ordinary shares as of the date of this annual report. Does not include 49,819 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 to Dr. Cheng, and 205,224 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to ACC Medical Limited, pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report. ACC Medical Limited, is a company wholly-owned by Dr. Cheng. Dr. Cheng maintains sole voting control over the shares held by ACC Medical Limited, the principal office address of which is at Unit 1, 13/F, Block A, 19-25 Jervois Street, Hong Kong.

(6) Does not include 33,514 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 138,060 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Miss Khan pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(7) Does not include 45,290 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 186,568 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Dr. Lee pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(8) [reserved]

(9) Does not include 5,435 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 22,389 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Mr. Bathurst pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(10) Does not include 5,435 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 22,389 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Mr. Scherer pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(11) Does not include 5,435 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 22,389 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Professor Wu pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(12) Does not include 5,435 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 22,389 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to Professor Arner pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

(13) Sui Fong Isabel Huen Ng is the mother of Mr. Ian Huen. Mr. Ian Huen does not have control nor substantial influence on the disposition and voting rights of the shares held by his mother.

(14) CGY Investments Limited is 50% held by Seng Fun Yee (Mr. Lui's spouse), 25% held by Mandy Lui (Mr. Lui's sister) and 25% held by Adrian Lui (Mr. Lui's brother). Mr. Lui controls and/or has substantial influence on the disposition and voting rights of the shares held by his spouse, but no such control over the shares held by his sister or brother. Includes (i) 481,863 Class A Ordinary Shares and 4,015,367 Class B Ordinary Shares held by CGY Investments Limited, and (ii) options held by CGY Investments Limited to purchase 149,407 Class A Ordinary Shares. Does not include 72,464 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 11, 2021 and 298,508 Class A Ordinary Shares issuable upon exercise of outstanding options issued on March 8, 2022 to CGY Investments Limited pursuant to the Option Plan, since such options have not vested and will not be exercisable within 60 days of the date of this annual report.

Item 7. MAJOR SHAREHOLDERS AND RELATED PARTY TRANSACTIONS

A. Major Shareholders

Please refer to "Item 6. Directors, Senior Management and Employees—E. Share Ownership."

B. Related Party Transactions

Lines of Credit

On August 13, 2019 (the "Effective Date"), Aptorum Therapeutics Limited ("ATL"), one of our wholly-owned subsidiaries, entered into two separate Promissory Notes and Line of Credit Agreements (the "Agreements") with Aeneas Group Limited and Jurchen Investment Corporation ("Jurchen"). The Aeneas Group Limited Agreement and Jurchen Agreement provide ATL with a line of credit up to twelve million dollars ($12,000,000) and three million dollars ($3,000,000), respectively (collectively, the "Line of Credit"), representing the maximum aggregate amount of the advances of funds from the Line of Credit that may be outstanding at any time under the Line of Credit (the "Principal Indebtedness"). ATL may draw down from the Line of Credit at any time through the day immediately preceding the third anniversary of the Effective Date (the "Maturity Date"). The Maturity is extendable for up to an additional three years period upon mutual written consent. Interest will be payable on the outstanding Principal Indebtedness at the rate of eight percent (8%) per annum, payable semi-annually in arrears on February 12 and August 12 in each year. ATL may pre-pay in whole or in part, the Principal Indebtedness of the Line of Credit, and all interest accrued at any time prior to the Maturity Date, without penalty. Under the Agreements, in addition to certain standard covenants, we are also not permitted, without the prior written consent of Aeneas Group and Jurchen to (i) liquidate, dissolve or wind-up our business and affairs; (ii) effect any merger or consolidation transaction; (iii) sell, lease, transfer, license or otherwise dispose, in a single transaction or series of related transactions, all or substantially all of our assets; or (iv) consent to any of the foregoing. The Agreements are subject to standard events of default, which if not cured within the agreed upon cure period, permits Aeneas Group Limited or Jurchen, as applicable, to declare the outstanding Principal Indebtedness immediately due and payable, to exercise any other remedy provided for in the Agreements or any other right available to Aeneas Group Limited or Jurchen as provided at law or in equity. Jurchen and Aeanas Group Limited also maintain the right to set-off during the term of the Agreements. As of the date hereof, the Company has not drawn down any loan from the Line of Credit.

On November 17, 2021, Aptorum Therapeutics Limited (the "Lender") entered into a loan agreement with Talem Medical Group Limited ("Talem" or the "Borrower"). According to the loan agreement, the Lender will grant a loan of up to AUD 4.7 million for the Borrower for general working capital purposes of the Borrower and its subsidiaries. The loan is interest-bearing at a rate of 10% per annum and secured by the entire issued shares of Talem Medical Group (Australia) Pty Limited held by the Borrower. The loan is initially matured 6 months from the date of the first drawdown date. The maturity date may be extended for 6 months to the first extended maturity date, and further extended for another 6 months to the second extended maturity date, if certain conditions stated in loan agreement are satisfied. We consider this loan to be a related party transaction as certain insiders, including Ian Huen, our Chief Executive Officer, Executive Director and Director of the Lender; Dr. Clark Cheng, our Chief Medical Officer, Executive Director and Director of the Lender; Darren Lui, our President, Executive Director and Director of the Lender; Professor Justin Wu, our Independent Non-Executive Director; and Dr. Thomas Lee, our Head of Research and Development and Director of the Lender have direct and indirect minority interests in the Borrower. As of the date hereof, the Lender has lent approximately AUD 4.7 million to Talem Medical and the current maturity date is May 16, 2022.

On January 13, 2022, the Group entered a line of credit facility with Libra Sciences Limited to provide up to a total $1 million in line of credit debt financing for its daily operation. The line of credit will mature on July 12, 2022, extendable for up to twelve months, and the interest on the outstanding principal indebtedness will be at the rate of 10% per annum.

Sales and Purchases of Securities

Registered Direct Offering

On May 26, 2021, the Company entered into a private placement shares purchase agreement with Jurchen, issuing 1,387,925 Class A Ordinary Shares at $2.882 per share, representing a 10% premium to the last closing price of the Company's Class A Ordinary Shares on the NASDAQ stock exchange on that date. The Company received aggregate gross proceeds of $4,000,000 from the purchase of these shares.

Disposal of a subsidiary

On May 27, 2021, Aptorum Therapeutics Limited, which is a wholly owned subsidiary of Aptorum Group Limited, entered a Share Sale Agreement to sell all of the shares of SMPTH Limited, a previously wholly owned subsidiary of Aptorum Therapeutics Limited, to Aeneas Group Limited at the consideration $1.

Consulting Arrangements

CGY Investment Limited

We entered into a consulting agreement with CGY Investment Limited ("CGY") effective on January 10, 2020. Pursuant to this agreement, CGY shall provide certain consultancy, advisory, and management services to the Group on potential investment projects related to health care or R&D platform; CGY shall be initially paid a monthly service fee of HK$104,000 per month (approximately US$13,333 per month), during the term of the agreement, which is remain in effect unless it is terminated. The monthly service fee is adjusted to HK$171,200 (approximately US$21,949) with effect from March 1, 2022. The agreement may be terminated by either party providing 1-months written notice to the other party.

CGY is 50% held by Seng Fun Yee (Mr. Lui's spouse), 25% held by Mandy Lui (Mr. Lui's sister) and 25% held by Adrian Lui (Mr. Lui's brother). Mr. Lui, President and Executive Director of the Group, controls and/or has substantial influence on the disposition and voting rights of the shares held by his spouse, but no such control over the shares held by his sister or brother. Hence, 50% of the consulting service fee will be deemed as Mr. Lui's compensation.

ACC Medical Limited

We entered into a consulting agreement with ACC Medical Limited ("ACC") effective on December 1, 2020. Pursuant to this agreement, ACC shall provide certain consultancy, advisory, and management services to the Group on clinic operations and other related projects for clinics' business development; ACC shall be initially paid a monthly service fee of HK$101,542 per month (approximately US$13,018 per month), during the term of the agreement, which is to remain in effect unless it is terminated. The monthly service fee is adjusted to HK$143,200 (approximately US$18,359 per month) effective from March 1, 2022. The agreement may be terminated by either party providing 1-months written notice to the other party. ACC is wholly owned by Dr. Clark Cheng, who is also the sole director of ACC, the Group's Chief Medical Officer and one of its executive directors.

GloboAsia, LLC

We entered into a consulting agreement with GloboAsia effective as of August 18, 2017 (the "2017 GA Agreement"); GloboAsia is not associated or affiliated with any FINRA members. However, the 2017 GA Agreement was terminated when Dr. Chan resigned from his position as our Chief Scientific Officer in March 2019. Dr. Chan serves as the Director of International Affairs of GloboAsia.

Effective as of April 1, 2019, GloboAsia, through Dr. Chan, shall serve as a member on our Scientific Advisory Board. To formalize such service, we entered into that certain consulting agreement with GloboAsia dated March 13, 2019 (the "2019 GA Agreement"). Pursuant to the 2019 GA Agreement, GloboAsia provides advisory and management services to us and as a member of the Scientific Advisory Board, they provide advice to us regarding research and development, the scientific merit of licenses or products and other related scientific issues. We agreed to pay GloboAsia an hourly rate of USD300 for work actually performed. The initial term of 2019 GA Agreement is until December 31, 2020 and shall thereafter be automatically renewed for successive one-year terms, unless earlier terminated by either party upon three months' notice prior to the end of the then applicable term; either party may also terminate the agreement upon 2 months written notice and the Company may terminate the agreement if Dr. Chan is no longer with GloboAsia or if GloboAsia commits any act of fraud or dishonesty.

Employment Agreements

We entered into Appointment Letters with each of our executive officers. The terms of the Appointment Letters for each of our executive officers are consistent with each other, except with regard to the individual's compensation, term of employment and duties and responsibilities, the latter of which coincides with the standard functions normally associated with the given position. In addition to setting forth the individual compensation and such, the appointment letters contain the following material terms:

We may terminate employment for cause, at any time, without advance notice or remuneration, for certain acts of the executive officer, such as conviction or plea of guilty to a felony or any crime involving moral turpitude, negligent or dishonest acts to our detriment, or misconduct or a failure to perform agreed duties. We may also terminate an executive officer's employment without cause upon three-month advance written notice. In such case of termination by us, we will provide severance payments to the executive officer as expressly required by applicable law of the jurisdiction where the executive officer is based. The executive officer may resign at any time with three-month advance written notice.

Each executive officer has agreed to hold, both during and after the termination or expiration of his or her Appointment Letter, in strict confidence and not to use, except as required in the performance of his or her duties in connection with the employment or pursuant to applicable law, any of our confidential information or trade secrets, any confidential information or trade secrets of our clients or prospective clients, or the confidential or proprietary information of any third-party received by us and for which we have confidential obligations.

In addition, each executive officer has agreed to be bound by non-solicitation and non-compete restrictions during the term of his or her employment and typically for one year following the last date of employment. Specifically, each executive officer has agreed not to (i) solicit or entice away from the Company, any person, firm, company or organization that is or shall have been at any time within 12 months prior to termination of employee a customer, client, identified prospective customer or client of the Company or in the habit of dealing with the Company; (ii) employ, solicit or entice away from the Company any person who is or shall have been on the date of or within 12 months prior to termination of employment an employee of the Company; or (iii) assume employment with or provide services to, or otherwise engage in income generating activities with any of our competitors, or engage, whether as principal, partner, licensor or otherwise, any of our competitors, without our express consent.

Some of our Appointment Letters also provide for the executive officer to participate in our mandatory provident fund, which is similar to a pension fund.

See "Item 6. Directors, Senior Management and Employees — C. Board Practices — Employment Agreements".

C. Interests of Experts and Counsel

Not applicable.

Item 8. FINANCIAL INFORMATION

A. Consolidated Statements and Other Financial Information

We have appended consolidated financial statements filed as part of this annual report.

Legal Proceedings

From time to time, we are subject to legal proceedings, investigations and claims incidental to the conduct of our business. We are not currently a party to any legal proceeding or investigation which, in the opinion of our management, is likely to have a material adverse effect on our business, financial condition or results of operations.

Dividend Policy

We have never declared or paid cash dividends to our shareholders, and we do not intend to pay cash dividends in the foreseeable future. We intend to reinvest any earnings in developing and expanding our business. Any future determination relating to our dividend policy will be at the discretion of our Board of Directors and will depend on a number of factors, including future earnings, our financial condition, operating results, contractual restrictions, capital requirements, business prospects, our strategic goals and plans to expand our business, applicable law and other factors that our Board of Directors may deem relevant.

Under Cayman Islands law, dividends may be declared and paid only out of funds legally available therefor, namely out of either profit or our share premium account, and provided further that a dividend may not be paid if this would result in our Company being unable to pay its debts as they fall due in the ordinary course of business.

B. Significant Changes

Except as disclosed elsewhere in this annual report, we have not experienced any significant changes since the date of our audited consolidated financial statements included in this annual report.

Item 9. THE OFFER AND LISTING

A. Offering and Listing Details.

Our Class A Ordinary Shares are currently listed on NASDAQ Global Market under the symbol "APM" and the Professional Compartment of Euronext in Paris under the Euronext ticker symbol "APM."

B. Plan of Distribution

Not applicable.

C. Markets

Our Class A Ordinary Shares are currently listed on NASDAQ Global Market under the symbol "APM" and the Professional Compartment of Euronext in Paris under the Euronext ticker symbol "APM."

D. Selling Shareholders

Not applicable.

E. Dilution

Not applicable.

F. Expenses of the Issue

Not applicable.

Item 10. ADDITIONAL INFORMATION

A. Share Capital

Not applicable.

B. Amended and Restated Memorandum and Articles of Association

The description of our Amended and Restated Memorandum and Articles of Association is incorporated by reference from the Registration Statement. Our amended and restated memorandum and articles of association were filed as Exhibit 3.1 to the Registration Statement and are hereby incorporated by reference into this annual report.

C. Material Contracts

We have not entered into any material contracts other than in the ordinary course of business and other than those described in "Item 4. Information on the Company" or elsewhere in this annual report.

D. Exchange Controls

There are no governmental laws, decrees, regulations or other legislation in the Cayman Islands, the United Kingdom or Hong Kong that may affect the import or export of capital, including the availability of cash and cash equivalents for use by us, or that may affect the remittance of dividends, interest, or other payments by us to non-resident holders of our ordinary shares, other than withholding tax requirements. There is no limitation imposed by Cayman Islands law, the United Kingdom law, Hong Kong law or our articles of association on the right of non-residents to hold or vote shares.

E. Taxation

Cayman Islands Tax Considerations

The Cayman Islands currently levies no taxes on individuals or corporations based upon profits, income, gains or appreciation and there is no taxation in the nature of inheritance tax or estate duty. There are no other taxes likely to be material to us levied by the government of the Cayman Islands except for stamp duties which may be applicable on instruments executed in, or brought within, the jurisdiction of the Cayman Islands. The Cayman Islands is not party to any double tax treaties which are applicable to any payments made by or to our Company. There are no exchange control regulations or currency restrictions in the Cayman Islands.

Payments of dividends and capital in respect of our Class A Ordinary Shares will not be subject to taxation in the Cayman Islands and no withholding will be required on the payment of a dividend or capital to any holder of our Class A Ordinary Shares, nor will gains derived from the disposal of our Class A Ordinary Shares be subject to Cayman Islands income or corporation tax.

No stamp duty is payable in respect of the issue of our Class A Ordinary Shares or on an instrument of transfer in respect of our Class A Ordinary Shares except on instruments executed in, or brought within, the jurisdiction of the Cayman Islands.

Material U.S. Federal Income Tax Considerations for U.S. Holders

The following is a description of the material U.S. federal income tax consequences to U.S. Holders (as defined below) of purchasing, owning and disposing of Class A Ordinary Shares. It is not a comprehensive description of all U.S. federal income tax considerations that may be relevant to a particular person's decision to acquire Class A Ordinary Shares. This discussion applies only to a U.S. Holder that holds a Class A Ordinary Share as a capital asset for U.S. federal income tax purposes (generally, property held for investment). In addition, it does not describe all of the tax consequences that may be relevant in light of a U.S. Holder's particular circumstances, including state and local tax consequences, non-U.S. tax consequences, federal estate or gift tax consequences, alternative minimum tax consequences, the potential application of the provisions of the Code known as the Medicare Contribution Tax, and tax consequences applicable to U.S. Holders subject to special rules, such as:

- banks and other financial institutions;
- insurance companies;
- dealers or traders in securities who use a mark-to-market method of tax accounting;
- persons holding Class A Ordinary Shares as part of a hedging transaction, "straddle," wash sale, conversion transaction or integrated transaction or persons entering into a constructive sale with respect to the Class A Ordinary Shares;
- persons whose "functional currency" for U.S. federal income tax purposes is not the U.S. dollar;
- tax exempt entities, including "individual retirement accounts" and "Roth IRAs";
- former citizens or long-term residents of the United States;
- entities or arrangements classified as partnerships for U.S. federal income tax purposes;
- regulated investment companies or real estate investment trusts;
- persons who acquired our Class A Ordinary Shares pursuant to the exercise of an employee share option or otherwise as compensation;
- persons that own or are deemed to own ten percent or more of our shares; and
- persons holding Class A Ordinary Shares in connection with a trade or business conducted outside the United States.

If an entity or arrangement that is classified as a partnership for U.S. federal income tax purposes holds Class A Ordinary Shares, the U.S. federal income tax treatment of such partnership and each partner thereof will generally depend on the status of the partner and the activities of the partnership. Partnerships holding Class A Ordinary Shares and partners in such partnerships are encouraged to consult their tax advisors as to the particular U.S. federal income tax consequences of purchasing, holding and disposing of Class A Ordinary Shares.

The discussion is based on the Code, the Treasury Regulations issued thereunder, and administrative and judicial interpretations thereof, all as in effect on the date hereof and all of which are subject to change, possibly with retroactive effect, or to different interpretation. Such change could materially and adversely affect the tax consequences described below.

For purposes of this discussion, a "U.S. Holder" is a holder who, for U.S. federal income tax purposes, is a beneficial owner of Class A Ordinary Shares and that is:

(1) an individual citizen or resident of the United States;

(2) a corporation, or other entity taxable as a corporation, created or organized in or under the laws of the United States, any state therein or the District of Columbia;

(3) an estate, the income of which is subject to U.S. federal income taxation regardless of its source; or

(4) a trust, (i) if a court within the United States is able to exercise primary supervision over its administration and one or more "U.S. persons" (within the meaning of the Code) have the authority to control all of its substantial decisions, or (ii) if a valid election is in effect for the trust to be treated as a U.S. person.

U.S. Holders are encouraged to consult their tax advisors concerning the U.S. federal, state, local and foreign tax consequences of purchasing, owning and disposing of Class A Ordinary Shares in their particular circumstances.

Taxation of Distributions

Subject to the discussion below under "Passive Foreign Investment Company Rules," a U.S. Holder will be required to include in gross income as dividend income the gross amount of any distributions paid on Class A Ordinary Shares (including any amount of taxes withheld), other than certain *pro rata* distributions of Class A Ordinary Shares, to the extent paid out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles). Distributions in excess of our current and accumulated earnings and profits would be treated as a non-taxable return of capital to the extent of the U.S. Holder's adjusted tax basis in the Class A Ordinary Shares and thereafter as a gain from the sale of the Class A Ordinary Shares. However, because we do not calculate our earnings and profits under U.S. federal income tax principles, we expect that distributions generally will be reported to U.S. Holders as dividends.

In case of a U.S. Holder that is a corporation, dividends paid on the Class A Ordinary Shares will be subject to regular corporate rates and will not be eligible for the "dividends received" deduction generally allowed to corporate shareholders with respect to dividends received from U.S. corporations.

Dividends received by an individual, trust or estate will be subject to taxation at standard tax rates. A reduced income tax rate applies to dividends paid by a "qualified foreign corporations" (if certain holding period requirements and other conditions are met). A non-U.S. corporation generally will be considered to be a qualified foreign corporation (i) if it is eligible for the benefits of a comprehensive tax treaty with the United States which includes an exchange of information program or (ii) with respect to any dividend it pays on stock which is readily tradable on an established securities market in the United States. US. Treasury Department guidance indicates that our Class A Ordinary Shares, which is listed on the NASDAQ Global Market is readily tradable on an established securities market in the United States. There can be no assurance, however, that our Class A Ordinary Shares will be considered readily tradable on an established securities market in later years.

Non-corporate U.S. Holders will not be eligible for reduced rates of taxation on any dividends received from us if we are a PFIC in the taxable year in which such dividends are paid or in the preceding taxable year (See "Item 10. Additional Information – E. Taxation – Material U.S. Federal Income Tax Considerations for U.S. Holders – Passive Foreign Investment Company Rules" below).

A U.S. Holder may be eligible, subject to a number of complex limitations, to claim a foreign tax credit in respect of any foreign withholding taxes imposed on dividends received on the Class A Ordinary Shares. A U.S. Holder who does not elect to claim a foreign tax credit for foreign income tax withheld may instead claim a deduction for U.S. federal income tax purposes in respect of such withholding, but only for a year in which such investor elects to do so for all creditable foreign income taxes. For purposes of calculating the foreign tax credit limitation, dividends paid by us will, depending on the circumstances of the U.S. Holder, be either general or passive income.

While we do not expect to pay dividends in the near future, in the event any dividends are paid and if a dividend is paid in non-U.S. currency, it must be included in a U.S. Holder's income as a U.S. dollar amount based on the exchange rate in effect on the date such dividend is actually or constructively received, regardless of whether the dividend is in fact converted into U.S. dollars. If the dividend is converted to U.S. dollars on the date of receipt, a U.S. Holder generally will not recognize a foreign currency gain or loss. If the non-U.S. currency is converted into U.S. dollars on a later date, however, the U.S. Holder must include in income any gain or loss resulting from any exchange rate fluctuations. Such gain or loss will generally be ordinary income or loss and will be from sources within the United States for foreign tax credit limitation purposes. U.S. Holders should consult their own tax advisors regarding the tax consequences to them if we pay dividends in non-U.S. currency.

Sale or Other Taxable Disposition of Ordinary Shares

Subject to the discussion below under "Passive Foreign Investment Company Rules," gain or loss realized on the sale or other taxable disposition of Class A Ordinary Shares will be capital gain or loss, and will be long-term capital gain or loss if the U.S. Holder held the Class A Ordinary Shares for more than one year. The amount of the gain or loss will equal the difference between the U.S. Holder's tax basis in the Class A Ordinary Shares disposed of and the amount realized on the disposition. Long-term capital gain of a non-corporate U.S. Holder is generally taxed at preferential rates. This gain or loss will generally be U.S.-source gain or loss for foreign tax credit purposes. The deductibility of capital losses is subject to limitations. U.S. Holders are urged to consult their tax advisors regarding the tax consequences if a foreign tax is imposed on the disposition of Class A Ordinary Shares, including the availability of the foreign tax credit under an investor's own particular circumstances.

A U.S. Holder that receives non-U.S. currency on the disposition of the Class A Ordinary Shares will realize an amount equal to the U.S. dollar value of the foreign currency received on the date of disposition (or in the case of cash basis and electing accrual basis taxpayers, the settlement date) whether or not converted into U.S. dollars at that time. Very generally, the U.S. Holder will recognize currency gain or loss if the U.S. dollar value of the currency received on the settlement date differs from the amount realized with respect to the Class A Ordinary Shares. Any currency gain or loss on the settlement date or on any subsequent disposition of the foreign currency generally will be U.S.-source ordinary income or loss.

Passive Foreign Investment Company Rules

Special U.S. federal income tax rules apply to a U.S. Holder that holds stock in a foreign corporation classified as a PFIC for U.S. federal income tax purposes. In general, a non-U.S. corporation will be classified as a PFIC for any taxable year in which, after applying certain look-through rules, either:

- at least 75% of its gross income for such taxable year is passive income (e.g., dividends, interest, capital gains and rents derived other than in the active conduct of a rental business); or

- at least 50% of its gross assets (determined on the basis of a quarterly average) is attributable to assets that produce passive income or are held for the production of passive income.

We will be treated as owning our proportionate share of the assets and earning our proportionate share of the income of any other corporation in which we own, directly or indirectly, 25% or more (by value) of the equity.

A separate determination must be made after the close of each taxable year as to whether we are a PFIC for that year. As a result, our PFIC status may change. In particular, the total value of our assets generally will be calculated using the market price of our Class A Ordinary Shares, which may fluctuate considerably. Fluctuations in the market price of our Class A Ordinary Shares may result in our being a PFIC for any taxable year.

Due to the amount of restricted and unrestricted cash and investments that we had on hand during our year ending December 31, 2021, we believe that we were classified as a PFIC for that tax year. Depending on the future composition and value of our assets, we may be classified as a PFIC for future years.

If we were to be classified as a PFIC, a U.S. Holder would be subject to different taxation rules depending on whether the U.S. Holder (i) takes no action, (ii) makes an election to treat us as a "Qualified Electing Fund" (a "QEF election") or (iii) if permitted, makes a "mark-to-market" election with respect to our Class A Ordinary Shares. A U.S. Holder of our Class A Ordinary Shares will also be required under applicable Treasury Regulations to file an annual information return (Form 8621) containing information regarding our company. Additional explanations of the PFIC rules are set forth below: this material is complex and may affect different U.S. Holders differently. Accordingly, U.S. Holders should consult their own tax advisors about the consequences of our company being classified as a PFIC and about what steps, if any, they might take to lessen the tax impact of our PFIC status on them.

A U.S. Holder who does not make a timely QEF or mark-to-market election (a "Non-Electing Holder"), as discussed below, will be subject to special tax rules with respect to any "excess distribution" that you receive and any gain you realize from a sale or other disposition (including a pledge) of Class A Ordinary Shares. Distributions you receive in a taxable year that are greater than 125% of the average annual distributions you received during the shorter of the three preceding taxable years or your holding period for the Class A Ordinary Shares will be treated as an excess distribution. Under these special tax rules:

- the excess distribution or gain will be allocated ratably over your holding period for the Class A Ordinary Shares;
- the amount allocated to the current taxable year, and any taxable year prior to the first taxable year in which we became a PFIC, will be treated as ordinary income; and
- the amount allocated to each other year will be subject to the highest tax rate in effect for that year and the interest charge generally applicable to underpayments of tax will be imposed on the resulting tax attributable to each such year.

It should be noted that, until such time as we make a distribution, there are no tax consequences to Non-Electing Holders. However, if we ever did make a distribution it would in all likelihood be an excess distribution (because we would not have previously made any distributions to holders of Class A Ordinary Shares). At that point, and for all subsequent distributions, the rules described above would apply to Non-Electing Holders. The tax liability for amounts allocated to years prior to the year of disposition or "excess distribution" cannot be offset by any net operating losses for such years, and gains (but not losses) realized on the sale of the Class A Ordinary Shares cannot be treated as capital, even if you hold the Ordinary Shares as capital assets.

Certain elections may be available that would result in alternative treatments. The adverse consequences of owning stock in a PFIC could be mitigated if a U.S. Holder makes a valid QEF election (a U.S. Holder which we refer to as an "Electing Holder") which, among other things, would require the Electing Holder to include currently in income its pro rata share of the PFIC's net capital gain and ordinary earnings, if any, for our taxable year that ends with or within the taxable year of the Electing Holder, regardless of whether or not the Electing Holder actually received distributions from us. When an Electing Holder makes a QEF election, its adjusted tax basis in our Class A Ordinary Shares is increased to reflect taxed but undistributed earnings and profits. Distributions of earnings and profits that had been previously taxed will result in a corresponding reduction in the adjusted tax basis in our Class A Ordinary Shares and will not be taxed again once distributed. An Electing Holder would generally recognize capital gain or loss on the sale, exchange or other disposition of our Class A Ordinary Shares.

A U.S. Holder can make a QEF election with respect to any year that we are a PFIC by filing IRS Form 8621 with its U.S. federal income tax return. This election must be made by the deadline (including extensions) for filing the U.S. Holder's federal tax return for the year in question. U.S. Holders should discuss their election alternatives with their own tax advisors. Once an election is made, the Electing Holder is subject to the QEF rules for as long as we are a PFIC.

It should be noted that in order to make a QEF election a U.S. Holder needs information from us concerning our PFIC status and our financial results for the year. We cannot assure our U.S. Holders that we will provide such information.

As an alternative to making a QEF election, a U.S. Holder may make a "mark-to-market" election with respect to our Class A Ordinary Shares provided our Class A Ordinary Shares are treated as "marketable stock." The Class A Ordinary Shares generally will be treated as marketable stock if they are regularly traded on a "qualified exchange or other market" (within the meaning of applicable Treasury Regulations) on at least 15 days during each calendar quarter (other than in de minimis amounts).

If a U.S. Holder makes an effective mark-to-market election, for each taxable year that we are a PFIC, the U.S. Holder will include as ordinary income the excess of the fair market value of its Class A Ordinary Shares at the end of the year over its adjusted tax basis in the Class A Ordinary Shares. You will be entitled to deduct as an ordinary loss in each such year the excess of your adjusted tax basis in the Class A Ordinary Shares over their fair market value at the end of the year, but only to the extent of the net amount previously included in income as a result of the mark-to-market election. A U.S. Holder's adjusted tax basis in the Class A Ordinary Shares will be increased by the amount of any income inclusion and decreased by the amount of any deductions under the mark-to-market rules. In addition, upon the sale or other disposition of your Class A Ordinary Shares in a year that we are PFIC, any gain will be treated as ordinary income and any loss will be treated as ordinary loss, but only to the extent of the net amount of previously included income as a result of the mark-to-market election.

If a U.S. Holder makes a mark-to-market election, it will be effective for the taxable year for which the election is made and all subsequent taxable years unless the Class A Ordinary Shares are no longer regularly traded on a qualified exchange or other market, or the IRS consents to the revocation of the election. You are urged to consult your tax advisor about the availability of the mark-to-market election, and whether making the election would be advisable in your particular circumstances.

Information Reporting and Backup Withholding

Payments of dividends and sales proceeds that are made within the United States or through certain U.S.-related financial intermediaries generally are subject to information reporting, and may be subject to backup withholding, unless (i) the U.S. Holder is a corporation or other exempt recipient or (ii) in the case of backup withholding, the U.S. Holder provides a correct taxpayer identification number and certifies that it is not subject to backup withholding.

Backup withholding is not an additional tax. The amount of any backup withholding from a payment to a U.S. Holder will be allowed as a credit against the holder's U.S. federal income tax liability and may entitle it to a refund, provided that the required information is timely furnished to the IRS.

Information with Respect to Foreign Financial Assets

Certain U.S. Holders may be required to report information relating to the Class A Ordinary Shares, subject to certain exceptions (including an exception for Class A Ordinary Shares held in accounts maintained by certain U.S. financial institutions). U.S. Holders should consult their tax advisors regarding their reporting obligations with respect to their purchase, ownership and disposition of the Class A Ordinary Shares.

F. Dividends and Paying Agents

Not applicable.

G. Statement by Experts

Not applicable.

H. Documents on Display

We have previously filed the Registration Statement with the SEC.

We are subject to the periodic reporting and other informational requirements of the Exchange Act. Under the Exchange Act, we are required to file reports and other information with the SEC. Specifically, we are required to file annually a Form 20-F within four months after the end of each fiscal year. Copies of reports and other information, when so filed, may be inspected without charge and may be obtained at prescribed rates at the public reference facilities maintained by the SEC at Judiciary Plaza, 100 F Street, N.E., Washington, D.C. 20549. The public may obtain information regarding the Washington, D.C. Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains a web site at http://www.sec.gov that contains reports, proxy and information statements, and other information regarding registrants that make electronic filings with the SEC using its EDGAR system. As a foreign private issuer, we are exempt from the rules of the Exchange Act prescribing, among other things, the furnishing and content of proxy statements to shareholders, and our executive officers, directors and principal shareholders are exempt from the reporting and short-swing profit recovery provisions contained in Section 16 of the Exchange Act.

We also maintain a corporate website at www.aptorumgroup.com. Information contained on, or that can be accessed through, our website does not constitute a part of this report.

I. Subsidiary Information

For a listing of our subsidiaries, see "Item 4. Information on the Company — A. History and Development of the Company."

Item 11. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

For purposes of Item 11, reference to the "Group" means Aptorum Group Limited and all of its subsidiaries.

Foreign Exchange Risk

Currency risk is the risk that the value of financial assets or liabilities will fluctuate due to changes in foreign exchange rates.

Currency risk sensitivity analysis

At December 31, 2021 and 2020, the Group has no significant foreign currency risk because most of the transactions are denominated in Hong Kong dollar or the United States dollar. Since the Hong Kong dollar is pegged to the United States dollar, the Group's exposure to foreign currency risk in respect of the balances denominated in Hong Kong dollars is considered to be minimal.

Credit Risk

Financial assets which potentially subject the Group to concentrations of credit risk consist principally of bank deposits and balances.

The Group takes on exposure to credit risk on cash and restricted cash balances held with HSBC, DBS Bank Ltd, Industrial and Commercial Bank of China (Macao) Limited, Bank of China (Hong Kong) Limited and Silicon Valley Bank for the purposes of payments of Group expenses.

All transactions in listed securities are settled or paid for upon delivery using approved and reputable brokers. The risk of default is considered minimal, as delivery of securities sold is only made when the broker has received payment. Payment is made on a purchase when the securities have been received by the broker. The trade will fail if either party fails to meet its obligation. The Group limits its exposure to credit risk by transacting all of its securities and contractual commitment activities with broker-dealers, banks and regulated exchanges with high credit ratings and that the Group considers to be well established.

Liquidity Risk

Liquidity risk is the risk that the Group will encounter difficulty in raising funds to meet commitments associated with financial assets and liabilities. Liquidity risk may result from an inability to sell a financial asset quickly at an amount close to its fair value.

The Group invests in private equities which are generally unquoted and not readily marketable. The Group manages its liquidity risk by setting investment limits on unlisted securities that cannot be readily disposed of. Investment of the Group's assets in unquoted securities may restrict the ability of the Group to dispose of its investment at a price and time it wishes to do so.

Interest Rate Risk

Interest rate risk arises from the possibility that changes in interest rates will affect future cash flows or the fair values of financial instruments.

Interest rate risk sensitivity analysis

The Group's cash held with the banks are exposed to interest rate risk. However, Management considers the risk to be minimal as they are short-term with terms less than one month.

Inflation Risk

In recent years, inflation has not had a material impact on our results of operations.

Item 12. DESCRIPTION OF SECURITIES OTHER THAN EQUITY SECURITIES

Items 12.D.3 and 12.D.4 of this Item 12 is not applicable, as the Company does not have any American Depositary Shares; all other applicable information required by this Item 12 is included in Exhibit 2.3.

Part II

Item 13. DEFAULTS, DIVIDEND ARREARAGES AND DELINQUENCIES

None.

Item 14. MATERIAL MODIFICATIONS TO THE RIGHTS OF SECURITY HOLDERS AND USE OF PROCEEDS

See "Item 10. Additional Information" for a description of the rights of securities holders, which remain unchanged.

Use of Proceeds

The following "Use of Proceeds" information relates to the Registration Statement (File No. 333-227198), which was initially filed on September 5, 2018 and which became effective on December 3, 2018, in relation to our initial public offering of 761,419 Class A Ordinary Shares, at an initial offering price of $15.8 per share, and the issuance to the underwriter in the initial public offering of warrants to purchase up to 38,071 Class A Ordinary Shares. Our initial public offering closed in December 17, 2018, for which Boustead Securities LLC, China Renaissance Securities (HK) Limited and AMTD Global Markets Limited served as underwriters.

We received gross proceeds of approximately $12.0 million from our initial public offering. As of the date of this annual report, in addition to our expenses relating to our IPO, all IPO proceeds have been used on our lead projects and other projects.

Item 15. CONTROLS AND PROCEDURES

(a) Disclosure Controls and Procedures

Under the supervision and with the participation of our management, including our chief executive officer and our chief financial officer, we carried out an evaluation of the effectiveness of our disclosure controls and procedures, which is defined in Rules 13a-15(e) of the Exchange Act, as of December 31, 2021. Based on that evaluation, our chief executive officer and chief financial officer concluded that our disclosure controls and procedures, as of December 31, 2021, were effective.

(b) Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with Generally Accepted Accounting Principles (GAAP) in the United States of America and includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of our company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of consolidated financial statements in accordance with GAAP, and that receipts and expenditures of our company are being made only in accordance with authorizations of our management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of the unauthorized acquisition, use or disposition of our company's assets that could have a material effect on the consolidated financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

As required by Section 404 of the Sarbanes-Oxley Act of 2002 and related rules as promulgated by the Securities and Exchange Commission, our management including our Chief Executive Officer and Chief Financial Officer assessed the effectiveness of internal control over financial reporting as of December 31, 2021 using the criteria set forth in the report "Internal Control—Integrated Framework (2013)" published by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2021.

In connection with the previous audit of our financial statements for the year ended December 31, 2018, we and our independent registered public accounting firm identified one material weakness in our internal control over financial reporting, as defined in the standards established by the Public Company Accounting Oversight Board of the United States. The material weakness identified was the lack of dedicated resources to take responsibility for the finance and accounting functions and the preparation of financial statements in compliance with generally accepted accounting principles in the United States, or U.S. GAAP.

Since 2019, we took actions to remediate the abovementioned material weakness, and we believe we have remediated the material weakness by implementing the following measures:

- provide trainings to staff regarding to the preparation of financial statements in compliance with generally accepted accounting principles in the United States;
- change to a new and well-established accounting system to enhance effectiveness and financial and system control;
- establish clear roles and responsibilities for accounting and financial reporting staff to address finance and accounting issues; and
- continue to monitor the improvement on internal control over financial reporting.

As of December 31, 2021 and 2020, we determined that the aforementioned measures remediated the material weakness. However, since we are still in the process of replenishing and building up a qualified finance and accounting team with sufficient dedicated resources, our management assessed that the deficiency related to the lack of dedicated resources to take responsibility for the finance and accounting functions and the preparation of financial statements in compliance with generally accepted accounting principles in the United States, or U.S. GAAP, still existed as of December 31, 2021. Based on the definition of "material weakness" and "significant deficiency" in the standards established by the Public Company Accounting Oversight Board of the United States, our management concluded that the deficiency now only rises to the level of a significant deficiency.

We cannot assure you that we will not identify additional material weaknesses or significant deficiencies in the future. See "Item 3. Key Information—D. Risk Factors— Risks Related to Our Industry, Business and Operation — If we fail to establish and maintain proper internal financial reporting controls, our ability to produce accurate financial statements or comply with applicable regulations could be impaired."

Notwithstanding there is a significant deficiency identified as described above, we believe that our consolidated financial statements contained in this annual report on Form 20-F fairly present our financial position, results of operations and cash flows for the years covered thereby in all material respects.

(c) Attestation Report of the Company's Registered Public Accounting Firm

We did not include an attestation report of the company's registered public accounting firm due to rules of the SEC where domestic and foreign registrants that are non-accelerated filers, which we are, and "emerging growth companies" which we also are, are not required to provide the auditor attestation report.

(d) Changes in Internal Control over Financial Reporting

There were no changes in our internal controls over financial reporting that occurred during the period covered by this annual report on Form 20-F that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 16. [RESERVED]

Item 16A. AUDIT COMMITTEE FINANCIAL EXPERT

We have one financial expert as of the date of this report. Our Board of Directors has determined that Mr. Charles Bathurst, Chair of our audit committee, qualifies as an "audit committee financial expert" as defined in the SEC rules and satisfies the financial sophistication requirements of The NASDAQ Global Market. Mr. Bathurst is "independent" as that term is defined in the rules of the SEC and the applicable rules of the NASDAQ Global Market.

Item 16B. CODE OF ETHICS

The Company's Code of Ethics became effective on the effective date of the Registration Statement. The Code of Ethics is incorporated by reference to exhibit 14.1 of the Registration Statement.

Item 16C. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table sets forth the aggregate fees by categories specified below in connection with certain professional services rendered by our principal external auditors, for the periods indicated.

	For the years ended December 31,	
	2021	2020
	(In thousand)	
Audit fees	$ 258	$ 253
Audit-related fees	37	45
Tax fees	-	-
All other fees	-	-
Total	$ 295	$ 298

"Audit fees" represents the aggregate fees billed or to be billed for each of the fiscal years listed for professional services rendered by our principal auditor for the audit of our annual financial statements.

"Audit-related fees" are the aggregate fees billed for assurance and related services that are reasonably related to the performance of the audit and are not reported under audit fees. These fees primarily include review of documents filed with the SEC.

"Tax fees" include fees for professional services rendered by our principal auditor for tax compliance and tax advice on actual or contemplated transactions.

"Other fees" include fees for services rendered by our independent registered public accounting firm with respect to other matters not reported under "Audit fees", "Audit-related fees" and "Tax fees".

The policy of our audit committee is to pre-approve all audit and non-audit services provided by our principal auditor including audit services, audit-related services, tax services and other services.

Item 16D. EXEMPTIONS FROM THE LISTING STANDARDS FOR AUDIT COMMITTEES

Not applicable.

Item 16E. PURCHASES OF EQUITY SECURITIES BY THE ISSUER AND AFFILIATED PURCHASERS

Not applicable.

Item 16F. CHANGE IN REGISTRANT'S CERTIFYING ACCOUNTANT

Not applicable.

Item 16G. CORPORATE GOVERNANCE

See "Item 6. Directors, Senior Management and Employees" for more information.

Item 16H. MINE SAFETY DISCLOSURE

Not applicable.

Item 16I. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

Part III

Item 17. FINANCIAL STATEMENTS

We have elected to provide financial statements pursuant to Item 18.

Item 18. FINANCIAL STATEMENTS

The consolidated financial statements of Aptorum Group Limited, and its subsidiaries are included at the end of this annual report.

Item 19. EXHIBITS

EXHIBIT INDEX

Exhibit No.	Description
1.1	Second Amended and Restated Articles of Association, as amended**
2.1	Registrant's Specimen Certificate for Ordinary Shares*
2.2	Form of Underwriter's Warrant+++
2.3	Description of Securities registered under Section 12 of the Exchange Act of 1934, as amended**
2.4	Form of Warrant+
4.1	Form of Underwriting Agreement+++
4.2	Appointment Letter between the Company and Ian Huen (Founder, Chief Executive Officer & Executive Director), dated September 25, 2017*
4.3	Employment Letter between the Company and Sabrina Khan (Chief Financial Officer), dated September 1, 2017*
4.4	Addendum to Employment Letter between Company and Sabrina Khan (Chief Financial Officer) dated April 24, 2018*
4.5	Appointment Letter between the Company and Darren Lui (Chief Business Officer, President & Director), dated September 25, 2017*
4.6	Employment Letter between the Company and Clark Cheng (Chief Medical Officer & Director), dated August 31, 2017*
4.7	Addendum to Appointment Letter between the Company and Clark Cheng (Chief Medical Officer & Director), dated September 25, 2017*
4.8	Second Addendum to Appointment Letter between the Company and Clark Cheng (Chief Medical Officer & Director), dated October 30, 2017*
4.9	Third Addendum to Appointment Letter between the Company and Clark Cheng (Chief Medical Officer & Director), dated January 2, 2018*
4.10	Appointment letter between the Company and Keith Chan (former Chief scientific officer) (Terminated March 13, 2019)*
4.11	Appointment Letter between the Company and Charles Bathurst (Independent Non-Executive Director), dated September 24, 2017*
4.12	Appointment Letter between the Company and Mirko Scherer (Independent Non-Executive Director), dated September 24, 2017*
4.13	Employment Agreement between the Company and Justin Wu (Independent Non-Executive Director), dated September 18, 2017*
4.14	Employment Agreement between the Company and Douglas Arner (Independent Non-Executive Director), dated February 13, 2018*
4.15	2017 Share Option Plan, as amended [15]
4.16	Service Agreement Between Covar Pharmaceuticals Incorporated and Videns Incorporation Limited*
4.17	Consulting Agreement between the Company and GloboAsia, LLC (includes provisions for the appointment of Keith Chan as member of the Scientific Advisory Board) dated March 13, 2019[5]
4.18	Exclusive Patent License Agreement for ALS-4 dated October 18, 2017[3]
4.19	First Amendment to Exclusive License Agreement for ALS-4 dated June 7, 2018*
4.20	Second Amendment to Exclusive License Agreement for ALS-4 dated July 10, 2019[6]
4.21	Exclusive License Agreement for ALS-4 dated January 11, 2019[4]

4.22	Employment Agreement with Dr. Lee dated March 13, 2019++
4.23	Master Collaboration Agreement by and between the Company, A*ccelerate Technologies Pte. Ltd, and AENEAS CAPITAL LIMITED dated April 24, 2019[1]
4.24	Bond Repurchase Agreement dated April 24, 2019[1]
4.25	Form of Line of Credit Agreement[2]
4.26	Form of Promissory Note[2]
4.27	Form of Securities Purchase Agreement+
4.28	Consulting agreement with CGY Investment Limited effective on January 10, 2020[6]
4.29	Administrative Consultant Services Agreement with Aeneas Management Limited dated January 1, 2019[6] (Terminated April 30, 2020)
4.30	Secondment Agreement between the Company and Aenco Limited dated January 1, 2019[6] (Replaced April 1, 2020)
4.31	Secondment Agreement (2) between the Company and Aenco Limited dated April 1, 2020[6] (Terminated September 30, 2020)
4.32	Evaluation Agreement with Illumina Inc. (portions of the exhibit have been omitted because they (i) are not material and (ii) would likely cause competitive harm to the Registrant if publicly disclosed.)[7]
4.33	Placement Agency Agreement, dated February 25, 2020 between the Company and Alliance Global Partners[8]
4.34	Form of Securities Purchase Agreement[8]
4.35	Form of Warrant[8]
4.36	Form of Securities Purchase Agreement dates as of September 29, 2020, by and among the Company and the purchasers named therein[9]
4.37	Form of Warrant[9]
4.38	Form of Pre-Funded Warrant[9]
4.39	Form of Placement Agent Warrant[9]
4.40	Exclusive License Agreement with Accelerate Technologies Pte Ltd.'s dated September 25, 2020[11, 12]
4.41	Sales Agreement, dated March 26, 2021 between the Company and H.C. Wainwright[10]
4.42	Share Subscription and Shareholders Agreement dated as of September 25, 2020[11,12]
4.43	Contract Research Agreement between Aptorum Therapeutics Limited and Aeneas Technology (Hong Kong) Limited[12]
4.44	Loan Agreement between Aptorum Therapeutics Limited and Talem Medical Group Limited (portions of the exhibit have been omitted because they (i) are not material and (ii) would likely cause competitive harm to the Company if publicly disclosed.)[11][13]
4.45	Specific Security Deed between Aptorum Therapeutics Limited and Talem Medical Group Limited[13]
4.46	Private Placement Shares Purchase Agreement with Jurchen Investment Corporation[14]
4.47	Concerted Action Agreement between Aptorum Therapeutics Limited and Peace Range Limited dated December 30, 2021 regarding to Mios Pharmaceuticals Limited **
4.48	Concerted Action Agreement between Aptorum Therapeutics Limited and Peace Range Limited dated December 30, 2021 regarding to Scipio Life Sciences Limited **
8.1	List of Subsidiaries**
12.1	Certification of Chief Executive Officer Pursuant to Rule 13a-14(a)/15d-14(a)**
12.2	Certification of Chief Financial Officer Pursuant to Rule 13a-14(a)/15d-14(a)**
13.1	Certification of Chief Executive Officer and Chief Financial Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002***
15.1	Consent of Marcum Bernstein & Pinchuk LLP**
99.1	Code of Business Ethics*
101.INS	Inline XBRL Instance Document**
101.SCH	Inline XBRL Taxonomy Extension Schema Document**
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document**
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document**
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document**
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document**
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)**

*** Furnished with this annual report on Form 20-F
** Filed with this annual report on Form 20-F
* Incorporated by reference to our Registration Statement Filed on Form F-1 on September 5, 2018

+++ Incorporated by reference to our Registration Statement Filed on Form F-1 on November 15, 2018
++ Incorporated by reference to our Current Report on Form 6-K filed on April 1, 2019
+ Incorporated by reference to our Current Report on Form 6-K filed on February 26, 2020

(1) Incorporated by reference to our Current Report on Form 6-K filed on April 24, 2019
(2) Incorporated by reference to our Current Report on Form 6-K filed on August 14, 2019
(3) Incorporated by reference to our Registration Statement Filed on Form F-1 on September 5, 2018; portions of the exhibit were previously omitted in reliance on the confidential treatment provisions available pursuant to revised paragraph 4(a) of Instructions as to Exhibits of Form 20-F.
(4) Incorporated by reference to our annual report on Form 20-F filed on April 15, 2019; portions of the exhibit were previously omitted in reliance on the confidential treatment provisions available pursuant to revised paragraph 4(a) of Instructions as to Exhibits of Form 20-F.
(5) Incorporated by reference to our annual report on Form 20-F filed on April 15, 2019
(6) Incorporated by reference to our annual report on Form 20-F filed on April 29, 2020. Certain information from this exhibit has been excluded from this exhibit because it both (i) is not material and (ii) would likely cause competitive harm to the Registrant if publicly disclosed.
(7) Incorporated by reference to our Current Report on Form 6-K filed on January 25, 2021; portions of the exhibit were omitted because they (i) are not material and (ii) would likely cause competitive harm to the Company if publicly disclosed.
(8) Incorporated by reference to our Current Report on Form 6-K filed on February 26, 2020
(9) Incorporated by reference to our Current Report on Form 6-K filed on October 2, 2020
(10) Incorporated by reference to our Current Report on Form 6-K filed on March 26, 2021
(11) Certain information from this exhibit has been excluded from this exhibit because it both (i) is not material and (ii) is the type that the registrant treats as private or confidential.
(12) Incorporated by reference to our annual report on Form 20-F filed on April 19, 2021
(13) Incorporated by reference to our Current Report on Form 6-K filed on November 17, 2021
(14) Incorporated by reference to our Current Report on Form 6-K filed on May 26, 2021
(15) Incorporated by reference to our Current Report on Form 6-K filed on November 17, 2021

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

Aptorum Group Limited

Date: April 29, 2022

By: /s/ Ian Huen
Ian Huen
Chief Executive Officer,
Chairman of the Board of Directors
(Principal Executive Officer)

/s/ Sabrina Khan
Sabrina Khan
Chief Financial Officer
Principal Accounting and Financial Officer

APTORUM GROUP LIMITED
Financial Statements

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New York Office
7 Penn Plaza, Suite 830
New York, NY 10001
T 212.279.7900

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors of Aptorum Group Limited

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Aptorum Group Limited (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations and comprehensive income (loss), equity and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Marcum Bernstein & Pinchuk LLP

Marcum Bernstein & Pinchuk LLP
We have served as the Company's auditor since 2017.

New York, New York
April 29, 2022

PCAOB ID. 5395

APTORUM GROUP LIMITED
CONSOLIDATED BALANCE SHEETS
December 31, 2021 and 2020
(Stated in U.S. Dollars)

	December 31, 2021	December 31, 2020
ASSETS		
Current assets:		
Cash	$ 8,131,217	$ 3,495,231
Restricted cash	130,270	130,125
Digital currencies	-	1,539
Accounts receivable	78,722	62,221
Inventories	35,775	39,133
Marketable securities, at fair value	236,615	28,384,944
Investments in derivatives	-	4,289
Amounts due from related parties	47,754	-
Due from brokers	76,380	160,337
Loan receivable from a related party	3,358,089	-
Other receivables and prepayments	593,478	1,378,996
Total current assets	12,688,300	33,656,815
Property, plant and equipment, net	3,731,116	4,686,323
Operating lease right-of-use assets	154,439	547,389
Long-term investments	4,156,907	4,079,707
Intangible assets, net	880,256	964,857
Long-term deposits	296,225	296,225
Total Assets	$ 21,907,243	$ 44,231,316
LIABILITIES AND EQUITY		
LIABILITIES		
Current liabilities:		
Amounts due to related parties	$ 11,389	$ 145,926
Accounts payable and accrued expenses	4,172,565	3,240,772
Finance lease liabilities current	47,923	49,396
Operating lease liabilities, current	145,391	432,600
Total current liabilities	4,377,268	3,868,694
Finance lease liabilities, non-current	-	47,923
Operating lease liabilities, non-current	23,853	155,121
Loan payables to related parties	-	2,007,285
Total Liabilities	$ 4,401,121	$ 6,079,023
Commitments and contingencies	-	-
EQUITY		
Class A Ordinary Shares ($1.00 par value; 60,000,000 shares authorized, 13,202,408 and 11,584,324 shares issued and outstanding as of December 31, 2021 and 2020, respectively)	$ 13,202,408	$ 11,584,324
Class B Ordinary Shares ($1.00 par value; 40,000,000 shares authorized, 22,437,754 shares issued and outstanding as of December 31, 2021 and 2020)	22,437,754	22,437,754
Additional paid-in capital	43,506,717	38,247,903
Accumulated other comprehensive (loss) income	(2,019)	53,296
Accumulated deficit	(55,537,515)	(30,489,126)
Total equity attributable to the shareholders of Aptorum Group Limited	23,607,345	41,834,151
Non-controlling interests	(6,101,223)	(3,681,858)
Total equity	17,506,122	38,152,293
Total Liabilities and Equity	$ 21,907,243	$ 44,231,316

See accompanying notes to the consolidated financial statements.

APTORUM GROUP LIMITED
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)
For Years Ended December 31, 2021, 2020 and 2019
(Stated in U.S. Dollars)

	Year Ended December 31, 2021	Year Ended December 31, 2020	Year Ended December 31, 2019
Revenue			
Healthcare services income	$ 1,541,778	$ 911,509	$ 535,166
Operating expenses			
Cost of healthcare services	(1,459,924)	(1,015,023)	(794,545)
Research and development expenses	(10,869,642)	(11,586,923)	(6,939,051)
General and administrative fees	(5,409,302)	(4,853,488)	(7,373,425)
Legal and professional fees	(2,617,834)	(2,854,225)	(3,405,705)
Other operating expenses	(392,511)	(877,391)	(220,891)
Total operating expenses	(20,749,213)	(21,187,050)	(18,733,617)
Other (loss) income, net			
(Loss) gain on investments in marketable securities, net	(8,031,595)	25,241,556	(81,839)
Gain on long-term investments	-	-	1,147,190
(Loss) gain on investments in derivatives, net	(4,289)	(199,031)	87,599
Gain on use of digital currencies	4,918	-	46,717
Gain on derecognition of non-financial assets	75,000	-	-
Gain on extinguishment of convertible debts	-	-	1,198,490
Changes in fair value of warrant liabilities	-	-	(866,300)
Interest expense, net	(93,601)	(243,628)	(3,699,672)
Rental income	-	30,894	16,868
Loss on disposal of subsidiaries	(3,638)	-	-
Sundry income	146,347	365,917	232,460
Total other (loss) income, net	(7,906,858)	25,195,708	(1,918,487)
Net (loss) income	(27,114,293)	4,920,167	(20,116,938)
Net loss attributable to non-controlling interests	2,065,904	2,146,687	1,430,176
Deemed dividend related to warrants down round provision	-	(755,514)	-
Net (loss) income attributable to Aptorum Group Limited	$ (25,048,389)	$ 6,311,340	$ (18,686,762)
Net (loss) income per share attributable to Aptorum Group Limited			
- Basic	$ (0.71)	$ 0.20	$ (0.64)
- Diluted	$ (0.71)	$ 0.20	$ (0.64)
Weighted-average shares outstanding			
- Basic	35,033,970	31,135,882	29,008,445
- Diluted	35,033,970	31,534,473	29,008,445
Net (loss) income	$ (27,114,293)	$ 4,920,167	$ (20,116,938)
Other comprehensive (loss) income			
Exchange differences on translation of foreign operations	(55,315)	58,848	(10,897)
Other comprehensive (loss) income	(55,315)	58,848	(10,897)
Comprehensive (loss) income	(27,169,608)	4,979,015	(20,127,835)
Comprehensive loss attributable to non-controlling interests	2,065,904	2,146,687	1,430,176
Deemed dividend related to warrants down round provision	-	(755,514)	-
Comprehensive (loss) income attributable to the shareholders of Aptorum Group Limited	(25,103,704)	6,370,188	(18,697,659)

See accompanying notes to the consolidated financial statements.

APTORUM GROUP LIMITED
CONSOLIDATED STATEMENTS OF EQUITY
For Years Ended December 31, 2021, 2020 and 2019
(Stated in U.S. Dollars)

	Class A Ordinary Shares		Class B Ordinary Shares		Additional Paid-in Capital	Accumulated deficit	Accumulated other comprehensive (loss) income	Non-controlling interests	Total
	Shares	Amount	Shares	Amount	Amount	Amount	Amount	Amount	Amount
Balance, January 1, 2019	**6,537,269**	**$ 6,537,269**	**22,437,754**	**$22,437,754**	**$23,003,285**	**$ (18,869,218)**	**$ 5,345**	**$ (368,533)**	**$ 32,745,902**
Issuance of shares to non-controlling interest	-	-	-	-	10,672	-	-	(10,672)	**-**
Issuance of tokens	-	-	-	-	-	-	-	300,000	**300,000**
Reacquisition of convertible bonds	-	-	-	-	(1,298,490)	-	-	-	**(1,298,490)**
Disposal of a subsidiary	-	-	-	-	-	-	-	(75)	**(75)**
Share-based compensation	-	-	-	-	1,612,832	-	-	-	**1, 612,832**
Exercise of warrants	60,093	60,093	-	-	1,559,325	-	-	-	**1,619,418**
Exchange difference on translation of foreign operation	-	-	-	-	-	-	(10,897)	-	**(10,897)**
Net loss	-	-	-	-	-	(18,686,762)	-	(1,430,176)	**(20,116,938)**
Balance, December 31, 2019	**6,597,362**	**$ 6,597,362**	**22,437,754**	**$22,437,754**	**$24,887,624**	**$ (37,555,980)**	**$ (5,552)**	**$(1,509,456)**	**$ 14,851,752**
Issuance of Class A Ordinary Shares and warrants, net of issuance cost	4,120,581	4,120,581	-	-	12,661,754	-	-	-	**16,782,335**
Issuance of shares to non-controlling interest	-	-	-	-	25,715	-	-	(25,715)	**-**
Warrant Exchange	540,540	540,540	-	-	(540,540)	-	-	-	**-**
Share-based compensation	-	-	-	-	1,478,565	-	-	-	**1,478,565**
Exercise of warrants	313,513	313,513	-	-	(313,513)	-	-	-	**-**
Exercise of options	12,328	12,328	-	-	48,298	-	-	-	**60,626**
Exchange difference on translation of foreign operation	-	-	-	-	-	-	58,848	-	**58,848**
Net income (loss)	-	-	-	-	-	7,066,854	-	(2,146,687)	**4,920,167**
Balance, December 31, 2020	**11,584,324**	**$11,584,324**	**22,437,754**	**$22,437,754**	**$38,247,903**	**$ (30,489,126)**	**$ 53,296**	**$(3,681,858)**	**$ 38,152,293**
Issuance of Class A Ordinary Shares	1,387,925	1,387,925	-	-	2,612,075	-	-	-	**4,000,000**
Issuance of shares to non-controlling interest	-	-	-	-	66,783	-	-	(61,423)	**5,360**
Disposal of subsidiaries under common control transaction	-	-	-	-	303,419	-	(5,386)	(300,000)	**(1,967)**
Disposal of subsidiaries	-	-	-	-	-	-	-	7,962	**7,962**
Share-based compensation	-	-	-	-	1,682,460	-	-	-	**1,682,460**
Exercise of warrants	40,000	40,000	-	-	90,012	-	-	-	**130,012**
Exercise of options	190,159	190,159	-	-	504,065	-	-	-	**694,224**
Exchange difference on translation of foreign operation	-	-	-	-	-	-	(49,929)	-	**(49,929)**
Net loss	-	-	-	-	-	(25,048,389)	-	(2,065,904)	**(27,114,293)**
Balance, December 31, 2021	**13,202,408**	**$13,202,408**	**22,437,754**	**$22,437,754**	**$43,506,717**	**$ (55,537,515)**	**$ (2,019)**	**$(6,101,223)**	**$ 17,506,122**

See accompanying notes to the consolidated financial statements.

APTORUM GROUP LIMITED
CONSOLIDATED STATEMENTS OF CASH FLOWS
For Years Ended December 31, 2021, 2020 and 2019
(Stated in U.S. Dollars)

	Year Ended December 31, 2021	Year Ended December 31, 2020	Year Ended December 31, 2019
Cash flows from operating activities			
Net (loss) income	$ (27,114,293)	$ 4,920,167	$ (20,116,938)
Adjustments to reconcile net income (loss) to net cash used in operating activities			
Amortization and depreciation	1,192,578	1,334,661	1,299,618
Share-based compensation	1,682,460	1,478,565	1,612,832
Loss (gain) on investments in marketable securities, net	8,031,595	(25,241,556)	81,839
Gain on non-marketable investments	-	-	(1,147,190)
Loss (gain) on investments in derivatives, net	4,289	199,031	(87,599)
Changes in fair value of warrant liabilities	-	-	866,300
Gain on derecognition of non-financial assets	(75,000)	-	-
Loss on disposal of subsidiaries	3,638	-	-
Gain on use of digital currencies	(4,918)	-	(46,717)
Settlement of service fee by tokens and digital currencies	90,457	24,000	437,178
Operating lease cost	425,280	483,398	-
Loss on disposal of property, plant and equipment	392	50,197	-
Impairment loss of property, plant and equipment	-	330,445	-
Impairment loss of intangible assets	-	200,000	-
Gain on extinguishment of convertible debts	-	-	(1,198,490)
Interest income	(41,246)	(825)	(79,558)
Interest expense and accretion of convertible debts	130,397	237,163	3,769,263
Accretion of finance lease obligation	4,450	7,290	9,967
Changes in operating assets and liabilities			
Accounts receivable	(16,501)	(21,678)	(37,716)
Inventories	3,358	(4,948)	(3,543)
Other receivables and prepayments	695,308	(358,365)	(427,541)
Long-term deposits	-	20	55,429
Due from brokers	83,957	156,668	501,963
Amounts due from related parties	112,635	50,962	168,089
Amounts due to related parties	(264,934)	(120,560)	(26,060)
Accounts payable and accrued expenses	855,272	800,960	986,241
Operating lease liabilities	(450,807)	(457,508)	-
Net cash used in operating activities	(14,651,633)	(15,931,913)	(13,382,633)
Cash flows from investing activities			
Purchase of digital currencies	-	-	(200,000)
Purchases of intangible assets	(6,026)	-	(70,109)
Purchases of property, plant and equipment	(131,750)	(161,314)	(837,062)
Proceeds from disposal of property, plant and equipment	-	1,051,282	-
Disposal of subsidiaries, net of cash disposed	(113,830)	-	-
Proceeds from sales of investment securities	20,116,734	952,196	999,110
Loan to a third party	-	-	(1,400,000)
Loan to a related party	(3,358,089)	-	-
Repayment of loan to a third party	-	-	1,400,000
Net cash provided by (used in) investing activities	16,507,039	1,842,164	(108,061)
Cash flows from financing activities			
Loan from related parties	3,500,000	1,000,000	6,330,472
Repayment of loan from related parties	(5,489,665)	(5,306,558)	-
Payment for settlement of convertible debts	-	-	(13,600,000
Proceeds from issuance of Class A Ordinary Shares and warrants	4,000,000	17,497,426	-
Payments of offering costs	-	(715,091)	-
Exercise of share options	694,224	-	-
Exercise of warrants	130,012	-	-
Payment of finance lease obligations	(53,846)	(53,845)	(53,843)
Net cash provided by (used in) financing activities	2,780,725	12,421,932	(7,323,371)
Net increase (decrease) in cash and restricted cash	4,636,131	(1,667,817)	(20,814,065)
Cash and restricted cash – Beginning of year	3,625,356	5,293,173	26,107,238
Cash and restricted cash – End of year	$ 8,261,487	$ 3,625,356	$ 5,293,173
Supplemental disclosures of cash flow information			
Interest paid	$ 273,155	$ 131,554	$ 557,333
Income taxes paid	$ -	$ -	$ -
Proceeds in broker accounts	$ 20,116,734	$ 952,196	$ 999,110
Non-cash operating, investing and financing activities			
Right-of-use assets obtained in exchange for new operating lease liabilities	$ -	$ 1,107,206	$ -
Issuance of token in exchange of services	$ -	$ -	$ 300,000
Settlement of service fee by tokens and digital currencies	$ 90,457	$ 24,000	$ 437,178
Deemed dividend related to warrants down round provision	$ -	$ 755,514	$ -
Reconciliation of cash and restricted cash			
Cash	$ 8,131,217	$ 3,495,231	$ 5,189,003
Restricted cash	130,270	130,125	104,170
Total cash and restricted cash shown in the consolidated statements of cash flows	$ 8,261,487	$ 3,625,356	$ 5,293,173

See accompanying notes to the consolidated financial statements.

(Stated in U.S. Dollars)

1. ORGANIZATION

The consolidated financial statements include the financial statements of Aptorum Group Limited (the "Company") and its subsidiaries. The Company and its subsidiaries are hereinafter collectively referred to as the "Group".

The Company, formerly known as APTUS Holdings Limited and STRIKER ASIA OPPORTUNITIES FUND CORPORATION, is a company incorporated on September 13, 2010 under the laws of the Cayman Islands with limited liability.

The Company researches and develops life science and biopharmaceutical products within its wholly-owned subsidiary, Aptorum Therapeutics Limited, formerly known as APTUS Therapeutics Limited ("Aptorum Therapeutics") and its indirect subsidiary companies (collectively, "Aptorum Therapeutics Group").

Below summarizes the list of the major subsidiaries consolidated as of December 31, 2021:

Name	Incorporation date	Ownership	Place of incorporation	Principle activities
Aptorum Therapeutics Limited	June 30, 2016	100%	Cayman Islands	Research and development of life science and biopharmaceutical products
APTUS MANAGEMENT LIMITED	May 16, 2017	100%	Hong Kong	Provision of management services to its holding company and fellow subsidiaries
Aptorum Medical Limited	August 28, 2017	92%	Cayman Islands	Provision of medical clinic services
Aptorum Innovations Holding Limited	April 15, 2019	100%	Cayman Islands	Investment holding company
Aptorum Innovations Holding Pte. Limited	June 5, 2019	75%	Singapore	Research and development of life science and biopharmaceutical products
Acticule Life Sciences Limited	June 30, 2017	80%	Cayman Islands	Research and development of life science and biopharmaceutical products
Claves Life Sciences Limited	August 2, 2017	100%	Cayman Islands	Research and development of life science and biopharmaceutical products
Nativus Life Sciences Limited	July 7, 2017	100%	Cayman Islands	Research and development of life science and biopharmaceutical products
Videns Incorporation Limited	March 2, 2017	100%	Cayman Islands	Research and development of life science and biopharmaceutical products
Mios Pharmaceuticals Limited	March 6, 2018	97.93%	Cayman Islands	Research and development of life science and biopharmaceutical products
mTOR (Hong Kong) Limited	November 4, 2016	90%	Hong Kong	Research and development of life science and biopharmaceutical products
Scipio Life Sciences Limited	July 19, 2017	97.93%	Cayman Islands	Research and development of life science and biopharmaceutical products
Signate Life Sciences Limited	August 28, 2017	100%	Cayman Islands	Research and development of life science and biopharmaceutical products

Deconsolidation of subsidiaries

On May 27, 2021, Aptorum Therapeutics Limited, which is a wholly owned subsidiary of Aptorum Group Limited, entered a Share Sale Agreement to sell all of the shares of SMPTH Limited to Aeneas Group Limited, a related party, at the consideration $1. SMPTH Limited was previously a wholly owned subsidiary of Aptorum Therapeutics Limited. The sale of SMPTH Limited was a common control transaction and resulted in $303,419 increase in additional paid-in capital in the consolidated statement of changes in equity.

During 2021, the Group disposed various inactive subsidiaries in order to simplify the group structure. As a result, the Group recorded a loss of $3,638, which is included in other loss, net in the Group's consolidated statement of operations for the year ended December 31, 2021. The loss is primarily resulted from the net reduction in deficit in non-controlling interest and carrying value of the assets and liabilities of these subsidiaries from the consolidated balance sheet.

2. LIQUIDITY

The Group reported a net loss of $27,114,293 and net operating cash outflow of $14,651,633 for the year ended December 31, 2021. In addition, the Group had an accumulated deficit of $55,537,515 as of December 31, 2021. The Group's operating results for future periods are subject to numerous uncertainties and it is uncertain if the Group will be able to reduce or eliminate its net losses for the foreseeable future. If management is not able to generate significant revenues from its product candidates currently in development, the Group may not be able to achieve profitability.

The Group's principal sources of liquidity have been cash and line of credit facilities from related parties and banks. As of the date of issuance of the consolidated financial statements, the Group has approximately $4.2 million of restricted and unrestricted cash, and $15 million and $3 million, respectively, of undrawn line of credit facilities from related parties and banks. In addition, the Group will need to maintain its operating costs at a level through strictly cost control and budget to ensure operating costs will not exceed such aforementioned sources of funds in order to continue as a going concern for a period within one year after the issuance of its consolidated financial statements.

The Group believes that available cash, together with the efforts from aforementioned management plan and actions, should enable the Group to meet current anticipated cash needs for at least the next 12 months after the date that the consolidated financial statements are issued and the Group has prepared the consolidated financial statements on a going concern basis. We may, however, need additional capital in the future to fund our continued operations. If we determine that our cash requirements exceed the amount of cash and cash equivalents we have at the time, we may seek to issue equity or debt securities or obtain credit facilities. The issuance and sale of additional equity or convertible debts would result in further dilution to our shareholders. The incurrence of indebtedness would result in increased fixed obligations and could result in operating covenants that might restrict our operations. We cannot assure you the financing will be available in amounts or on terms acceptable to us, if at all.

3. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Principles of presentation and consolidation

The consolidated financial statements of the Group are presented on the accrual basis of accounting in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") and include the accounts of the Company, its direct and indirect wholly and majority owned subsidiaries. In accordance with the provisions of Accounting Standards Codification ("ASC") 810, Consolidation, we consolidate any variable interest entity ("VIE") of which we are the primary beneficiary. The typical condition for a controlling financial interest ownership is holding a majority of the voting interests of an entity; however, a controlling financial interest may also exist in entities, such as VIEs, through arrangements that do not involve controlling voting interests. ASC 810 requires a variable interest holder to consolidate a VIE if that party has the power to direct the activities of the VIE that most significantly impact the VIE's economic performance and the obligation to absorb losses of the VIE that could potentially be significant to the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE. We do not consolidate a VIE in which we have a majority ownership interest when we are not considered the primary beneficiary. We have determined that we are not the primary beneficiary of the VIE (see Note 14, Variable Interest Entity). We evaluate our relationships with the VIE on an ongoing basis to determine whether we become the primary beneficiary. All material intercompany balances and transactions have been eliminated in preparation of the consolidated financial statements.

Non-controlling interests

Non-controlling interests are recognized to reflect the portion of the equity of majority-owned subsidiaries which are not attributable, directly or indirectly, to the controlling shareholder. Non-controlling interests are classified as a separate line item in the equity section of the Group's consolidated balance sheets and have been separately disclosed in the Group's consolidated statements of operations and comprehensive loss to distinguish the interests from that of the Group.

Use of estimates

The preparation of the consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements as well as income and expenses during the reporting period. Significant accounting estimates reflected in the Group's consolidated financial statements include valuation of equity securities, fair value of investments in securities, convertible debts, finance lease, warrants and share options, the useful lives of intangible assets and property, plant and equipment, impairment of long-lived assets, valuation allowance for deferred tax assets, and collectability of receivables. Actual results could differ from those estimates.

Foreign currency translation and transaction

USD is the reporting currency. The functional currency of subsidiaries in the Cayman Islands, Seychelles, Samoa and the United States are USD, the functional currency of subsidiaries in Hong Kong is Hong Kong Dollars ("HKD"), the functional currency of a subsidiary in Singapore is Singapore Dollars ("SGD"), the functional currency of a subsidiary in the United Kingdom is Great British Pound ("GBP"), the functional currency of subsidiaries in Canada is Canadian Dollars ("CAD"), and the functional currency of subsidiaries in Ireland is Euro ("EUR"). An entity's functional currency is the currency of the primary economic environment in which it operates, normally that is the currency of the environment in which it primarily generates and expends cash. The management considered various indicators, such as cash flows, market expenses, financing and inter-company transactions and arrangements in determining the Group's functional currency.

In the consolidated financial statements, the financial information of the Company and its subsidiaries, which use HKD, SGD, GBP, CAD and EUR as their functional currency, has been translated into USD. Assets and liabilities are translated from each subsidiary's functional currency at the exchange rates on the balance sheet dates, equity amounts are translated at historical exchange rates, and revenues, expenses, gains, and losses are translated using the average exchange rates for the year. Translation adjustments are reported as cumulative translation adjustments and are shown as a separate component of other comprehensive income or loss in the consolidated statements of operations and comprehensive income or loss.

Cash

Cash consists of cash on hand and bank deposits, which is unrestricted as to withdrawal and use.

Restricted cash

Restricted cash represented time deposits pledged for banking facilities.

Digital currencies

Digital currencies represented BitCoin, Ethereum, or other virtual currencies that the Group purchased and used to settle certain token related expenses.

Digital currencies are included in current assets in the consolidated balance sheets. Digital currencies purchased are recorded at cost.

Digital currencies held are accounted for as intangible assets with indefinite useful lives. An intangible asset with an indefinite useful life is not amortized but assessed for impairment annually, or more frequently, when events or changes in circumstances occur indicating that it is more likely than not that the indefinite-lived asset is impaired. Impairment exists when the carrying amount exceeds its fair value, which is measured using the quoted price of the digital currency at the time its fair value is being measured. In testing for impairment, the Group has the option to first perform a qualitative assessment to determine whether it is more likely than not that an impairment exists. If it is determined that it is not more likely than not that an impairment exists, a quantitative impairment test is not necessary. If the Group concludes otherwise, it is required to perform a quantitative impairment test. To the extent an impairment loss is recognized, the loss establishes the new cost basis of the asset. Subsequent reversal of impairment losses is not permitted.

Purchases of digital currencies by the Group are included within investing activities in the consolidated statements of cash flows. The utilization of digital currencies in exchange of services are included within operating activities in the consolidated statements of cash flows and any gains or losses from such use are included in other income (loss) in the consolidated statements of operations. The Company accounts for its gains or losses in accordance with the first in first out (FIFO) method.

Inventories

Inventories are stated at lower of cost and net realizable value. Cost is determined using the weighted average method.

Where there is evidence that the utility of inventories, in their disposal in the ordinary course of business, will be less than cost, whether due to physical deterioration, obsolescence, changes in price levels, or other causes, the inventories are written down to net realizable value.

Accounts receivable

Accounts receivable are stated at the original amount less an allowance for doubtful receivables, if any, based on a review of all outstanding amounts at period end. An allowance is estimated in accordance with ASC Topic 326, *Credit Losses* and records the allowance for credit losses as an offset to accounts receivable, and the expected credit losses charged to the allowance is included in other operating expenses in the consolidated statements of operations. In determining expected credit losses, the Group consider the historical level of credit losses, current economic trends, and reasonable and supportable forecasts that affect the collectability of the future cash flows. As of December 31, 2021 and 2020, no allowance for doubtful receivables were made.

Marketable securities

Marketable securities are publicly traded stocks measured at fair value and classified within Level 1 and 2 in the fair value hierarchy because the Group either uses quoted prices for identical assets in active markets, inputs that are based upon quoted prices for similar instruments in active markets, or quoted prices for identical assets in markets with insufficient volume or infrequent transaction (less active markets).

Investments in derivatives

Investments in derivatives are warrants measured at fair value, with gains or losses from changes in fair value recognized in other (loss) income, net in the consolidated statement of operations. The fair value of these warrants have been determined using the Black-Scholes pricing mode. The Black-Scholes pricing model provides for assumptions regarding volatility, call and put features and risk-free interest rates within the total period to maturity.

Long-term investments

The Group's long-term investments consist of equity method investment in common stocks and non-marketable investments in non-redeemable preferred shares of privately-held companies that are not required to be consolidated under the variable interest or voting models. Long-term investments are classified as non-current assets on the consolidated balance sheets as those investments do not have stated contractual maturity dates.

Non marketable investments

The non-marketable equity securities not accounted for under the equity method are measured at cost, less any impairment, plus or minus changes resulting from observable price changes in orderly transactions for identical or similar investments of the same issuer. Adjustments are determined primarily based on a market approach as of the transaction date.

Equity method investment – Fair value option

The Group elects the fair value option for an investment that would otherwise be accounted for using the equity method of accounting. Such election is irrevocable and is applied on an investment by investment basis at initial recognition. The fair value of such investments is based on quoted prices in an active market, if any, or recent orderly transactions for identical or similar investment of the same issuer. Changes in the fair value of these equity method investments are recognized in other (loss) income, net in the consolidated statement of operations.

Fair value measurement

Fair value is defined as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities required or permitted to be recorded at fair value, the Group considers the principal or most advantageous market in which it would transact its business, and it considers assumptions that market participants would use when pricing the asset or liability.

As a basis for considering such assumptions, a three-tier fair value hierarchy prioritizes the inputs utilized in measuring fair value as follows:

- Level 1 applies to assets or liabilities for which there are quoted prices in active markets for identical assets or liabilities.
- Level 2 applies to assets or liabilities for which there are inputs other than quoted prices included within Level 1 that are observable for the asset or liability such as quoted prices for similar assets or liabilities in active markets; quoted prices for identical assets or liabilities in markets with insufficient volume or infrequent transactions (less active markets); or model-derived valuations in which significant inputs are observable or can be derived principally from, or corroborated by, observable market data.
- Level 3 applies to assets or liabilities for which there are unobservable inputs to the valuation methodology that are significant to the measurement of the fair value of the assets or liabilities.

The hierarchy requires the Group to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. A financial instrument's categorization within the fair value hierarchy is based upon the lowest level of input that is significant to the fair value measurement. The Group has estimated the fair value amounts of its financial instruments using the available market information and valuation methodologies considered to be appropriate and has determined that the carrying value of the Group's cash, restricted cash, accounts receivable, due from brokers, other receivables and prepayments, amounts due from/to related parties, accounts payable and accrued expenses, and loan receivables from related parties as of December 31, 2021 and 2020 approximate fair value due to the short-term nature of these assets and liabilities.

Property, plant and equipment

Property, plant and equipment is stated at cost less accumulated depreciation and impairment losses. Cost represents the purchase price of the asset and other costs incurred to bring the asset into its existing use. Maintenance, repairs and betterments, including replacement of minor items, are charged to expense; major additions to physical properties are capitalized.

Assets under construction are stated at cost less impairment losses. Cost comprises of cost of laboratory equipment delivered but not ready to be used, together with interest expense capitalized during the period of construction or installation and testing. Capitalization of these costs ceases and the asset concerned is transferred to the appropriate fixed assets category when substantially all the activities necessary to prepare the asset for its intended use are completed.

Depreciation of property, plant and equipment is provided using the straight-line method over their estimated useful lives:

Building	29 years
Computer equipment	3 years
Furniture, fixture, and office and medical equipment	5 years
Leasehold improvements	Shorter of the remaining lease terms or 5 years
Laboratory equipment	5 years
Motor vehicle	5 years

Upon sale or disposal, the applicable amounts of asset cost and accumulated depreciation are removed from the accounts and the net amount less proceeds from disposal is charged or credited to income.

Intangible assets

Indefinite-lived intangible assets are tested for impairment at least annually and are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Indefinite-lived intangible assets are impaired if their estimated fair values are less than their carrying values.

Finite-lived intangible assets are carried at cost less accumulated amortization and impairment if any. The finite intangible assets are amortized over their estimated useful life, which is the period over which the assets are expected to contribute directly or indirectly to the future cash flows of the Group. These intangible assets are tested for impairment at the time of a triggering event, if one were to occur. Finite-lived intangible assets may be impaired when the estimated undiscounted future cash flows generated from the assets are less than their carrying amounts.

The Group may rely on a qualitative assessment when performing its intangible asset impairment test. Otherwise, the impairment evaluation is performed at the lowest level of identifiable cash flows independent of other assets.

The Group's intangible assets mainly consist of computer software, exclusive rights in prepaid patented and unpatented licenses. The prepaid patented licenses are for clinical purpose or further development into other products. Prepaid unpatented license is for further development, once the associated research and development efforts are completed, the prepaid unpatented license will be reclassified as a finite-lived asset and is amortized over its useful life. The estimated useful life of the exclusive rights in using patents is generally the remaining patent life from the acquisition date to expiration date under the law, which is 17 to 20 years, the Group will reassess the remaining patent life on annual basis, and the Group will assess the intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may no longer be recoverable.

Impairment of long-lived assets

The Group reviews its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may no longer be recoverable. When these events occur, the Group measures impairment by comparing the carrying value of the long-lived assets to the estimated undiscounted future cash flows expected to result from the use of the assets and their eventual disposition. If the sum of the expected undiscounted cash flow is less than the carrying amount of the assets, the Group would recognize an impairment loss, which is the excess of carrying amount over the fair value of the assets, using the expected future discounted cash flows.

Convertible debts

The Group determines the appropriate accounting treatment of its convertible debts in accordance with the terms in relation to the conversion feature, call and put option, beneficial conversion feature ("BCF") and settlement feature. After considering the impact of such features, the Group concluded that, the convertible debts contained a contingent beneficial conversion feature, which shall not be recognized in earnings until the contingency is resolved, and therefore accounted for such instrument as a liability in its entirety.

Convertible debts were subsequently measured at amortized cost, using the effective interest rate method. Amortized cost is calculated by taking into account any discount or premium on acquisition and fees or costs that are an integral part of the effective interest rate. The effective interest rate amortization is included in interest expense in the consolidated statements of operations.

Management concluded that the contingency was effectively resolved upon the completion of the IPO on December 17, 2018 so that part of the convertible debts were converted automatically accordingly. The BCF derecognized upon automatic conversion was recorded as interest expense with a corresponding increase to additional paid-in capital. The remaining BCF was recorded as debt discount, which was amortized through the maturity of the convertible debts, with a corresponding increase to additional paid-in capital.

On April 24, 2019, the Group repurchased its convertible debts at approximately $13.6 million with carrying amount of approximately $13.5 million and a gain on extinguishment on convertible debts of approximately $1.2 million was recognized. The repurchasing of convertible debts is considered an extinguishment and the difference between the repurchasing price of debt, the net carrying amount of the extinguished debt and the intrinsic value of BCF is recognized in the consolidated statements of operations. The intrinsic value of BCF of approximately $1.3 million at the extinguishment date was recorded as a reduction of additional paid-in capital.

Operating leases

Prior to the adoption of ASU No. 2016-02, Leases (Topic 842) and subsequent amendments to the initial guidance including ASU No. 2017-13, ASU No. 2018-10, ASU No. 2018-11, ASU No. 2018-20, and ASU No. 2019-01 (collectively, "Topic 842"), operating leases were not recognized on the consolidated balance sheets, instead, rental expenses with fixed payments were recognized on a straight-line basis over the lease term.

Effective January 1, 2020, the Group adopted Topic 842 using a modified retrospective transition approach for leases that exist at, or are entered into after January 1, 2020, and has not recast the comparative periods presented in the consolidated financial statements. At the inception of a contract, the Group determines if the arrangement is, or contains, a lease. Operating lease liabilities are recognized at lease commencement based on the present value of lease payments over the lease term. Operating lease right-of-use assets are initially measured at cost, which comprises the initial amount of the lease liability adjusted for lease payments made at or before the lease commencement date, plus any initial direct costs incurred and less any lease incentives received. As the rate implicit in the lease cannot be readily determined, the Group uses incremental borrowing rate at the lease commencement date in determining the imputed interest and present value of lease payments. The incremental borrowing rate is determined based on the rate of interest that the Group would have to pay to borrow an amount equal to the lease payments on a collateralized basis over a similar term in a similar economic environment. The lease term for all of the Group's leases includes the non-cancellable period of the lease plus any additional periods covered by either a Group's option to extend (or not to terminate) the lease that the Group is reasonably certain to exercise, or an option to extend (or not to terminate) the lease controlled by the lessor. For operating leases, the Group recognizes a single lease cost on a straight-line basis over the remaining lease term.

The Group has elected not to recognize right-of-use assets or lease liabilities for leases with an initial term of 12 months or less and the Group recognizes lease expense for these leases on a straight-line basis over the lease terms.

Finance lease

Leases that transfer substantially all the rewards and risks of ownership of assets to the Group, other than legal title, are accounted for as finance leases. At the inception of a finance lease, the cost of the leased asset is capitalized at the present value of the minimum lease payments and recorded together with the obligation, excluding the interest element, to reflect the purchase and financing. Assets held under capitalized finance leases are included in property, plant and equipment, and depreciated over the shorter of the lease terms and the estimated useful lives of the assets. The interest expenses of such leases are charged to the consolidated statements of operations to provide a constant periodic rate of charge over the lease terms.

Warrants

In connection of the issuance of Class A Ordinary Shares, the Company may issue warrants to purchase Class A Ordinary Shares. Warrants classified as equity are initially recorded at fair value and subsequent changes in fair value are not recognized as long as the warrants continue to be classified as equity.

Revenue recognition

Revenues are derived from healthcare services rendered to patients for healthcare consultation and medical treatment. Revenue is reported at the amount that reflects the consideration to which the Group expects to be entitled in exchange for providing healthcare services.

The Group recognizes revenue as its performance obligations are completed. Healthcare services are treated as a single performance obligation satisfied at a point in time because the performance obligations are generally satisfied over a period of less than one day.

The Group determines the transaction price based on established billing rates. The Group considers the patient's ability and intent to pay the amount of consideration upon admission. Subsequent changes resulting from a patient's ability to pay are recorded as bad debt expense, which is included as a component of other operating expenses in the consolidated statements of operations. During the years ended December 31, 2021, 2020, and 2019, there were no bad debt expenses were recorded.

Cost of healthcare services

Cost of healthcare services rendered represents cost in relation to the medical services provided including the compensation of the physicians and cost of pharmaceutical supplies and medicine.

Research and development expenses

Research and development costs are expensed as incurred. Research and development expenses are comprised of costs incurred in performing research and development activities, including amortization of the patent license, depreciation of laboratory equipment, costs of engaging external consultants, advisors and contracted research organization to conduct preclinical development activities and trials, payroll expenses to research and development staff, and sponsored research expenses to universities and research institutions.

Share-based compensation

The Group uses the fair value method of accounting for the share options granted to directors, employees, external consultants and advisors to measure the cost services received in exchange for the share based awards. The fair value of share option awards with only service condition is estimated on the grant or offering date using the Black-Scholes option-pricing model. The Black-Scholes option-pricing model requires inputs such as the risk-free interest rate, expected term and expected volatility. These inputs are subjective and generally require significant judgment. The resulting cost is recognized over the period during which a director, employee, external consultant or advisor is required to provide service in exchange for the awards, usually the vesting period, which is generally from 9.5 months to 21.5 months. Share-based compensation expense is recognized on a graded vesting basis, net of actual forfeitures in the period.

Share-based compensation expense is recorded in cost of healthcare services, research and development expenses, general and administrative fees and legal and professional fees in the consolidated statements of operations.

Gain or loss on derecognition of non-financial asset

The Group determines if a contract exists, identifies the distinct non-financial assets, and determines when control transfers and, therefore, when to derecognize the asset. Additionally, the Group applies the measurement principles of revenue from contracts with customers within U.S. GAAP to determine the amount of consideration to include in the calculation of the gain or loss for the non-financial asset. Any gains or losses have been included within other income (loss).

Income taxes

The Group accounts for income taxes under the asset and liability method. Under this method, deferred income taxes are determined based on differences between the financial carrying amounts of existing assets and liabilities and their tax bases. Income taxes are provided for in accordance with the laws of the relevant taxing authorities.

A valuation allowance is provided for deferred tax assets if it is more likely than not that these items will either expire before the Group is able to realize their benefits, or that future deductibility is uncertain. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount expected to be realized.

Uncertain tax positions

The Group accounts for uncertainty in income taxes using a two-step approach to recognizing and measuring uncertain tax positions. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon settlement. Interest and penalties related to uncertain tax positions are recognized and recorded as necessary in the provision for income taxes. The Group recognizes interest on non-payment of income taxes and penalties associated with tax positions when a tax position does not meet more likely than not thresholds be sustained under examination. The tax returns of the Group's Hong Kong subsidiaries are subject to examination by the relevant tax authorities. According to the Hong Kong Inland Revenue Department, the statute of limitation is six years if any company chargeable with tax has not been assessed or has been assessed at less than the proper amount, the statute of limitation is extended to ten years if the underpayment of taxes is due to fraud or willful evasion. According to United Kingdom, Singapore, the United States and Samoa tax rule, trading losses are available to be carried forward indefinitely. According to the Seychelles tax rule, net operating losses are available to be carried forward for 5 years. The Group did not have any material interest or penalties associated with tax positions for the years ended December 31, 2021, 2020 and 2019, and did not have any significant unrecognized uncertain tax positions as of December 31, 2021 and 2020. The Group does not believe that its assessment regarding unrecognized tax benefits will materially change over the next twelve months.

Comprehensive income or loss

U.S. GAAP generally requires that recognized revenue, expenses, gains and losses be included in net income or loss. Although certain changes in assets and liabilities are reported as separate components of the equity section of the consolidated balance sheets, such items, along with net income or loss, are components of comprehensive income or loss. The components of other comprehensive income or loss consist of exchange differences on translation of foreign operations.

Net income or loss per share

Basic net income or loss per share is computed by dividing net income or loss attributable to ordinary shareholders by the weighted average number of ordinary shares outstanding during the period. Diluted net income or loss per share reflects the potential dilution that could occur if securities or other contracts to issue ordinary shares were exercised or converted into ordinary shares. Potential dilutive securities are excluded from the calculation of diluted loss per share in loss periods as their effect would be anti-dilutive.

Risks and uncertainties

The Group is subject to a number of risks associated with companies at a similar stage, including dependence on key individuals, competition from similar services and larger companies, volatility of the industry, ability to obtain regulatory clearance, ability to obtain adequate financing to support growth, the ability to attract and retain additional qualified personnel to manage the anticipated growth of the Group and general economic conditions.

The Group is currently evaluating the impact of the COVID-19 pandemic and has concluded that while it is reasonably possible that the virus could have a negative effect on the Group's financial position and results of its operations, the specific impact is not readily determinable as of the date of these financial statements. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Recently adopted accounting pronouncements

In June 2016, the FASB issued ASU 2016-13, Financial Instruments—Credit Losses. Subsequently, the FASB issued ASU 2019-05, Financial Instruments- Credit Losses (Topic 326): Targeted Transition Relief. The amendments in ASU 2016-13 update guidance on reporting credit losses for financial assets. These amendments affect loans, debt securities, accounts receivables, net investments in leases, off balance sheet credit exposures, reinsurance receivables, and any other financial assets not excluded from the scope that have the contractual right to receive cash. The amendments are effective for fiscal years beginning after December 15, 2020, and interim periods within those fiscal years. We adopted the ASU during 2021 as of the beginning of our fiscal year, which did not have a material impact on our consolidated financial statements.

Recently issued accounting standards which have not yet been adopted

The Group is an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2010 (the "JOBS Act"). Under the JOBS Act, the emerging growth companies ("EGCs") can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies.

In December 2019, the FASB issued ASU 2019-12, Income Taxes (Topic 740): "Simplifying the Accounting for Income Taxes" ("ASU 2019-12"), which simplifies the accounting for income taxes. This standard will be effective for fiscal years beginning after December 15, 2021, and interim periods within fiscal years beginning after December 15, 2022, on a prospective basis, and early adoption is permitted. The ASU is currently not expected to have a material impact on our consolidated financial statements.

In May 2021, the FASB issued ASU No. 2021-04, Issuer's Accounting for Certain Modifications or Exchanges of Freestanding Equity-Classified Written Call Options. The ASU addresses the previous lack of specific guidance in the accounting standards codification related to modifications or exchanges of freestanding equity-classified written call options (such as warrants) by specifying the accounting for various modification scenarios. The ASU is effective for interim and annual periods beginning after December 15, 2021, with early adoption permitted for any periods after issuance to be applied as of the beginning of the fiscal year that includes the interim period. The ASU is currently not expected to have a material impact on our consolidated financial statements.

In November 2021, the FASB issued ASU 2021-10, Government Assistance (Topic 832). This ASU requires business entities to disclose information about government assistance they receive if the transactions were accounted for by analogy to either a grant or a contribution accounting model. The disclosure requirements include the nature of the transaction and the related accounting policy used, the line items on the balance sheets and statements of operations that are affected and the amounts applicable to each financial statement line item and the significant terms and conditions of the transactions. The ASU is effective for annual periods beginning after December 15, 2021. The disclosure requirements can be applied either retrospectively or prospectively to all transactions in the scope of the amendments that are reflected in the financial statements at the date of initial application and new transactions that are entered into after the date of initial application. The ASU is currently not expected to have a material impact on our consolidated financial statements.

The Group does not believe other recently issued but not yet effective accounting standards, if currently adopted, would have a material impact on the consolidated balance sheets, consolidated statements of operations and cash flows.

(Stated in U.S. Dollars)

4. REVENUE

For the years ended December 31, 2021, 2020 and 2019, all revenue came from provision of healthcare services in Hong Kong.

5. INVESTMENT AND FAIR VALUE MEASUREMENT

Assets Measured at Fair Value on a Recurring Basis

The following table provides the assets and liabilities carried at fair value measured on a recurring basis as of December 31, 2021 and 2020:

December 31, 2021	Level 1	Level 2	Level 3	Total
Current Assets				
Marketable securities				
Common stocks	$ 23,527	$ 213,088	$ -	$ 236,615
Non current Assets				
Long-term investments				
Common stocks	$ -	$ -	$ 77,200	$ 77,200
Total assets at fair value	$ 23,527	$ 213,088	$ 77,200	$ 313,815

December 31, 2020	Level 1	Level 2	Level 3	Total
Current Assets				
Marketable securities				
Common stocks	$ 66,062	$ 28,318,882	$ -	$ 28,384,944
Investments in derivatives				
Warrants	-	-	4,289	4,289
Total assets at fair value	$ 66,062	$ 28,318,882	$ 4,289	$ 28,389,233

The following is a reconciliation of Level 3 assets measured and recorded at fair value on a recurring basis during the years ended December 31, 2021 and 2020:

	Warrants	Common Stock
Balance at January 1, 2021	**$ 4,289**	**$ -**
Change in unrealized (depreciation) appreciation, net	(4,289)	-
Additions	-	77,200
Balance at December 31, 2021	**$ -**	**$ 77,200**
Net change in unrealized appreciation relating to investments still held at December 31, 2021	-	-
Balance at January 1, 2020	**$ 203,320**	**$ -**
Change in unrealized depreciation	(199,031)	-
Balance at December 31, 2020	**$ 4,289**	**$ -**
Net change in unrealized depreciation relating to investments still held at December 31, 2020	(198,549)	-

(Stated in U.S. Dollars)

The following table presents the quantitative information about the Group's Level 3 fair value measurements of investment as of December 31, 2021 and 2020, which utilized significant unobservable internally-developed inputs:

December 31, 2021	Valuation technique	Unobservable input	Range (weighted average)
Common stocks	Recent transactions	Recent transaction price	$0.0001 - $0.01

December 31, 2020	Valuation technique	Unobservable input	Range (weighted average)
Warrants	Black-Scholes Model	Estimated time to exit Historical Volatility	6 months 122%

(Stated in U.S. Dollars)

Non-marketable investments

The Group's non-marketable investments are investments in privately held companies without readily determinable fair values. The carrying value of the non-marketable investments are adjusted based on price changes from observable transactions of identical or similar securities of the same issuer (referred to as the measurement alternative) or for impairment. Any changes in carrying value are recorded within other income (loss), net in the consolidated statements of operations.

The following is a summary of unrealized gains and losses recorded in other income (loss), net, and included as adjustments to the carrying value of non-marketable investments held as of December 31, 2021, 2020 and 2019 based on the observable price in an orderly transaction for the same or similar security of the same issuers:

	Year ended December 31, 2021	Year ended December 31, 2020	Year ended December 31, 2019
Upward adjustments	$ -	$ -	$ 1,017,468
Total unrealized gain for non-marketable investments	$ -	$ -	$ 1,017,468

The Group did not record any realized gains or losses for the non-marketable investments measured at fair value on a non-recurring basis during the years ended December 31, 2021, 2020 and 2019.

The following table summarizes the total carrying value of the non-marketable investments held as of December 31, 2021 and 2020 including cumulative unrealized upward and downward adjustments made to the initial cost basis of the investments:

	December 31, 2021	December 31, 2020
Initial cost basis	$ 4,079,707	$ 4,079,707
Upward adjustments	-	-
Total carrying value at the end of the year	$ 4,079,707	$ 4,079,707

For the year ended December 31, 2020, non-marketable investments with initial cost of $2,015,005 and accumulated upward adjustments of $1,017,468 were transferred into marketable securities, at fair value. There was no transferred of non-marketable investments into marketable securities for the year ended December 31, 2021.

Equity method investment, fair value option

In December 2021, one of the Group's subsidiaries, Libra Sciences Limited ("Libra", formerly known as Aptorum Pharmaceutical Development Limited), issued Class A and Class B ordinary shares to various parties in exchange of licenses or cash. Each Class A share of Libra is entitled to 1 vote while each Class B share of Libra is entitled to 10 votes. Upon the share issuance, the Group was holding 97.27% economic interest and 31.51% voting power in Libra. The Group lost the controlling interest in Libra because it was transferred to a third party, and therefore deconsolidated Libra. However, the Group still owns 97.27% economic interest and 31.51% voting power, which is deemed as having significant influence over Libra. As a result, the Group's investment in Libra is subject to the equity method of accounting. The Group assessed that the fair value option can better reflect the true value of Libra. Pursuant to ASC 825 – Financial Instruments ("ASC 825"), the Group elected to apply the fair value option for its investments in Libra and will remeasure its investments in Libra at fair value every reporting period. For the year ended December 31, 2021, there was no change in fair value of equity method investment, at fair value.

(Stated in U.S. Dollars)

6. OTHER RECEIVABLES AND PREPAYMENTS

Other receivables and prepayments as of December 31, 2021 and 2020 consisted of:

	December 31, 2021	December 31, 2020
Prepaid research and development expenses	$ 314,165	$ 978,044
Prepaid insurance	92,035	82,060
Prepaid service fee	90,857	174,114
Rental deposits	12,011	12,022
Prepaid rental expenses	13,205	14,251
Other receivables	47,697	74,176
Others	23,508	44,329
	$ 593,478	$ 1,378,996

7. DIGITAL CURRENCIES

The following table presents additional information about digital currencies:

	December 31, 2021	December 31, 2020
Beginning balance	$ 1,539	$ 1,539
Utilization of digital currencies to settle service fee	(6,457)	-
Gain on use of digital currencies	4,918	-
Ending balance	$ -	$ 1,539

8. PROPERTY, PLANT AND EQUIPMENT, NET

Property, plant and equipment as of December 31, 2021 and 2020 consisted of:

	December 31, 2021	December 31, 2020
Computer equipment	$ 85,495	$ 77,611
Furniture, fixture, and office and medical equipment	264,123	262,664
Leasehold improvements	542,514	542,514
Laboratory equipment	4,179,064	4,058,538
Motor vehicle	239,093	239,093
Assets in construction	1,899,169	1,899,169
	7,209,458	7,079,589
Less: accumulated depreciation	3,478,342	2,393,266
Property, plant and equipment, net	$ 3,731,116	$ 4,686,323

Depreciation expenses for property, plant and equipment amounted to $1,086,564, $1,128,867 and $1,071,799 for the years ended December 31, 2021, 2020 and 2019, respectively.

For the year ended December 31, 2020, the Group recorded $330,445 of impairment loss of buildings in other operating expenses due to the management assessed that its carrying amount may not be recoverable. On July 20, 2020, the Group signed a sales and purchase agreement to sell its property in Fo Tan, Hong Kong, at approximately $1.1 million to a third party buyer. The property was assigned to the buyer on September 1, 2020. For the year ended December 31, 2021 and 2019, no impairment loss was recorded.

For the year ended December 31, 2021, the Group recorded $392 of loss on disposal of office equipment in other operating expenses. For the year ended December 31, 2020, the Group disposed certain leasehold improvement and furniture, fixture, and office equipment as a result of the relocation of office, incurred a disposal loss of $50,197 in other operating expenses. For the year ended December 31, 2019, no gain or loss from disposal was recorded.

(Stated in U.S. Dollars)

9. INTANGIBLE ASSETS, NET

	December 31, 2021	December 31, 2020
Gross carrying amount		
Prepaid patented licenses	$ 1,338,205	$ 1,322,820
Computer software	31,667	26,985
	1,369,872	1,349,805
Less: accumulated amortization		
Prepaid patented licenses	462,803	360,212
Computer software	26,813	24,736
	489,616	384,948
Intangible assets, net		
Prepaid patented licenses	875,402	962,608
Computer software	4,854	2,249
Intangible assets, net	$ 880,256	$ 964,857

As of December 31, 2021 and 2020, the Group has capitalized eight and seven of the exclusive licenses respectively, which includes seven patented technologies in relation to the Group's therapeutics segment respectively. Pursuant to the license agreements, the Group paid upfront payments and became the exclusive licensee to prosecute certain patents developed or licensed under the applicable agreements.

Prepaid patented licenses and computer software are finite-lived intangible assets which are amortized over their estimated useful life. Amortization expenses for finite-lived intangible assets amounted to $106,014, $145,961 and $167,985 for the years ended December 31, 2021, 2020 and 2019, respectively.

For the year ended December 31, 2020, an impairment loss of $200,000 was recognized in research and development expenses as the Group considered that the carrying amount of an intangible asset related to an unpatented license may not be recoverable. This license agreement was terminated on February 19, 2021. For the year ended December 31, 2021 and 2019, no impairment loss was recorded.

The Group wrote off the cost and the related amortization of $1,344, $70,477 and $34,400 after the expiration of the computer software for the years ended December 31, 2021, 2020 and 2019, respectively.

The Group expects amortization expense related to its finite-lived intangible assets for the next five years and thereafter to be as follows as of December 31, 2021:

For the years ending December 31,	Amount
2022	$ 105,911
2023	105,911
2024	99,245
2025	81,925
2026	81,924
Thereafter	405,340
Total	$ 880,256

(Stated in U.S. Dollars)

10. LONG-TERM DEPOSITS

Long-term deposits as of December 31, 2021 and 2020 consisted of:

	December 31, 2021	December 31, 2020
Rental deposits	$ 149,175	$ 149,175
Prepayments for equipment	147,050	147,050
	$ 296,225	$ 296,225

11. ACCOUNTS PAYABLE AND ACCRUED EXPENSES

Accounts payable and accrued expenses as of December 31, 2021 and 2020 consisted of:

	December 31, 2021	December 31, 2020
Deferred bonus and salaries payable	$ 3,173,739	$ 2,078,958
Research and development expenses payable	519,012	750,989
Professional fees payable	166,190	185,838
Cost of healthcare services payable	142,968	104,457
Insurance expenses payable	35,010	33,152
Others	135,646	87,378
	$ 4,172,565	$ 3,240,772

12. INCOME TAXES

The Company and its subsidiaries file tax returns separately.

Income taxes

Cayman Islands: under the current laws of the Cayman Islands, the Company and its subsidiaries in the Cayman Islands are not subject to taxes on their income and capital gains.

Hong Kong: in accordance with the relevant tax laws and regulations of Hong Kong, a company registered in Hong Kong is subject to income taxes within Hong Kong at the applicable tax rate on taxable income. In March 2018, the Hong Kong Government introduced a two-tiered profit tax rate regime by enacting the Inland Revenue (Amendment) (No.3) Ordinance 2018 (the “Ordinance”). Under the two-tiered profits tax rate regime, the first $2 million of assessable profits of qualifying corporations is taxed at 8.25% and the remaining assessable profits at 16.5%. The Ordinance is effective from the year of assessment 2018-2019. According to the policy, if no election has been made, the whole of the taxpaying entity’s assessable profits will be chargeable to Profits Tax at the rate of 16.5% or 15%, as applicable. Because the preferential tax treatment is not elected by the Group, all the subsidiaries registered in Hong Kong are subject to income tax at a rate of 16.5%. The subsidiaries registered in Hong Kong did not have assessable profits that were derived Hong Kong during the years ended December 31, 2021, 2020 and 2019. Therefore, no Hong Kong profit tax has been provided for in the periods presented. Our returns for 2015 and subsequent tax years remain subject to examination by Hong Kong Inland Revenue Department.

(Stated in U.S. Dollars)

United Kingdom: in accordance with the relevant tax laws and regulations of United Kingdom, a company registered in the United Kingdom is subject to income taxes within United Kingdom at the applicable tax rate on taxable income. All the United Kingdom subsidiaries that are not entitled to any tax holiday were subject to income tax at a rate of 19%. The subsidiary in United Kingdom did not have assessable profits that were derived from United Kingdom during the years ended December 31, 2021, 2020 and 2019. Therefore, no United Kingdom profit tax has been provided for in the periods presented. Our returns for 2017 and subsequent tax years remain subject to examination by the UK tax authority.

Singapore: in accordance with the relevant tax laws and regulations of Singapore, a company registered in the Singapore is subject to income taxes within Singapore at the applicable tax rate on taxable income. All the Singapore subsidiaries that are not entitled to any tax holiday were subject to income tax at a rate of 17%. The subsidiary in Singapore did not have assessable profits that were derived from Singapore during the years ended December 31, 2021, 2020 and 2019. Therefore, no Singapore profit tax has been provided for in the periods presented. Our returns for 2017 and subsequent tax years remain subject to examination by the Singapore tax authority.

United States (Nevada): in accordance with the relevant tax laws and regulations of the United States, a company registered in the United States is subject to income taxes within the United States at the applicable tax rate on taxable income. All the United States subsidiaries in Nevada that are not entitled to any tax holiday were subject to income tax at a rate of 21%. The subsidiary in the United States did not have assessable profits that were derived from the United States during the years ended December 31, 2021, 2020 and 2019. Therefore, no United States profit tax has been provided for in the periods presented. Our returns for 2018 and subsequent tax years remain subject to examination by Internal Revenue Service.

Canada: in accordance with the relevant tax laws and regulations of Canada, a company registered in Canada is subject to income taxes within Canada at the applicable tax rate on taxable income. All the Canada subsidiaries that are not entitled to any tax holiday were subject to income tax at a rate of 15%. The subsidiary in Canada did not have assessable profits that were derived from Canada during the years ended December 31, 2021, 2020 and 2019. Therefore, no Canada profit tax has been provided for in the periods presented. Our returns for 2017 and subsequent tax years remain subject to examination by the Canada tax authority.

Ireland: in accordance with the relevant tax laws and regulations of Ireland, a company registered in Ireland is subject to income taxes within Ireland at the applicable tax rate on taxable income. All the Ireland subsidiaries that are not entitled to any tax holiday were subject to income tax at a rate of 12.5%. The subsidiary in Ireland did not have assessable profits that were derived from Ireland during the years ended December 31, 2021, 2020 and 2019. Therefore, no Ireland profit tax has been provided for in the periods presented. Our returns for 2017 and subsequent tax years remain subject to examination by the Ireland tax authority.

The components of the provision for income taxes expenses are:

	Year ended December 31, 2021	Year ended December 31, 2020	Year ended December 31, 2019
Current	$ -	$ -	$ -
Deferred	-	-	-
Total income taxes expense	$ -	$ -	-

The reconciliation of income taxes expenses computed at the Hong Kong statutory tax rate applicable to income tax expense is as follows:

	Year ended December 31, 2021	Year ended December 31, 2020	Year ended December 31, 2019
Net income (loss) before tax	$ (27,114,293)	$ 4,920,167	$ (20,116,938)
Provision for income taxes at Hong Kong statutory income tax rate (16.5%)	(4,473,859)	811,828	(3,319,294)
Impact of different tax rates in other jurisdictions	(214,135)	(18,869)	(91,623)
Non-taxable income	(716,628)	(4,281,521)	(389,714)
Non-deductible expenses	1,992,463	79,200	702,433
Change in valuation allowance	3,412,159	3,409,362	3,098,198
Effective income tax expense	$ -	$ -	$ -

(Stated in U.S. Dollars)

Deferred tax asset, net

Deferred tax assets and deferred tax liabilities reflect the tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purpose and the tax bases used for income tax purpose. The following represents the tax effect of each major type of temporary difference.

	December 31, 2021	December 31, 2020
Deferred tax asset:		
Tax loss carry forward	$ 12,189,424	$ 9,461,421
Share-based payment expenses	698,564	497,808
	12,887,988	9,959,229
Deferred tax liability:		
Depreciation and amortization	(255,824)	(397,669)
Net deferred tax assets before valuation allowance	12,632,164	9,561,560
Valuation allowance	(12,632,164)	(9,561,560)
Deferred tax asset, net	$ -	$ -

As of December 31, 2021 and 2020, the Group had net operating loss carry-forwards of $73,785,041 and $57,065,283, respectively, including its Hong Kong, Singapore, the United States, the United Kingdom, Canada and Ireland operations, which are available to reduce future taxable income and have an unlimited carryover period. For the year ended December 31, 2021, there was no tax loss carried forward expired, while tax loss brought forward of $1,805,527 was cancelled due to the disposal of various subsidiaries.

Valuation allowance was provided against deferred tax assets in entities where it was determined, it was more likely than not that the benefits of the deferred tax assets will not be realized. The Group had deferred tax assets which consisted of tax loss carry forward, which can be carried forward to offset future taxable income. The Group maintains a full valuation allowance on its net deferred tax assets. The management determines it is more likely than not that all of its deferred tax assets will not be utilized.

Changes in valuation allowance are as follows:

	Year ended December 31, 2021	Year ended December 31, 2020	Year ended December 31, 2019
Balance as of January 1	$ 9,561,560	$ 6,152,198	$ 3,054,000
Additions	3,412,159	3,409,362	3,098,198
Disposal	(341,555)	-	-
Balance as of December 31	$ 12,632,164	$ 9,561,560	$ 6,152,198

(Stated in U.S. Dollars)

13. RELATED PARTY BALANCES AND TRANSACTIONS

The following is a list of a director and related parties to which the Group has transactions with:

(a) Ian Huen, the Chief Executive Officer and an Executive Director of the Group;
(b) Darren Lui, the President and an Executive Director of the Group
(c) Clark Cheng, an Executive Director of the Group;
(d) Sabrina Khan, the Chief Financial Officer of the Group.
(e) Aeneas Group Limited, an entity controlled by Ian Huen;
(f) Aeneas Management Limited, an entity controlled by Ian Huen;
(g) Aenco Solutions Limited, an entity controlled by Ian Huen. In 2020, it is no longer the Group's related party as it is disposed to a third party;
(h) Aenco Limited, an entity controlled by Ian Huen;
(i) Aeneas Technology (Hong Kong) Limited, an entity controlled by Ian Huen;
(j) Jurchen Investment Corporation, the holding company and an entity controlled by Ian Huen;
(k) CGY Investment Limited, an entity jointly controlled by Darren Lui;
(l) ACC Medical Limited, an entity controlled by Clark Cheng;
(m) Talem Medical Group Limited, an entity which Clark Cheng is a director;
(n) Libra Sciences Limited, an entity which was originally a wholly owned subsidiary of ATL. Since December 30, 2021, Libra has been turned into a related party to the Group due to the voting power owned by ATL is decreased to below 50% but more than 20%. (Note 14)

Amounts due from related parties

Amounts due from related parties consisted of the following as of December 31, 2021 and 2020:

	December 31, 2021	December 31, 2020
Current		
Libra Sciences Limited	$ 4,193	$ -
Jurchen Investment Corporation	2,000	-
CGY Investment Limited	2,000	-
Talem Medical Group Limited	3,397,650	-
	$ 3,405,843	$ -

Amounts due to related parties

Amounts due to related parties consisted of the following as of December 31, 2021 and 2020:

	December 31, 2021	December 31, 2020
Current		
Ian Huen	$ 1,397	$ 2,110
Darren Lui	3,449	-
Clark Cheng	5,699	401
Sabrina Khan	844	39
Aeneas Group Limited	-	123,922
Jurchen Investment Corporation	-	19,454
Total	$ 11,389	$ 145,926
Non-current		
Aeneas Group Limited (Note a)	$ -	$ 1,507,285
Jurchen Investment Corporation (Note a)	-	500,000
	$ -	$ 2,007,285

(Stated in U.S. Dollars)

Related party transactions

Related party transactions consisted of the following for the years ended December 31, 2021, 2020 and 2019:

	Year ended December 31, 2021	Year ended December 31, 2020	Year ended December 31, 2019
Loan from related parties (Note a)			
- Aeneas Group Limited	$ 1,000,000	$ 500,000	$ 3,330,472
- Jurchen Investment Corporation	$ 2,500,000	$ 500,000	$ 3,000,000
Interest expenses (Note a)			
- Aeneas Group Limited	$ 64,753	$ 155,633	$ 14,247
- Jurchen Investment Corporation	$ 65,644	$ 81,530	$ 20,055
Loan repayment and interest paid to related parties (Note a)			
- Aeneas Group Limited	$ 2,673,389	$ 2,356,080	$ -
- Jurchen Investment Corporation	$ 3,085,097	$ 3,082,131	$ -
Loan to a related party (Note b)			
- Talem Medical Group Limited	$ 3,358,089	$ -	$ -
Interest income (Note b)			
- Talem Medical Group Limited	$ 39,561	$ -	$ -
Consultant, secondment, management and administrative services fees (Note c)			
- CGY Investments Limited	$ 173,333	$ 169,462	$ -
- ACC Medical Limited	$ 157,511	$ 13,018	$ -
- Aenco Limited	$ -	$ 746,153	$ 830,769
- Aeneas Technology (Hong Kong) Limited	$ -	$ 617,794	$ -
- Aeneas Management Limited	$ -	$ 231,795	$ 698,152
Rental expense (Note d)			
- Jurchen Investment Corporation	$ -	$ 96,300	$ 227,729
Issuance of tokens for tokens creation, offering and consultancy services (Note e)			
- Aenco Solutions Limited	$ -	$ -	$ 300,000
Tokens creation, offering and consultancy services expense (Note e)			
- Aenco Solutions Limited	$ -	$ -	$ 192,000
Prepayment of tokens consultancy services (Note e)			
- Aenco Solutions Limited	$ -	$ -	$ 108,000
Healthcare services income			
- Aeneas Management Limited	$ 7,564	$ 321	$ 1,923

Note a: On August 13, 2019, the Group entered into financing arrangements with Aeneas Group Limited, a related party, and Jurchen Investment Corporation, the ultimate parent of the Group, allowing the Group to access up to a total $15.0 million in line of credit debt financing. The line of credit will initially mature on August 12, 2022, extendable for up to an additional three years period upon mutual written consent. The interest on the outstanding principal indebtedness is at the rate of 8% per annum. The Group may early repay, in whole or in part, the principal indebtedness and all interest accrued at any time prior to the maturity date without the prior written consent of the lender and without payment of any premium or penalty.

Note b: On November 17, 2021, Aptorum Therapeutics Limited (the "Lender") entered into a loan agreement with Talem Medical Group Limited (the "Borrower"). According to the loan agreement, the Lender granted a loan of up to AUD4,700,000 for the Borrower for general working capital purposes of the Borrower and its subsidiaries. The loan is interest-bearing at a rate of 10% per annum and secured by the entire issued shares of Talem Medical Group (Australia) Pty Limited held by the Borrower. The loan is initially matured 6 months from the date of the first drawdown. The maturity date may be extended for 6 months to the first extended maturity date, and further extended for another 6 months to the second extended maturity date, if certain conditions stated in loan agreement are satisfied.

Note c: Aenco Limited provided certain information technology services to the Group. For the year ended December 31, 2019, Aenco Limited was entitled to receive a fixed amount of services fees of HKD 540,000 (approximately $69,231) per calendar month with the expiry date on December 31, 2019. The agreement was originally renewed under the same terms with the expiry date on December 31, 2020. The agreement was replaced by another agreement on April 1, 2020. Pursuant to the replaced agreement, Aenco Limited is entitled to receive a fixed amount of services fee of HKD 700,000 (approximately $89,744) per calendar month. On September 30, 2020, the replaced agreement was terminated as mutually agreed.

Aeneas Technology (Hong Kong) Limited provided research to the Group to assist the Group in computerized drug screening process of Smart-ACT® platform. Aeneas Technology (Hong Kong) Limited is entitled to receive a fixed amount of research fees of HKD 963,760 (approximately $123,559) per calendar month with the expiry date on October 30, 2021. On September 30, 2020, the agreement was terminated as mutually agreed.

Aeneas Management Limited provided certain documentation and administrative services to the Group. For the year ended December 31, 2019, Aeneas Management Limited was entitled to receive a fixed amount of services fees of HKD 452,000 (approximately $57,949) per calendar month with the expiry date on December 31, 2019. The agreement was originally renewed under the same terms with the expiry date on December 31, 2020. On April 30, 2020, the agreement was terminated as mutually agreed.

CGY Investment Limited provided certain consultancy, advisory and management services to the Group on potential investment projects related to healthcare or R&D platforms. CGY Investment Limited is initially entitled to receive HK $104,000 (approximately $13,333) per calendar month plus reimbursement; such the monthly service fee is adjusted to HK$171,200 (approximately US$21,949) with effect from March 1, 2022. The agreement will be remained in effect until 1 month's notice in writing is given by either party.

ACC Medical Limited provided certain consultancy, advisory, and management services to the Group on clinic operations and other related projects for clinics' business development. ACC Medical Limited is initially entitled to receive HK $101,542 (approximately $13,018) per calendar month plus reimbursement; such monthly service fee is adjusted to HK$143,200 (approximately US$18,359 per month) effective from March 1, 2022. The agreement will be remained in effect until 1 month's notice in writing is given by either party.

Note d: Jurchen Investment Corporation entered into a sub-tenancy agreement with a subsidiary of the Group for the rental arrangement of an office in Hong Kong. For the period February 1, 2018 through January 31, 2021, Jurchen Investment Corporation was entitled to receive a fixed amount of rental fee of HK $130,000 (approximately USD 16,667) per calendar month. In May 2020, Jurchen Investment Corporation and the Group mutually agreed to early terminate the rental agreement and returned the office on May 31, 2020.

Note e: In July 2019, Smart Pharmaceutical Limited Partnership ("SPLP"), a wholly owned subsidiary of the Group, transferred 100,000,000 SMPT token to Aenco Solutions Limited, a related party, in exchange of the services related to token creation and offering and consulting services for five years for an amount of $300,000. On March 5, 2021, all agreements regarding the SMPT tokens, including the agreement between SPLP and Aenco Solutions Limited in exchange of the service to deal with the token creation, have been terminated.

Note f: On March 29, 2019, Aptorum Medical Limited issued 112 shares to Clark Cheng in according to the appointment agreement, decreasing the equity interest of the Company from 95% to 94%. On January 2, 2020, Aptorum Medical Limited further issued 115 shares to Clark Cheng in according to the appointment agreement, decreasing the equity interest of the Company from 94% to 93%. On January 2, 2021, Aptorum Medical Limited further issued 117 shares to Clark Cheng in according to the appointment agreement, decreasing the equity interest of the Company from 93% to 92%.

Note g: On May 27, 2021, Aptorum Therapeutics Limited, which is a wholly owned subsidiary of Aptorum Group Limited, entered a Share Sale Agreement to sell all of the shares of SMPTH Limited to Aeneas Group Limited at the consideration $1. The sale of SMPTH Limited was a common control transaction and resulted in $303,419 increase in additional paid-in capital in the condensed consolidated statement of changes in equity.

Note h: On January 1, 2022, the Group entered into an administrative management services agreement with Libra Sciences Limited. According to the agreement, the Group will provide documentation and administrative services, include but are not limited to human resources and payroll administration, general secretarial and administrative support, and accounting and financial reporting services. The Group is entitled to receive a fixed amount of services fees of HKD 25,000 (approximately $3,205) per calendar month with the expiry date on December 31, 2023.

Note i: On January 13, 2022, the Group entered a line of credit facility with Libra Sciences Limited to provide up to a total $1 million line of credit for its daily operation. The line of credit will mature on July 12, 2022, extendable for up to twelve months, and the interest on the outstanding principal indebtedness will be at the rate of 10% per annum.

(Stated in U.S. Dollars)

14. VARIABLE INTEREST ENTITY

The Company consolidates VIEs in which the Group has a variable interest and is determined to be the primary beneficiary. This determination is based on whether the Group has a variable interest (or combination of variable interests) that provides the Company with (a) the power to direct the activities that most significantly impact the VIE's economic performance and (b) the obligation to absorb losses or right to receive benefits that could be potentially significant to the VIE. The Group continually reassesses whether it is the primary beneficiary of a VIE throughout the entire period the Group is involved with the VIE.

On December 30, 2021, three of the Group's subsidiaries, Libra Sciences Limited ("Libra", formerly known as Aptorum Pharmaceutical Development Limited), Mios Pharmaceuticals Limited ("Mios") and Scipio Life Sciences Limited ("Scipio"), issued Class A and Class B ordinary shares to various parties; for each such entity, each Class A ordinary share is entitled to 1 vote and 1 share of economic benefit of the respective company, while each Class B ordinary share is entitled to 10 votes and 0.001 share of economic benefit of the respective company. Following such share issuances, the Group lost its majority voting rights in each of these three companies and only holds 48.33%, 48.39% and 48.36% economic interest in Libra, Mios and Scipio, respectively. However, the Group still holds a majority of each of these three company's outstanding Class A ordinary shares and therefore will absorb/receive portions of these subsidiaries' expected losses or residual returns. In addition, none of these three companies have sufficient equity to sustain its own activities, and they have two classes of ordinary shares which have different rights, benefits and obligations. We determined that all these three companies are variable interest entities ("VIE"). On December 31, 2021, Libra, Mios and Scipio further issued Class A ordinary shares to the Group in exchange of certain projects licenses. Upon these share issuances, the Group was holding 97.27% economic interest and 31.51% voting power in Libra, 97.93% economic interest and 36.17% voting power in Mios, and 97.93% economic interest and 35.06% voting power in Scipio, respectively.

We have considered each of these entity's Memorandum and Article of Association and their respective board of directors (the sole director of each of Mios and Scipio is an executive director of the Group), and determined that we have the power to manage and make decisions that affect Mios and Scipio's research and development activities, which activities most significantly impact Mios and Scipio's economic performance. However, we do not have such power over Libra's research and development activities, which activities most significantly impact Libra's economic performance. Accordingly, we determined that we are the primary beneficiary of Mios and Scipio, but not the primary beneficiary of Libra.

The following tables summarize the aggregate carrying value of VIEs' assets and liabilities in the consolidated balance sheets that are consolidated

	Assets	Liabilities	Net Assets
December 31, 2021			
Total	$ 5,361	$ 2,266	$ 3,095

The following tables summarize the aggregate carrying value of assets and liabilities in the Group's consolidated balance sheets that relate to the VIE in which the Group holds a variable interest but is not the primary beneficiary.

	Assets	Liabilities	Net Assets	Maximum Exposure to Losses
December 31, 2021				
Total	$ 4,195	$ -	$ 4,195	$ 4,195

(Stated in U.S. Dollars)

The Group's maximum exposure to loss from its involvement with unconsolidated VIE represents the estimated loss that would be incurred if the VIE is liquidated, so that the fair value of the equity investment in VIE is zero and the amounts due from the VIE have to be fully impaired.

On January 1, 2022, the Group entered into an administrative management services agreement with Libra. According to the agreement, the Group will provide documentation and administrative services, including but are not limited to human resources and payroll administration, general secretarial and administrative support, and accounting and financial reporting services. The Group is entitled to receive a fixed amount of services fees of HKD 25,000 (approximately $3,205) per calendar month with the expiry date on December 31, 2023.

On January 13, 2022, the Group entered a line of credit facility with Libra to provide up to a total $1 million in line of credit debt financing for its daily operation. The line of credit will mature on July 12, 2022, extendable for up to twelve months, and the interest on the outstanding principal indebtedness will be at the rate of 10% per annum.

15. LEASE

As of December 31, 2021, the Group has three non-short-term operating leases for office, laboratories and clinic with remaining terms expiring from 2022 through 2023 and a weighted average remaining lease term of 1.0 years. Weighted average discount rates used in the calculation of the operating lease liability is 8%. The discount rates reflect the estimated incremental borrowing rate, which includes an assessment of the credit rating to determine the rate that the Group would have to pay to borrow, on a collateralized basis for a similar term, an amount equal to the lease payments in a similar economic environment.

	For the year ended December 31, 2021	For the year ended December 31, 2020
Lease cost		
Finance lease cost:		
Depreciation	$ 47,819	$ 47,819
Interest on lease liabilities	4,450	7,290
Operating lease cost	425,280	483,398
Short-term lease cost	86,125	68,472
Variable lease cost	-	-
Sublease income	-	-
Total lease cost	$ 563,674	$ 606,979
Other information		
Cash paid for amounts included in the measurement of lease liabilities		
Operating cash flows from operating leases	$ 450,807	$ 457,508
Financing cash flows from finance leases	53,846	53,845
Right-of-use assets obtained in exchange for new operating lease liabilities	-	1,107,206
Weighted-average remaining lease term – finance leases	0.9 years	1.9 years
Weighted-average remaining lease term – operating leases	1.0 years	1.5 years
Weighted-average discount rate – finance leases	2.5%	2.5%
Weighted-average discount rate – operating leases	8.0%	8.0%

The maturity analysis of operating leases liabilities as of December 31, 2021 is as follows:

	December 31, 2021
Remaining periods ending December 31,	
2022	$ 149,539
2023	26,001
Total future undiscounted cash flow	175,540
Less: Discount on operating lease liabilities	(6,296)
Present value of operating lease liabilities	169,244
Less: Current portion of operating lease liabilities	(145,391)
Non-current portion of operating lease liabilities	$ 23,853

(Stated in U.S. Dollars)

On May 14, 2018, the Group leased a vehicle for its operation with a lease term of 54 months, and the lease was classified as a finance lease. The following lists the components of the net present value of finance leases liabilities:

	December 31, 2021
Remaining periods ending December 31,	
2022	$ 49,358
Total future undiscounted cash flow	49,358
Less: Discount on finance lease liabilities	(1,435)
Present value of finance lease liabilities	$ 47,923

16. ORDINARY SHARES

On February 28, 2020, the Group entered into securities purchase agreement (the "Purchase Agreement") with certain non-affiliated institutional investors and Jurchen Investment Corporation, the ultimate parent of the Group, pursuant to which the Company agreed to sell a total of 1,351,350 Class A Ordinary Shares and warrants to purchase 1,351,350 of the Class A Ordinary Shares, for gross proceeds of approximately $10 million. At the completion of the offering, approximately $1.0 million offering costs was charged to additional paid-in capital. Each warrant entitled their holders to purchase 1 Class A Ordinary Shares and is exercisable immediately as of the date of issuance at an exercise price of $7.40 per Class A Ordinary Share and expire seven years from the date of issuance. Additionally, the Group issued 43,243 warrants to placement agent on terms substantially the same as the warrants issued to investors, except that the exercise price of the warrants issued to the placement agent is $8.88.

On August 27, 2020, the Group entered into warrant exchange agreements (the "Purchaser Exchange Agreements") with two non-affiliated purchasers to exchange their warrant of the Company by Class A Ordinary Shares of the Company (the "Purchaser Warrant Exchange"). Pursuant to the Purchaser Exchange Agreements, the Company and the Non-affiliated Purchasers have agreed that in consideration for exchanging in full all of the warrants held by the Non-affiliated Purchasers, the Company will exchange one (1) Class A Ordinary Share for each one (1) Purchaser Exchange Warrant. Total 540,540 Class A Ordinary Shares are issued to two non-affiliated purchasers in exchange for 540,540 warrants. For other warrant holders did not participate in the Purchaser Warrant Exchange, the exercise prices of their respective warrants will be reduced to a nominal amount pursuant to the anti-dilution provisions in such warrants (a "Down Round"). As a result of this Down Round being triggered, the Group recorded a deemed dividend of $755,514 as a decrease to net income attributable to Aptorum Group Limited in computing basic net income per share on the consolidated statements of operations.

On October 2, 2020, the Group completed a public offering, issuing 2,769,231 Class A Ordinary Shares and warrants to purchase an aggregate of 2,769,231 Class A Ordinary Shares, for gross proceeds of approximately $9 million. At the completion of the offering, approximately $1.2 million offering costs was charged to additional paid-in capital. The warrants have an exercise price of $3.25 per Class A Ordinary Share, are exercisable upon issuance and will expire five years from the date of issuance. Additionally, the Group issued 147,538 warrants to placement agent on terms substantially the same as the warrants issued to investors, except that the exercise price of the warrants issued to the placement agent is $4.0625. Following the public offering completed on October 2, 2020, the placement agent of the offering on February 28, 2020 was further received 65,406 warrants as a tail fee, with an exercise price of $3.9 and expire seven years from the date of issuance.

On March 26, 2021, the Company entered into an at-the-market offering agreement (the "Sales Agreement"), with H.C. Wainwright & Co., LLC, acting as our sales agent (the "Sales Agent"), relating to the sale of our Class A Ordinary Shares, offered pursuant to the prospectus supplement and the accompanying prospectus to the registration statement on Form F-3 (File No. 333-235819) (such offering, the "ATM Offering", or "At The Market Offering"). In accordance with the terms of the Sales Agreement, we may offer and sell shares of our Class A Ordinary Shares having an aggregate offering price of up to $15,000,000 from time to time through the Sales Agent under such prospectus supplement and the accompanying prospectus. As of the date of issuance of the consolidated financial statements, we have not yet issued any Class A Ordinary Shares pursuant to the ATM Offering.

On May 26, 2021, the Company entered into a private placement shares purchase agreement with Jurchen Investment Corporation, issuing 1,387,925 Class A Ordinary Shares at $2.882 per share, representing a 10% premium to the last closing price of the Company's Class A Ordinary Shares on the NASDAQ stock exchange on that date. The Company received aggregate gross proceeds of $4,000,000 from the purchase of these shares.

All the above issued warrants are classified as equity in accordance with ASC 815, Derivatives and Hedging. This ASC provides a scope exception from classifying and measuring as a financial liability a contract that would otherwise meet the definition of a derivative if the contract is both (i) indexed to the entity's own stock and (ii) meets the equity classifications conditions. The Group concluded all above issued warrants should be equity-classified since they contain no provisions which would require the Group to account for the warrants as a derivative liability and therefore were initially measured at fair value in permanent equity with subsequent changes in fair value not measured.

For the year ended December 31, 2021, the Group issued 40,000 and 190,159 Class A Ordinary Shares to warrant holders and share option holders respectively as a result of exercise of warrants or options. For the year ended December 31, 2020, the Group issued 313,513 and 12,328 Class A Ordinary Shares to warrant holders and share option holders respectively as a result of exercise of warrants or options. For the year ended December 31, 2019, the Group issued 60,093 Class A Ordinary Shares to warrant holders as a result of exercise of warrants.

Holders of Class A Ordinary Shares and Class B Ordinary Shares have the same rights except for the following: (i) each Class A Ordinary Share is entitled to one vote while each Class B Ordinary Share is entitled to ten votes; and (ii) each Class B Ordinary Share is convertible into one Class A Ordinary Share at any time while Class A Ordinary Shares are not convertible under any circumstances.

(Stated in U.S. Dollars)

17. SHARE BASED COMPENSATION

Share option plan

On October 13, 2017, the Group adopted the 2017 Share Option Plan (the "Option Plan") and on November 5, 2021, the Group amended the Option Plan. A total of 5,500,000 Class A Ordinary Shares (subject to subsequent adjustments described more fully below) may be issued pursuant to awards under the Option Plan. Subsequent adjustments include that on each January 1, starting with January 1, 2020, an additional number of shares equal to the lesser of (i) 2% of the outstanding number of Class A Ordinary Shares (on a fully diluted basis) on the immediate preceding December 31, and (ii) such lower number of Class A Ordinary Shares as may be determined by the board of directors, subject in all cases to adjustments as provided in Section 10 of the Option Plan. Awards will be made pursuant to agreements and may be subject to vesting and other restrictions as determined by the board of directors.

218,222 options were granted on March 15, 2019 to directors, employees, external consultants and advisors of the Group. One-half of each option grant vests on January 1, 2020 and expires on December 31, 2030, and the other half vests on January 1, 2021 and expires on December 31, 2031. The exercise price is $12.91 per share, which was based on the closing price of the shares traded on the NASDAQ stock exchange on the trading day preceding the grant date.

536,777 options were granted on March 16, 2020 to directors, employees, external consultants and advisors of the Group. One-half of each option grant vests on January 1, 2021 and expires on December 31, 2031 and the other half vests on January 1, 2022 and expires on December 31, 2032. The exercise price is $2.99 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date.

148,792 options were granted on June 1, 2020 to directors and employees of the Group. Nearly one-half of each option grant vests on December 1, 2020 and expires on November 30, 2030 and the remaining vests on January 1, 2021 and expires on December 31, 2031. The exercise price is US$3.11 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date.

27,473 options were granted on August 10, 2020 to Dr. Weiss, which vest on August 10, 2021 and expire on August 9, 2031. The exercise price is $3.64 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date.

752,185 options were granted on March 11, 2021 to directors, employees, external consultants and advisors of the Group with an exercise price of $2.76 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date. 367,950 options vest on January 1, 2022 and expire on December 31, 2032; 367,930 options vest on January 1, 2023 and expire on December 31, 2033; 9,058 options vest on June 8, 2021 and expire on June 7, 2032; and 7,247 options vest on July 14, 2021 and expire on July 13, 2032.

1,531,332 options were granted on March 8, 2022 to directors, employees, external consultants and advisors of the Group with an exercise price of $1.34 per share, which was based on the average closing price of the shares traded on the NASDAQ stock exchange for the five trading days immediately preceding the grant date. 748,881 options vest on January 1, 2023 and expire on December 31, 2033; 748,868 options vest on January 1, 2024 and expire on December 31, 2034; 18,657 options vest on June 8, 2022 and expire on June 7, 2033; and 14,926 options vest on July 14, 2022 and expire on July 13, 2033.

A summary of the option activity as of December 31, 2021, 2020 and 2019 and changes during the period is presented below:

	Number of share options	Weighted average exercise price $	Remaining contractual term in years	Aggregate Intrinsic value
Outstanding, January 1, 2021	717,717	3.76	11.22	
Granted	752,185	2.76	12.29	
Exercised	(190,159)	3.65		-
Forfeited	(6,037)	2.91		
Outstanding, December 31, 2021	1,273,706	3.19	11.01	-
Exercisable, December 31, 2021	314,560	4.26	9.63	-

(Stated in U.S. Dollars)

	Number of share options	Weighted average exercise price $	Remaining contractual term in years	Aggregate Intrinsic value
Outstanding, January 1, 2020	218,222	12.91	11.51	
Granted	713,042	3.04	11.99	
Exercised	(12,328)	4.92		-
Forfeited	(52,427)	5.80		
Cancelled	(148,792)	12.91		
Outstanding, December 31, 2020	717,717	3.76	11.22	-
Exercisable, December 31, 2020	84,671	6.12	9.95	-

	Number of share options	Weighted average exercise price $	Remaining contractual term in years	Aggregate Intrinsic value
Granted, March 15, 2019	218,222	12.91	12.31	
Outstanding, December 31, 2019	218,222	12.91	11.51	641,573
Exercisable, December 31, 2019	-	-	-	-

The weighted-average grant date fair value of share option grants during the years ended December 31, 2021, 2020 and 2019 was $2.57, $1.76 and $10.31, respectively. The maximum contractual term for share option was 12.8 years.

The fair value of each stock option award is estimated on the date of grant using the Black-Scholes option pricing model under the following assumptions.

	Granted in 2021	Granted in 2020	Granted in 2019
Expected volatility	97.70%	88.44%-96.55%	95.02%-95.15%
Risk-free interest rate	1.64%	0.59%-0.69%	2.46%-2.49%
Expected term from grant date (in years)	5.62-6.41	5.25-7.29	6.29-7.29
Dividend rate	-	-	-
Dilution factor	1	0.9909-1	0.9962
Fair value	$2.51-$2.60	$1.55-$2.66	$10.1-$10.52

In connection with the grant of share options to employees and non-employees, the Group recorded share-based compensation charges of $1,203,000 and $479,460, respectively, for the year ended December 31, 2021, $1,191,957 and $286,608, respectively, for the year ended December 31, 2020, and $1,180,477 and $432,355, respectively, for the year ended December 31, 2019.

18. NON-CONTROLLING INTEREST

On March 29, 2019, AML, a majority-owned subsidiary of the Group, issued 112 shares to a director of the Group, which resulted an increase of his equity interest of AML from 5% to 6%. A deficit of $10,672 was reclassified from additional paid-in capital to non-controlling interests within the Group's consolidated financial statements. On January 2, 2020, AML further issued 115 shares to a director of the Group, which resulted an increase of his equity interest of AML from 6% to 7%. A deficit of $22,325 was reclassified from additional paid-in capital to non-controlling interests within the Group's consolidated financial statements. On January 2, 2021, AML further issued 117 shares to a director of the Group, which resulted an increase of his equity interest of AML from 7% to 8%. A deficit of $34,130 was reclassified from additional paid-in capital to non-controlling interests within the Group's consolidated financial statements.

On April 24, 2019, the Smart Pharma Tokens ("SMPT tokens") was announced to be launched. The SMPT tokens are secured by way of a floating charge against the Project intellectual property ("IP") to guarantee the distribution of accrued sales-based royalties, sublicensing income or additional cash flow generated by drug candidates developed by the Smart-ACT^{TM} platform. SMPT token holders will only be eligible to receive a token distribution if any sales-based royalties, sublicensing income or additional cash flow is generated by drug candidates developed by the Smart-ACT^{TM} platform, as and when SPLP declares the distribution. Because the token distribution is secured by a security interest in such intellectual property rights, if and when SPLP defaults in its distribution obligations to the SMPT token holders, or in the event of liquidation, dissolution or winding up of SPLP, the floating charge may crystallize into a fixed charge over the charged assets (i.e., the Project IP owned by SPLP).

Total 1 billion SMPT tokens are offered by Smart Pharmaceutical Limited Partnership ("SPLP"), a wholly owned subsidiary of the Group. In July 2019, SPLP transferred 100,000,000 SMPT tokens to Aenco Solutions Limited, a related party of the Group, in exchange for the services related to the tokens creation, offering and 5-year consultancy service. Amount of $300,000 were classified as a component of non-controlling interests within the Group's consolidated financial statements. The remaining 900,000,000 SMPT tokens are remained and kept by SPLP. On May 27, 2021, Aptorum Therapeutics Limited, which is a wholly owned subsidiary of Aptorum Group Limited, entered into a Share Sale Agreement to sell all of the shares of SMPTH Limited to Aeneas Group Limited at the consideration $1. The $300,000 non-controlling interests was included in the calculation of amount to be reclassified to additional paid-in capital as a result of common control transaction.

On September 25, 2020, Aptorum Innovation Holding Limited ("AIHL"), a wholly-owned subsidiary of the Group, signed a share subscription and shareholders agreement with certain new individuals and institutions to subscribe ordinary shares of Aptorum Innovation Holding Pte. Limited, a wholly-owned subsidiary of AIHL before the share subscription agreement. As a result, AIHL's equity interest in Aptorum Innovation Holding Pte. Limited was decreased from 100% to 75%. A deficit of $3,090 was reclassified from additional paid-in capital to non-controlling interests within the Group's consolidated financial statements.

On December 30, 2021, two of the Group's subsidiaries, Mios Pharmaceuticals Limited ("Mios") and Scipio Life Sciences Limited ("Scipio"), issued Class A and Class B ordinary shares to various parties; for each such entity, each Class A ordinary share is entitled to 1 vote and 1 share of economic interest of the respective company, while each Class B ordinary share is entitled to 10 votes and 0.001 share of economic interest of the respective company. On December 31, 2021, Mios and Scipio further issued Class A ordinary shares to the Group in exchange of certain projects licenses. Upon these share issuances, the Group was holding 97.93% economic interest and 36.17% voting power in Mios, and 97.93% economic interest and 35.06% voting power in Scipio, respectively. Since the sole director of Mios and Scipio is an executive director of the Group, the Group can effectively participate in all significant financial and operating decisions in these two companies through the power granted to the sole director in Mios and Scipio's Articles of Association. The Group is deemed to have control over Mios and Scipio and hence these two companies are still within the Group. As a result, a total deficit of $27,293 was reclassified from additional paid-in capital to non-controlling interests within the Group's consolidated financial statements.

As of December 31, 2021, non-controlling interest related to 25% equity interest in Aptorum Innovations Holding Pte. Limited, 10% equity interest in mTOR (Hong Kong) Limited, 8% equity interest in Aptorum Medical Limited, 2.07% equity interest in Mios Pharmaceuticals Limited, 2.07% equity interest in Scipio Life Sciences Limited and 20% equity interest in Acticule Life Sciences Limited in the consolidated balance sheets was deficit of $6,101,223 in total. As of December 31, 2020, non-controlling interest related to 25% equity interest in Aptorum Innovations Holding Pte. Limited, 10% equity interest in mTOR (Hong Kong) Limited, 7% equity interest in Aptorum Medical Limited, 20% equity interest in Acticule Life Sciences Limited, 20% equity interest in the Lanither Life Sciences Limited and the token issued by SPLP in the consolidated balance sheets was deficit of $3,681,858 in total.

For the years ended December 31, 2021, 2020 and 2019, non-controlling interest in the consolidated statements of operations were loss of $2,065,904, $2,146,687 and $1,430,176, respectively.

(Stated in U.S. Dollars)

19. NET (LOSS) INCOME PER SHARE

The following table sets forth the computation of basic and diluted (loss) income per share:

	Year ended December 31, 2021	Year ended December 31, 2020	Year ended December 31, 2019
Numerator:			
Net (loss) income attributable to Aptorum Group Limited	$ (25,048,389)	$ 6,311,340	$ (18,686,762)
Denominator:			
Weighted average shares outstanding			
– Basic	35,033,970	31,135,882	29,008,445
– Diluted	35,033,970	31,534,473	29,008,445
Net (loss) income per share attributable to Aptorum Group Limited			
– Basic	$ (0.71)	$ 0.20	$ (0.64)
– Diluted	$ (0.71)	$ 0.20	$ (0.64)

Basic net (loss) income per share is computed by dividing net (loss) income attributable to ordinary shareholders by the weighted average number of ordinary shares outstanding during the period. Diluted net (loss) income per share reflects the potential dilution that could occur if securities or other contracts to issue ordinary shares were exercised or converted into ordinary shares. Potential dilutive securities are excluded from the calculation of diluted loss per share in loss periods as their effect would be anti-dilutive.

(Stated in U.S. Dollars)

20. COMMITMENTS AND CONTINGENCIES

Contingent Payment Obligations

The Group has entered into agreements with independent third parties for purchasing office and laboratory equipment. As of December 31, 2021, the Group had non-cancellable purchase commitments of $49,166.

The Group has additional contingency payment obligations under each of the license agreements, such as milestone payments, royalties, research and development funding, if certain condition or milestone is met.

Milestone payments are to be made upon achievements of certain conditions, such as Investigational New Drugs ("IND") filing or U.S. Food and Drug Administration ("FDA") approval, first commercial sale of the licensed products, or other achievements. The aggregate amount of the milestone payments that the Group are required to pay up to different achievements of conditions and milestones for all the license agreements signed as of December 31, 2021 are below:

	Amount
Drug molecules: up to the conditions and milestones of	
Preclinical to IND filing	$ 282,564
From entering phase 1 to before first commercial sale	22,276,410
First commercial sale	14,982,051
Net sales amount more than certain threshold in a year	70,769,231
Subtotal	$ 108,310,256
Diagnostics technology: up to the conditions and milestones of	
Before FDA approval	$ 201,155
	$ 108,511,411

For the years ended December 31, 2021, 2020 and 2019, the Group incurred $nil, $129,203 and $nil milestone payments, respectively. For the years ended December 31, 2021, 2020 and 2019, the Group did not incur any royalties or research and development funding, respectively.

21. SEGMENT REPORTING

The Group's chief operating decision maker, the Chief Executive Officer, reviews the consolidated results when making decisions about allocating resources and accessing performance of the Group as a whole and hence, the Group has only one reportable segment. The Group does not distinguish between markets or segments for the purpose of internal reporting. The Group's long-lived assets are substantially located in Hong Kong and majority of the Group's expense is derived from within Hong Kong. Therefore, no geographical segments are presented.

22. SUBSEQUENT EVENTS

The Group has evaluated subsequent events through the date of issuance of the consolidated financial statements. Except for the events disclosed elsewhere in the consolidate financial statements and the following events with material financial impact on the Group's consolidated financial statements, no other subsequent event is identified that would have required adjustment or disclosure in the consolidated financial statements.

In April 2022, the Group accepted a banking facilities agreement offered by a bank. According to the banking facilities agreement, the bank offers a revolving loan of up to $3 million to the Group. The Group may draw down from the revolving loan at any time through the day immediately preceding 12 months of the agreement effective date. Interest will be payable on demand on the outstanding loans at the rate of either Hong Kong Interbank Offered Rate ("HIBOR") plus 1.5% per annum for loan in Hong Kong Dollars, or Secured Overnight Financing Rate ("SOFR") compounded rate plus 1.5% per annum for loan in the United State Dollars. The loan will be secured by a charge over deposits of up to $3 million when the Group draw down.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 6-K

REPORT OF FOREIGN PRIVATE ISSUER
PURSUANT TO RULE 13a-16 OR 15d-16
UNDER THE SECURITIES EXCHANGE ACT OF 1934

For the month of April 2022

Commission File Number: 001-38764

APTORUM GROUP LIMITED

17 Hanover Square
London W1S 1BN, United Kingdom
(Address of principal executive offices)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F: Form 20-F ☒ Form 40-F ☐

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1): ☐

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7): ☐

On April 29, 2022, Aptorum Group Limited (the "Company") issued a press release. A copy of the press release is attached hereto as Exhibit 99.1.

Neither this report nor the exhibits attached constitutes an offer to sell, or the solicitation of an offer to buy our securities, nor shall there be any sale of our securities in any state or jurisdiction in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of any such state or jurisdiction.

The information in this Form 6-K, including the exhibits shall not be deemed to be "filed" for the purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and shall not be incorporated by reference into any filing under the Securities Act of 1933, as amended, except as shall be expressly set forth by specific reference in such filing.

This Form 6-K is hereby incorporated by reference into the registration statements of the Company on Form S-8 (Registration Number 333-232591) and Form F-3 (Registration Number 333-235819) and into each prospectus outstanding under the foregoing registration statements, to the extent not superseded by documents or reports subsequently filed or furnished by the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended.

EXHIBIT INDEX

Exhibit No.	Description
99.1	Press Release

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Aptorum Group Limited

Date: April 29, 2022

By: /s/ Sabrina Khan
Name: Sabrina Khan
Title: Chief Financial Officer

EXHIBIT INDEX

Exhibit No.	Description
99.1	Press Release

Aptorum Group Limited Reports 2021 Fiscal Year End Financial Results and Provides Business Update

New York & London & Paris, April 29, 2022 – Aptorum Group Limited (Nasdaq: APM, Euronext Paris: APM) ("Aptorum Group" or "We"), a clinical stage biopharmaceutical company dedicated to meeting unmet medical needs in oncology, autoimmune diseases and infectious diseases, today announced financial results for the fiscal year ended December 31, 2021, and provided an update on clinical and corporate developments.

Mr. Ian Huen, Chief Executive Officer and Executive Director of Aptorum Group, commented "Aptorum's operational plans remain on track. In particular, our lead projects, ALS-4 (targeting infections caused by *Staphylococcus aureus* including *Methicillin-resistant Staphylococcus aureus* (MRSA)) and SACT-1 (targeting neuroblastoma), have respectively completed their phase 1 clinical trials and we are working towards the commencement of the next stage of human clinical trials for further proof of concept of these 2 lead projects in the United States. We are also pleased with the progress of our other lead project, RPIDD, a liquid biopsy program targeting infectious disease diagnostics which is currently undergoing human clinical validations in Singapore. We are also excited about previously announced expanded oncology and autoimmune drug discovery programs targeting unmet mutations and novel biomarkers utilizing first-in-class drug molecules. Last but not least, we are excited about the near-future commercialization of our woman's health supplement product NativusWell® in Asia and Europe, which we hope to be followed by launch in the United States, subject to the successful completion of our registration process. Our team is currently focused on delivering the above milestones for our stakeholders and we believe 2022 will be an exciting year for the company."

Clinical Pipeline Update and Upcoming Milestones

In 2022, we announced a number of updates for our lead and other projects:

- Our ALS-4 (a first in-class anti-virulence based small molecule drug targeting infections caused by Staphylococcus aureus, including, but not limited to Methicillin Resistant Staphylococcus Aureus ("MRSA")) Phase 1 clinical trial is completed. Dosing and clinical evaluations of the Single Ascending Dose studies ("SAD") and Multiple Ascending Dose studies ("MAD") have been completed for a total of 72 healthy subjects, no subjects were dropped from the studies and no serious adverse events observed. With the encouraging safety data, we are on track to submit an IND application to the United States Food and Drug Administration ("US FDA") this year seeking to initiate a Phase 2 clinical study to assess the safety and efficacy of ALS-4 in patients.

- Our SACT-1 (a repurposed small molecule drug targeting Neuroblastoma and potentially other cancer types) Phase 1 clinical trial for assessing relative bioavailability and food effect has been completed with no serious adverse events observed. Our first patent on SACT-1 has been granted by the US Patent and Trademark Office and the US FDA has also granted an Orphan Drug Designation for SACT-1 for the treatment of neuroblastoma. We plan to hold an end of Phase 1 meeting and submit a clinical protocol to the US FDA this year to initiate a Phase 1b/2a clinical study to assess the safety and efficacy of SACT-1 in patients.

- Our first patent on the molecular based rapid pathogen diagnostics liquid biopsy technology ("RPIDD") has been granted by the US Patent and Trademark Office. We started the clinical validation of our RPIDD for the diagnosis of pathogens including viruses, bacteria, fungi and parasites. We have been enrolling patients with febrile neutropenia and sepsis for our clinical validation. Various bacteria and viruses have been detected in these patient samples, including Escherichia coli, Klebsiella pneumoniae and Herpesviridae. The data have been cross-validated by standard of care diagnostics results such as blood culture technology. RPIDD achieved high analytical sensitivity and specificity of the clinical samples respectively at both low depth (60,000 reads) and high depth (1 million reads) sequencing and further clinical validation is ongoing.

- We launched our oncology and autoimmune discovery and development platform. The platform will initially focus on non-small cell lung cancer ("NSCLC") and autoimmune diseases such as lupus, rheumatoid arthritis, inflammatory bowel diseases, etc. We are currently conducting optimization for selected candidates as part of its small molecule library for major targets including, but not limited to EGFR, ALK, KRAS, p53 mutations.

Fiscal Year End Financial Results

Aptorum Group reported a net loss of $27.1 million in 2021, as compared to net income of $4.9 million in 2020. The net income in 2020 was mainly driven by the gain on investments in marketable securities, net of $25.2 million, while there was a loss on investments in marketable securities, net of $8.0 million in 2021.

Research and development expenses were $10.9 million in 2021 as compared to $11.6 million in 2020. The decrease in research and development expenses in 2021 was primarily due to less sponsored research to universities in 2021, partly offset by the increase in contracted research organizations services and consultation due to the development progress of our lead projects.

General and administrative fees were $5.4 million in 2021 as compared to $4.9 million in 2020. The increase in general and administration fees was mainly due to increase in bonus expenses to our directors, employees, external consultants and advisors. The increase is partly offset by a significant decrease in travelling expenses due to the outbreak of COVID-19.

Legal and professional fees were $2.6 million in 2021 as compared to $2.9 million in 2020. The decrease in legal and professional fees was mainly due to less one-off professional services engaged during 2021.

Aptorum Group reported $8.3 million of cash and restricted cash as of December 31, 2021 compared to $3.6 million as of December 31, 2020. The increase in cash and restricted cash was mainly the result of the proceeds from sales of investment securities of $20.1 million and proceeds from issuance of Class A Ordinary Shares of $4.0 million in 2021, partly offset by the cash used in operating activities of $14.7 million, net repayment of loan from related parties of $2.0 million, and loan to a related party of $3.4 million in 2021.

About Aptorum Group

Aptorum Group Limited (Nasdaq: APM, Euronext Paris: APM) is a clinical stage biopharmaceutical company dedicated to the discovery, development and commercialization of therapeutic assets to treat diseases with unmet medical needs, particularly in oncology (including orphan oncology indications) and infectious diseases. The pipeline of Aptorum is also enriched through (i) the establishment of drug discovery platforms that enable the discovery of new therapeutics assets through, e.g. systematic screening of existing approved drug molecules, and microbiome-based research platform for treatments of metabolic diseases; and (ii) the co-development of a novel molecular-based rapid pathogen identification and detection diagnostics technology with Accelerate Technologies Pte Ltd, commercialization arm of the Singapore's Agency for Science, Technology and Research.

For more information about the Company, please visit www.aptorumgroup.com.

Investor Relations
investor.relations@aptorumgroup.com
+44 20 80929299

Redchip – Financial Communications United States
Investor relations
Dave Gentry
dave@redchip.com
+1 407 491 4498

Actifin – Financial Communications Europe
Investor relations
Ghislaine Gasparetto
ggasparetto@actifin.fr
+33 1 56 88 11 22

Disclaimer and Forward-Looking Statements

This press release does not constitute an offer to sell or a solicitation of offers to buy any securities of Aptorum Group.

This press release includes statements concerning Aptorum Group Limited and its future expectations, plans and prospects that constitute "forward-looking statements" within the meaning of the US Private Securities Litigation Reform Act of 1995. For this purpose, any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements. In some cases, you can identify forward-looking statements by terms such as "may," "should," "expects," "plans," "anticipates," "could," "intends," "target," "projects," "contemplates," "believes," "estimates," "predicts," "potential," or "continue," or the negative of these terms or other similar expressions. Aptorum Group has based these forward-looking statements, which include statements regarding projected timelines for application submissions and trials, largely on its current expectations and projections about future events and trends that it believes may affect its business, financial condition and results of operations. These forward-looking statements speak only as of the date of this press release and are subject to a number of risks, uncertainties and assumptions including, without limitation, risks related to its announced management and organizational changes, the continued service and availability of key personnel, its ability to expand its product assortments by offering additional products for additional consumer segments, development results, the company's anticipated growth strategies, anticipated trends and challenges in its business, and its expectations regarding, and the stability of, its supply chain, and the risks more fully described in Aptorum Group's Form 20-F and other filings that Aptorum Group may make with the SEC in the future, as well as the prospectus that received the French Autorité des Marchés Financiers visa n°20-352 on 16 July 2020. As a result, the projections included in such forward-looking statements are subject to change and actual results may differ materially from those described herein.

Aptorum Group assumes no obligation to update any forward-looking statements contained in this press release as a result of new information, future events or otherwise.

This announcement is not a prospectus within the meaning of the Regulation (EU) n°2017/1129 of 14 June 2017 as amended by Regulations Delegated (EU) n°2019/980 of 14 March 2019 and n°2019/979 of 14 March 2019.

This press release is provided "as is" without any representation or warranty of any kind.

APTORUM GROUP LIMITED
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)
For Years Ended December 31, 2021 and 2020
(Stated in U.S. Dollars)

	Year Ended December 31, 2021	Year Ended December 31, 2020
Revenue		
Healthcare services income	$ 1,541,778	$ 911,509
Operating expenses		
Cost of healthcare services	(1,459,924)	(1,015,023)
Research and development expenses	(10,869,642)	(11,586,923)
General and administrative fees	(5,409,302)	(4,853,488)
Legal and professional fees	(2,617,834)	(2,854,225)
Other operating expenses	(392,511)	(877,391)
Total operating expenses	(20,749,213)	(21,187,050)
Other (loss) income, net		
(Loss) gain on investments in marketable securities, net	(8,031,595)	25,241,556
Loss on investments in derivatives, net	(4,289)	(199,031)
Gain on use of digital currencies	4,918	-
Gain on derecognition of non-financial assets	75,000	-
Interest expense, net	(93,601)	(243,628)
Rental income	-	30,894
Loss on disposal of subsidiaries	(3,638)	-
Sundry income	146,347	365,917
Total other (loss) income, net	(7,906,858)	25,195,708
Net (loss) income	(27,114,293)	4,920,167
Net loss attributable to non-controlling interests	2,065,904	2,146,687
Deemed dividend related to warrants down round provision	-	(755,514)
Net (loss) income attributable to Aptorum Group Limited	$ (25,048,389)	$ 6,311,340
Net (loss) income per share attributable to Aptorum Group Limited		
- Basic	$ (0.71)	$ 0.20
- Diluted	$ (0.71)	$ 0.20
Weighted-average shares outstanding		
- Basic	35,033,970	31,135,882
- Diluted	35,033,970	31,534,473
Net (loss) income	$ (27,114,293)	$ 4,920,167
Other comprehensive (loss) income		
Exchange differences on translation of foreign operations	(55,315)	58,848
Other comprehensive (loss) income	(55,315)	58,848
Comprehensive (loss) income	(27,169,608)	4,979,015
Comprehensive loss attributable to non-controlling interests	2,065,904	2,146,687
Deemed dividend related to warrants down round provision	-	(755,514
Comprehensive (loss) income attributable to the shareholders of Aptorum Group Limited	(25,103,704)	6,370,188

APTORUM GROUP LIMITED
CONSOLIDATED BALANCE SHEETS
December 31, 2021 and 2020
(Stated in U.S. Dollars)

	December 31, 2021	December 31, 2020
ASSETS		
Current assets:		
Cash	$ 8,131,217	$ 3,495,231
Restricted cash	130,270	130,125
Digital currencies	-	1,539
Accounts receivable	78,722	62,221
Inventories	35,775	39,133
Marketable securities, at fair value	236,615	28,384,944
Investments in derivatives	-	4,289
Amounts due from related parties	47,754	-
Due from brokers	76,380	160,337
Loan receivable from a related party	3,358,089	
Other receivables and prepayments	593,478	1,378,996
Total current assets	12,688,300	33,656,815
Property, plant and equipment, net	3,731,116	4,686,323
Operating lease right-of-use assets	154,439	547,389
Long-term investments	4,156,907	4,079,707
Intangible assets, net	880,256	964,857
Long-term deposits	296,225	296,225
Total Assets	$ 21,907,243	$ 44,231,316
LIABILITIES AND EQUITY		
LIABILITIES		
Current liabilities:		
Amounts due to related parties	$ 11,389	$ 145,926
Accounts payable and accrued expenses	4,172,565	3,240,772
Finance lease liabilities current	47,923	49,396
Operating lease liabilities, current	145,391	432,600
Total current liabilities	4,377,268	3,868,694
Finance lease liabilities, non-current	-	47,923
Operating lease liabilities, non-current	23,853	155,121
Loan payables to related parties	-	2,007,285
Total Liabilities	$ 4,401,121	$ 6,079,023
Commitments and contingencies	-	-
EQUITY		
Class A Ordinary Shares ($1.00 par value; 60,000,000 shares authorized, 13,202,408 and 11,584,324 shares issued and outstanding as of December 31, 2021 and 2020, respectively)	$ 13,202,408	$ 11,584,324
Class B Ordinary Shares ($1.00 par value; 40,000,000 shares authorized, 22,437,754 shares issued and outstanding as of December 31, 2021 and 2020)	22,437,754	22,437,754
Additional paid-in capital	43,506,717	38,247,903
Accumulated other comprehensive (loss) income	(2,019)	53,296
Accumulated deficit	(55,537,515)	(30,489,126)
Total equity attributable to the shareholders of Aptorum Group Limited	23,607,345	41,834,151
Non-controlling interests	(6,101,223)	(3,681,858)
Total equity	17,506,122	38,152,293
Total Liabilities and Equity	$ 21,907,243	$ 44,231,316