Group Package Accounts

Registered number: SC336222 (Scotland)

Pharma Research Limited

Report of the Directors and audited financial statements

For the year ended 31 December 2021

Contents

Company information

DIRECTORS:	Dr A Stevenson Mr D Peyton
SECRETARY:	Mr D Peyton
REGISTERED OFFICE:	Life Science Innovation Building Cornhill Road Aberdeen Scotland AB25 2ZS
REGISTERED NUMBER:	SC336222 (Scotland)
AUDITOR:	RSM UK Audit LLP Central Square 5th floor 29 Wellington Street Leeds LS1 4DL

Report of the Directors

For the year ended 31 December 2021

The Directors present their report with the audited financial statements of the company for the year ended 31 December 2021.

PRINCIPAL ACTIVITY

The principal activities of the company in the year under review were that of: Clinical trials in current live biotherapeutic products (LBP's) in patients; and research to understand the mechanism of action of existing and potential LBP candidates allowing targeted development in important new therapeutic areas through the MicroRx® platform.

REVIEW OF BUSINESS

During 2021 we have continued to utilise the MicroRx® platform to discover promising new LBP candidates for major diseases with significant unmet need. MicroRx® is a unique LBP discovery and development platform and, alongside building our internal pipeline of LBP candidates, the platform also enables us to build valuable partnerships and collaborations.

In 2019, we entered into a research collaboration and option to license agreement with MSD (the tradename of Merck & Co., Inc., Kenilworth, NJ, USA) to discover and develop LBPs for vaccines. This collaboration pairs our proprietary MicroRx® platform with MSD's expertise in the development and commercialisation of novel vaccines, to discover and develop LBPs for use in vaccines in up to three undisclosed indications.

As part of our central nervous system (CNS) portfolio we became an industry partner of the Parkinson's Progression Markers Initiative (PPMI) in 2020. This is a longitudinal study sponsored by The Michael J. Fox Foundation for Parkinson's Research to better understand Parkinson's disease and accelerate the development of new treatments. Accordingly, we are currently planning a first-in-human clinical study for our lead CNS therapeutic candidates, MRx0029 and MRx0005, in Parkinson's disease patients, which we expect to commence in 2022.

A clinical trial of MRx0518 is ongoing in combination with hypofractionated radiotherapy for resectable pancreatic ductal adenocarcinoma (PDAC). This study is being conducted under our strategic collaboration with the University of Texas MD Anderson Cancer Center. This open-label, Phase I clinical trial will treat 15 potentially resectable pancreatic ductal adenocarcinoma (PDAC) patients for approximately six to nine weeks, before, during and after a course of hypofractionated radiation until resection. The clinical trial is evaluating the safety of MRx0518 with radiation and whether MRx0518 can elicit an immunogenic profile that may be beneficial in decreasing systemic failure and improving local control. Efficacy outcomes will include incidence of major pathologic response, tumor infiltrating lymphocytes, overall survival, progression-free survival, local control, distant control and margin status. The study will evaluate immune infiltrates and stromal cells within and near the tumor as well as evaluating circulating immune cells, tumor cells and tumor DNA. Study treatment has been well tolerated to date. Recruitment is expected to be completed in 2022, following delays due to the COVID-19 pandemic.

In 2021 we initiated two further collaborations. In February 2021 we announced a clinical trial collaboration and supply agreement with Merck KGaA, Darmstadt, Germany and Pfizer Inc. for Bavencio® (avelumab), under which we are initiating a clinical trial to evaluate Bavencio® in combination with MRx0518 as a first-line maintenance therapy for patients with locally advanced or metastatic urothelial carcinoma that has not progressed with first-line platinum-containing chemotherapy.

In April 2021 we announced a collaboration with Parkinson's UK, a non-profit organization focused on advancing the understanding of Parkinson's disease and improving treatments, to establish a Patient Advisory Board (PAB) comprised of people living with Parkinson's. Supported by Parkinson's UK, the PAB provides valuable patient-centric perspective to 4D pharma as we continue to advance novel Live Biotherapeutics into the clinic to treat neurodegenerative conditions such as Parkinson's, as well as raising awareness of the issues people with Parkinson's face with current treatment options.

We believe that the collaborations to discover and develop LBPs for vaccines, in addition to the proof-of-concept data generated to date across multiple programs, has validated the MicroRx® platform and 4D pharma's approach to LBP development. We will continue to seek future collaborations, and engage with additional new partners, to further explore the potential of LBPs in disease areas of interest.

Results

With its continued investment in research and development the Company is reporting a loss of £16,170,523 before tax (2020: £13,585,351).

Dividends

The Directors do not recommend a dividend for the year and no dividends were paid in the current or previous year.

DIRECTORS

The Directors shown below have held office during the whole of the period from 1 January 2021 to the date of this report.

Dr A Stevenson

Mr D Peyton

GOING CONCERN

The Directors have prepared detailed financial forecasts and cash flows looking beyond 12 months from the date of the approval of these financial statements. In developing these forecasts, the Directors have made assumptions based upon their view of the current and future economic conditions that are expected to prevail over the forecast period and believe that the current cash position of the Group will be sufficient to support the Company into quarter four of 2022.The Directors are continuing to explore sources of finance available to the Group and have a reasonable expectation that they will be able to secure sufficient cash inflows into the company to continue its activities for not less than 12 months from the date of approval of these accounts. They have therefore prepared the financial statements on a going concern basis.

Because the additional finance is not committed at the date of approval of these financial statements, these circumstances represent a material uncertainty as to the Company's ability to continue as a going concern. Should the Group be unable to obtain further finance such that the going concern basis of preparation were no longer appropriate, adjustments would be required including to reduce the balance sheet values of assets to their recoverable amounts, and to provide for future liabilities that may arise.

A Group letter of support from the ultimate parent undertaking 4D pharma plc is in place with 4D Pharma Research Limited to ensure that 4D Pharma Research also remains a going concern.

THIRD PARTY INDEMNITY

Under a group policy with 4D pharma plc. qualifying Directors' and Officers' insurance was in place for the benefit of the Directors during the current and previous year.

STATEMENT OF DIRECTORS' RESPONSIBILITIES

The Directors are responsible for preparing the Report of the Directors and the financial statements in accordance with applicable law and regulations.

Company law requires the Directors to prepare financial statements for each financial year. Under that law the Directors have elected to prepare the financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards and applicable law), including Financial Reporting Standard 102 'The Financial Reporting Standard applicable in the UK and Republic of Ireland'. Under company law the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the company and of the profit or loss of the company for that period. In preparing these financial statements, the Directors are required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and accounting estimates that are reasonable and prudent;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the company will continue in business

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the company's transactions and disclose with reasonable accuracy at any time the financial position of the company and enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

STATEMENT AS TO DISCLOSURE OF INFORMATION TO THE AUDITOR

So far as the Directors are aware, there is no relevant audit information (as defined by Section 418 of the Companies Act 2006) of which the company's auditor is unaware, and each director has taken all the steps that he ought to have taken as a director in order to make himself aware of any relevant audit information and to establish that the company's auditor is aware of that information.

SUBSEQUENT EVENTS

There are no subsequent events to disclose, following the preparation of the Financial Statements.

AUDITOR

RSM UK Audit LLP has indicated its willingness to continue in office.

Ordinary resolutions to re-appoint RSM UK Audit LLP as auditor and to authorise the Directors to agree their audit fee, will be proposed at the forthcoming annual general meeting.

SMALL COMPANY PROVISIONS

This report has been prepared in accordance with the provisions of Part 15 of the Companies Act 2006 relating to small companies.

ON BEHALF OF THE BOARD:

Mr D Peyton - Director

Date: 31 March 2022

Independent Auditors Report

To the members of 4D Pharma Research Limited

Opinion

We have audited the financial statements of 4D Pharma Research Limited (the 'company') for the year ended 31 December 2021 which comprise of the Statement of Total Comprehensive Income, the Statement of Financial Position, the Statement of Changes in Equity and the notes to the financial statements, including significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including FRS 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the company's affairs as at 31 December 2021 and of its loss for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice;
- have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Material uncertainty related to going concern

We draw attention to the accounting policy on going concern on page 12 of the financial statements, which indicates that the cash flow forecast prepared by the directors estimates that the Group and Company has access to sufficient funds to support the current level of activities to the final quarter of 2022 and therefore needs to raise additional funds. As stated in the accounting policy on going concern, these events or conditions, along with the other matters as set forth on page 3 indicate that a material uncertainty exists that may cast significant doubt on the Company's ability to continue as a going concern. Our opinion is not modified in respect of this matter.

In auditing the financial statements, we have concluded that the director's use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

Our responsibilities and the responsibilities of the directors with respect to going concern are described in the relevant sections of this report.

Other information

The other information comprises the information included in the annual report, other than the financial statements and our auditor's report thereon. The directors are responsible for the other information contained within the annual report. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

Our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the course of the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether this gives rise to a material misstatement in the financial statements themselves. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006
In our opinion, based on the work undertaken in the course of the audit:

- the information given in the directors' report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the directors' report has been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception
In the light of the knowledge and understanding of the company and its environment obtained in the course of the audit, we have not identified material misstatements in the directors' report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit; or
- the directors were not entitled to take advantage of the small companies exemption from the requirement to prepare a strategic report or in preparing the directors' report.

Responsibilities of directors
As explained more fully in the directors' responsibilities statement set out on page 4, the directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements
Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

The extent to which the audit was considered capable of detecting irregularities, including fraud
Irregularities are instances of non-compliance with laws and regulations. The objectives of our audit are to obtain sufficient appropriate audit evidence regarding compliance with laws and regulations that have a direct effect on the determination of material amounts and disclosures in the financial statements, to perform audit procedures to help identify instances of non-compliance with other laws and regulations that may have a material effect on the financial statements, and to respond appropriately to identified or suspected non-compliance with laws and regulations identified during the audit.

In relation to fraud, the objectives of our audit are to identify and assess the risk of material misstatement of the financial statements due to fraud, to obtain sufficient appropriate audit evidence regarding the assessed risks of material misstatement due to fraud through designing and implementing appropriate responses and to respond appropriately to fraud or suspected fraud identified during the audit.

However, it is the primary responsibility of management, with the oversight of those charged with governance, to ensure that the entity's operations are conducted in accordance with the provisions of laws and regulations and for the prevention and detection of fraud.

In identifying and assessing risks of material misstatement in respect of irregularities, including fraud, the audit engagement team:

- obtained an understanding of the nature of the industry and sector, including the legal and regulatory frameworks that the company operates in and how the company is complying with the legal and regulatory frameworks;
- inquired of management, and those charged with governance, about their own identification and assessment of the risks of irregularities, including any known actual, suspected or alleged instances of fraud;
- discussed matters about non-compliance with laws and regulations and how fraud might occur including assessment of how and where the financial statements may be susceptible to fraud.

As a result of these procedures, we consider the most significant laws and regulations that have a direct impact on the financial statements are FRS 102, the Companies Act 2006 and tax compliance regulations. We performed audit procedures to detect non-compliances which may have a material impact on the financial statements which included reviewing financial statement disclosures, inspecting correspondence with local tax authorities and evaluating advice received from external tax advisors.

The most significant laws and regulations that have an indirect impact on the financial statements are those in relation to Patent maintenance and compliance, and Good Laboratory Practice. We performed audit procedures to inquire of management whether the company is in compliance with these law and regulations and inspected correspondence with licensing or regulatory authorities.

The audit engagement team identified the risk of management override of controls as the area where the financial statements were most susceptible to material misstatement due to fraud. Audit procedures performed included but were not limited to testing manual journal entries and other adjustments and evaluating the business rationale in relation to significant, unusual transactions and transactions entered into outside the normal course of business, challenging judgments and estimates applied in the preparation of the financial statements.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at: http://www.frc.org.uk/auditorsresponsibilities This description forms part of our auditor's report.

Use of our report

This report is made solely to the company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and the company's members as a body, for our audit work, for this report, or for the opinions we have formed.

Andrew Allchin

Andrew Allchin (Mar 31, 2022 14:18 GMT+1)

Andrew Allchin FCA (Senior Statutory Auditor)
For and on behalf of RSM UK Audit LLP, Statutory Auditor
Chartered Accountants
Central Square
5th Floor
29 Wellington Street
Leeds
LS1 4DL

31 March 2022

Statement of Total Comprehensive Income

For the year ended 31 December 2021

	Notes	2021 £	2020 £
Revenue	3	522,325	533,508
Direct costs		(16,043,240)	(13,640,269)
Administrative expenses		(649,608)	(478,590)
OPERATING LOSS	5	(16,170,523)	(13,585,351)
Interest payable and similar expenses		-	-
LOSS BEFORE TAXATION		(16,170,523)	(13,585,351)
Tax on loss	6	2,411,174	1,962,177
TOTAL COMPREHENSIVE LOSS FOR THE FINANCIAL YEAR		(13,759,349)	(11,623,174)

The notes form part of these financial statements on pages 12 to 25.

Statement of Financial Position

31 December 2021

	Notes	2021 £	2021 £	2020 £	2020 £
FIXED ASSETS					
Intangible assets	7		5,320		10,281
Tangible assets	8		172,525		268,556
			177,845		278,837
CURRENT ASSETS					
Debtors	9	5,692,274		3,419,085	
Cash at bank		268,909		1,892,641	
		5,961,183		5,311,726	
CREDITORS					
Amounts falling due within one year	10	(82,788,254)		(68,605,731)	
NET CURRENT LIABILITIES			(76,827,071)		(63,294,005)
TOTAL ASSETS LESS CURRENT LIABILITIES			(76,649,226)		(63,015,168)
CAPITAL AND RESERVES					
Called up share capital	12		1,087		1,087
Share premium	14		1,482,533		1,482,533
Capital contribution reserve	13		170,408		78,392
Retained earnings	14		(78,303,254)		(64,577,180)
SHAREHOLDERS' DEFICIT			(76,649,226)		(63,015,168)

The financial statements were approved by the Board of Directors on 31 March 2022 and were signed on its behalf by:

Mr D Peyton - Director

The notes form part of these financial statements on pages 12 to 25.

Statement of Changes in Equity

For the year ended 31 December 2021

	Called up share capital	Share premium	Capital contribution reserve	Retained earnings	Total equity
	£	£	£	£	£
Balance at 1 January 2020	1,087	1,482,533	50,456	(52,999,796)	(51,465,720)
Changes in equity					
Share-based compensation	-	-	73,726	-	73,726
Lapsed Options			(45,790)	45,790	-
Total comprehensive income	-	-	-	(11,623,174)	(11,623,174)
Balance at 31 December 2020	1,087	1,482,533	78,392	(64,577,180)	(63,015,168)
Changes in equity					
Share-based compensation	-	-	125,291	-	125,291
Lapsed options	-	-	(33,275)	33,275	-
Total comprehensive income	-	-	-	(13,759,349)	(13,759,349)
Balance at 31 December 2021	1,087	1,482,533	170,408	(78,303,254)	(76,649,226)

The notes form part of these financial statements on pages 12 to 25.

Notes to the Financial Statements

For the year ended 31 December 2021

1. STATUTORY INFORMATION

4D Pharma Research Limited (the Company) is a private company, limited by shares and registered in Scotland. The address of the Company's registered office and place of business is Life Science Innovation Building, Cornhill Road, Aberdeen, Scotland, AB25 2ZS.

2. ACCOUNTING POLICIES

General information
The company's principal activities were that of: Clinical trials in current live biotherapeutic products (LBP's) in patients; and, research to understand the mechanism of action of existing and potential LBP candidates allowing targeted development in important new therapeutic areas through the MicroRx platform.

Basis of accounting
These financial statements have been prepared in accordance with FRS 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" ("FRS 102") and the requirements of the Companies Act 2006 and under the historical cost convention.

Presentational currency
These financial statements are presented in Pounds Sterling, which is the functional currency for the Company. Monetary amounts in the financial statements are rounded to the nearest whole £1, except where otherwise indicated.

Going concern
The Company and Group, of which it is part, are subject to a number of risks similar to those of other development stage pharmaceutical companies. These risks include, amongst others, generation of revenues in due course from the development portfolio and risks associated with research, development, and obtaining regulatory approvals of its products. Ultimately, the attainment of profitable operations is dependent on future uncertain events which include obtaining adequate financing to fulfil both the Company and the Group's commercial and development activities and generating a level of revenue to support the Company and Group's cost structure.

The Group's and Company's Directors have prepared detailed financial forecasts and cash flows looking beyond 12 months from the date of the approval of these financial statements. In developing these forecasts, the Directors have made assumptions based upon their views of the current and future economic conditions that are expected to prevail over the forecast period. The Directors estimate that the cash held by the Group, which is available to the Company, will provide funding until the fourth quarter of 2022. The Directors are continuing to explore sources of finance available to the Group and have a reasonable expectation that they will be able to secure further cash inflows into the Group to continue to fund the Company's activities beyond the current forecast. They have therefore prepared the financial statements on a going concern basis.

Because the additional finance is not committed at the date of approval of these financial statements, these circumstances represent a material uncertainty as to the Company's ability to continue as a going concern. Should the Group be unable to obtain further finance such that the going concern basis of preparation were no longer appropriate, adjustments would be required including to reduce the

balance sheet values of assets to their recoverable amounts, and to provide for future liabilities that may arise.

A Group letter of support from the ultimate parent undertaking 4D pharma plc is in place with 4D Pharma Research Limited to ensure that 4D Pharma Research also remains a going concern.

Financial Reporting Standard 102 – reduced disclosure exemptions
The company is a qualifying entity for the purposes of FRS 102, being a member of a group where the parent of that group prepares publicly available consolidated financial statements, including this company, which are intended to give a true and fair view of the assets, liabilities, financial position and profit or loss of the group. The company has therefore taken advantage of exemptions from the following disclosure requirements:

- Section 4 'Statement of Financial Position' - Reconciliation of the opening and closing number of shares.
- The requirements of Section 7 Statement of Cash Flows and Section 3 Financial Statement Presentation paragraph 3.17(d).
- The requirement of Section 33 Related Party Disclosures - Compensation for key management personnel.
- Section 11 'Basic Financial Instruments' & Section 12 'Other Financial Instrument Issues' - Carrying amounts, interest income/expense and net gains/losses for each category of financial instrument; basis of determining fair values; details of collateral, loan defaults or breaches, details of hedges, hedging fair value changes recognised in the Statement of Total Comprehensive Income.

Intangible assets
Intangible assets are initially measured at cost. After initial recognition, intangible assets are measured at cost less any accumulated amortisation and any accumulated impairment losses.

Amortisation is provided at the following annual rates in order to write off each asset over its estimated useful life.

Computer Software	- Straight line over three to five years
Patents and licences	- Straight line over five to twenty years

Tangible fixed assets
Tangible fixed assets are initially recognised at cost. After initial recognition, these assets are carried at cost less any accumulated depreciation and accumulated impairment losses.

Cost comprises the aggregate amount paid, and the fair value of any other consideration given to acquire the assets and includes costs directly attributable to making the asset capable of operating as intended.

Depreciation is provided at the following annual rates in order to write off each asset over its estimated useful life.

Plant and machinery	- Straight line over three to ten years
Leasehold Improvements	- Straight line over three to ten years

Taxation
Taxation for the year comprises current and deferred tax. Tax is recognised in the Statement of Total Comprehensive Income, except to the extent that it relates to items recognised directly in equity.

Current or deferred taxation assets and liabilities are not discounted.

Current tax is recognised at the amount of tax payable using the tax rates and laws that have been enacted or substantively enacted by the Statement of Financial Position date.

Deferred tax is recognised in respect of all timing differences that have originated but not reversed at the Statement of Financial Position date.

Timing differences arise from the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in the financial statements. Deferred tax is measured using tax rates and laws that have been enacted or substantively enacted by the year end and that are expected to apply to the reversal of the timing difference.

Unrelieved tax losses and other deferred tax assets are recognised only to the extent that it is probable that they will be recovered against the reversal of deferred tax liabilities or other future taxable profits.

Revenue
Revenue is measured at the fair value of the consideration received or receivable. Revenues from contracts to provide scientific research services to third parties or from Collaboration Agreements are recognised as those services are delivered.

Research and development
Expenditure on research is written off in the year in which it is incurred.

Development expenditure is capitalised only to the extent that they can be reliably measured, the product or process is technically, and commercially feasible, future economic benefits are probable, and the Company intends to and has sufficient resources to complete development and sell or use the asset. Other development expenditure is recognised in the Statement of Total Comprehensive Income as incurred.

Foreign currencies
Assets and liabilities in foreign currencies are translated into sterling at the rates of exchange ruling at the statement of financial position date. Transactions in foreign currencies are translated into sterling at the rate of exchange ruling at the date of transaction. Exchange differences are taken into account in arriving at the operating result.

Pension costs and other post-retirement benefits
The company operates defined contribution pension schemes. Contributions payable to the company's pension schemes are charged to the Statement of Total Comprehensive Income in the period to which they relate.

Share-based payments
The Company's parent issues equity-settled share-based payments to certain employees as consideration for services. Equity-settled share-based payment transactions are measured with reference to the fair value at the date of grant, recognised on a straight-line basis over the vesting period, based on the Group's estimate of shares that will eventually vest. Fair value is measured using a suitable option pricing model.

At each reporting date before vesting, the cumulative expense is calculated, representing the extent to which the vesting period has expired and management's best estimate of the achievement or otherwise of non-market conditions and the number of equity instruments that will ultimately vest.

The movement in cumulative expense since the previous reporting date is recognised in the Statement of Total Comprehensive Income, with a corresponding entry in equity.

Where the terms of an equity-settled award are modified or a new award is designated as replacing a cancelled or settled award, the cost based on the original award terms continues to be recognised over the remainder of the original vesting period. In addition, an expense is recognised over the remainder of the new vesting period for the incremental fair value of any modification, based on the difference between the fair value of the original award and the fair value of the modified award, both as measured on the date of modification. No reduction is recognised if this difference is negative.

Where equity settled share-based payments have lapsed due to a failure to meet the vesting conditions, to the extent that they relate to performance criteria, the value of the adjustment is recognised in the Statement of Total Comprehensive Income. Where share-based payments fail to vest as a result of market based vesting criteria, the fair value of the award is included in the Statement of Total Comprehensive Income as an expense until the fair value is recognised in full and the cumulative total of the lapsed award is transferred from the Share-based payment reserve to Retained earnings.

Operating leases

Operating leases are expensed to the Statement of Total Comprehensive Income on a straight-line basis over the life of the lease.

Financial instruments

The Company has elected to apply the provisions of Section 11 'Basic Financial Instruments' and Section 12 'Other Financial Instruments Issues' of FRS 102, in full, to all of its financial instruments. Financial assets and financial liabilities are recognised when the Company becomes a party to the contractual provisions of the instrument, and are offset only when the Company currently has a legally enforceable right to set off the recognised amounts and intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

Financial assets

Debtors

Debtors which are receivable within one year and which do not constitute a financing transaction are initially measured at the transaction price. Such debtors are subsequently measured at amortised cost, being the transaction price less any amounts settled and any impairment losses.

Where the arrangement with a debtor constitutes a financing transaction, the debtor is initially and subsequently measured at the present value of future payments discounted at a market rate of interest for a similar debt instrument.

A provision for impairment of debtors is established when there is objective evidence that the amounts due will not be collected according to the original terms of the contract. Impairment losses are recognised in the Statement of Total Comprehensive Income for the excess of the carrying value of the debtor over the present value of the future cash flows discounted using the original effective interest rate. Subsequent reversals of an impairment loss that objectively relate to an event occurring after the impairment loss was recognised, are recognised immediately in the Statement of Total Comprehensive Income.

Financial liabilities and equity
Financial instruments are classified as liabilities and equity instruments according to the substance of the contractual arrangements entered into. An equity instrument is any contract that evidences a residual interest in the assets of the Company after deducting all of its liabilities.

Equity instruments
Financial instruments classified as equity instruments are recorded at the fair value of the cash or other resources received or receivable, net of direct costs of issuing the equity instruments.

Trade creditors
Trade creditors payable within one year that do not constitute a financing transaction are initially measured at the transaction price and subsequently measured at amortised cost, being the transaction price less any amounts settled.

Where the arrangement with a trade creditor constitutes a financing transaction, the creditor is initially and subsequently measured at the present value of future payments discounted at a market rate of interest for a similar instrument.

Borrowings
Borrowings are initially recognised at the transaction price, including transaction costs, and subsequently measured at amortised cost using the effective interest method. Interest expense is recognised on the basis of the effective interest method and is included in interest payable and other similar charges.

Derecognition of financial assets and liabilities
A financial asset is derecognised only when the contractual rights to cash flows expire or are settled, or substantially all the risks and rewards of ownership are transferred to another party, or if some significant risks and rewards of ownership are retained but control of the asset has transferred to another party that is able to sell the asset in its entirety to an unrelated third party. A financial liability (or part thereof) is derecognised when the obligation specified in the contract is discharged, cancelled or expires.

The use of estimates and judgements
The preparation of financial statements requires management to make estimates and judgements that affect the amount reported for assets and liabilities at the reporting date and the amounts reported for revenues and expenses during the year. The nature of estimation means that actual amounts could differ from these estimates. Estimates and judgements used in the preparation of the financial statements are continuously reviewed and revised as necessary. While every effort is made to ensure that such estimates and judgements are reasonable, by their nature they are uncertain and as such, changes in estimates and judgements may have a material impact on the financial statements.

a. Research and development
   Careful judgement by the Directors is applied when deciding whether the recognition requirements for development costs have been met. This is necessary as the economic success of any product development is uncertain until such time as technical viability has been proven and commercial supply agreements are likely to be achieved. Judgements are based on the information available at each reporting date which includes the progress with testing and certification on, for example, establishment of commercial arrangements with third parties. In addition, all internal activities related to research and development of new products are continuously monitored by the Directors.

3. REVENUE

	2021 £	2020 £
Revenue	522,325	533,508

In October 2019, the Group entered into a collaboration agreement with MSD (Merck & Co.). The collaboration agreement was for the use of the MicroRx platform to discover and develop LBP candidates as vaccines in up to three indications and the Company is charged with undertaking the discovery and engineering of the LBPs. Total cost incurred on the contract in the year were £1,129,577 (2020: £1,040,727) and are included within Direct costs in the Statement of Total Comprehensive Income.

No other revenue was generated during the year.

4. EMPLOYEES AND DIRECTORS

	2021 £	2020 £
Wages and salaries	1,129,436	1,095,371
Social security costs	121,436	105,830
Other pension costs	48,769	50,809
Share-based compensation	125,291	73,726
	1,424,932	1,325,736

The average number of employees during the year was as follows:

	2021	2020
Laboratory and administrative staff	29	35

	2021 £	2020 £
Directors' remuneration	-	-

All Directors are remunerated through the ultimate parent company, 4D pharma plc.

5. OPERATING LOSS

The operating loss is stated after charging/(crediting):

	2021 £	2020 £
Depreciation on owned assets	133,550	185,370
Patents and licences amortisation	83	1,000
Computer software amortisation	4,878	5,801
Operating lease rentals		
Land and buildings	90,010	39,203
Equipment	-	1,647
Stock recognised as an expense	645,021	399,194
Foreign currency gains realised	(4,411)	(30,685)
Statutory audit of the financial statements	10,500	10,500

The Company only performs research and development, so all expenditure is directly or indirectly linked to this activity.

6. TAXATION

The tax credit on the loss for the year was as follows:

	2021 £	2020 £
Current tax:		
UK corporation tax	(2,411,174)	(1,962,177)
Tax on loss	(2,411,174)	(1,962,177)

UK corporation tax has been charged at 19% (2020: 19%).

Reconciliation of total tax credit included in the Statement of Total Comprehensive Income
The tax assessed for the year is lower than the standard rate of corporation tax in the UK. The difference is explained below:

	2021 £	2020 £
Loss before tax	(16,170,523)	(13,585,351)
Loss multiplied by the standard rate of corporation tax in the UK of 19% (2020 - 19%)	(3,072,399)	(2,581,216)
Effects of:		
Expenses not deductible for tax purposes	54,742	40,406
Capital allowances in excess of depreciation	17,816	24,008
Adjustments to tax charge in respect of previous periods	145,644	29,125
Research and development enhanced deductions	(1,893,656)	(1,400,892)
Unrelieved tax losses and other deductions	1,543,183	1,439,193
Adjustment for reduced rate on reclaim of research and development over the current tax rate	793,496	487,199
Total tax credit	(2,411,174)	(1,962,177)

At 31 December 2021, the Company had tax losses available to carry forward of approximately £42,536,424 (2020: £34,295,456).

The enacted UK corporation tax rate 25.00% forms the basis for the UK element of the deferred tax calculation. The Company has not recognised deferred tax assets relating to such earned forwards losses of approximately £10,634,106 (2020 £6,516,137).

Management considers that there is insufficient evidence of future taxable income, taxable temporary differences and feasible tax-planning strategies to utilise all of the cumulative losses and therefore it is not considered certain that the deferred tax assets will be realised in full. If future income differs from current projections, this could significantly impact the tax charge or benefit in future years.

7. INTANGIBLE FIXED ASSETS

	Patents and licences £	Computer software £	Total £
COST			
At 1 January 2021	5,000	39,800	44,800
Additions	-	-	-
At 31 December 2021	5,000	39,800	44,800
AMORTISATION			
At 1 January 2021	4,917	29,602	34,519
Amortisation for the year	83	4,878	4,961
At 31 December 2021	5,000	34,480	39,480
NET BOOK VALUE			
At 31 December 2021	-	5,320	5,320
At 31 December 2020	83	10,198	10,281

8. TANGIBLE FIXED ASSETS

	Leasehold improvements £	Plant and machinery £	Total £
COST			
At 1 January 2021	3,100	1,552,095	1,555,195
Additions	-	44,831	44,831
Disposals	-	(88,684)	(88,684)
At 31 December 2021	3,100	1,508,242	1,511,342
DEPRECIATION			
At 1 January 2021	1,705	1,284,934	1,286,639
Charge for the year	620	132,930	133,550
Disposals	-	(81,372)	(81,372)
At 31 December 2021	2,325	1,336,492	1,338,817
NET BOOK VALUE			
At 31 December 2021	775	171,750	172,525
At 31 December 2020	1,395	267,161	268,556

9. DEBTORS: AMOUNTS FALLING DUE WITHIN ONE YEAR

	2021 £	2020 £
Other debtors	8	1,352
Taxation receivables	4,423,485	2,012,311
VAT	105,970	131,445
Prepayments	1,162,811	1,273,977
	5,692,274	3,419,085

10. CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR

	2021 £	2020 £
Trade creditors	493,108	590,626
Amounts owed to group undertakings	79,617,696	66,164,855
Social security and other taxes	46,459	26,247
Other creditors	4,153	5,098
Accruals and deferred income	2,626,838	1,818,905
	82,788,254	68,605,731

11. LEASING AGREEMENTS

Minimum lease payments under non-cancellable operating leases fall due as follows:

	2021 £	2020 £
Within one year	-	69,239

12. CALLED UP SHARE CAPITAL

Allotted, issued and fully paid:

Number	Class	Nominal Value	2021 £	2020 £
108,764	Ordinary	£0.01	1,087	1,087

All shares carry equal voting and dividend rights.

13. CAPITAL CONTRIBUTION RESERVE

	2021 £	2020 £
Outstanding at the start of the year	78,392	50,456
Lapsed options	(33,275)	(45,790)
Share-based compensation	125,291	73,726
Outstanding at 31 December	**170,408**	**78,392**

The capital contribution reserve accumulates the corresponding credit entry in respect of share-based payment charges. Movements in the reserve are disclosed in the Statement of Changes in Equity.

Options which lapse due to a failure to meet performance-based vesting criteria are expensed through the Statement of Total Comprehensive Income as they occur. Where options lapse for other reasons the value attributable to them is transferred from the Capital contribution reserve to Retained earnings.

A charge of £125,291 has been recognised in the Statement of Total Comprehensive Income for the year (2020: £73,726).

Share option schemes
The Group operates the following unapproved share option schemes in which staff of 4D Pharma Research Limited are entitled to options in 4D pharma plc:

4D pharma plc 2015 Long Term Incentive Plan ("LTIP")
Share options were granted to staff members on 11 May 2016, 24 May 2017, 26 October 2018 and 5 July 2019. Share options are awarded to management and key staff as a mechanism for attracting and retaining key members of staff. These options vest over a three-year period from the date of grant and are exercisable until the tenth anniversary of the award. Exercise of the award is subject to the employee remaining a full-time member of staff at the point of exercise and the vesting conditions being met.

Vesting conditions are based on a mixture of 4D pharma plc's TSR performance relative to an appropriate comparator group, and certain individual performance criteria.

The fair value benefit is measured using a Black Scholes model, taking into account the terms and conditions upon which the share options were issued.

2021 Long Term Incentive Plan ("LTIP")

Share options were granted to staff members under the "2021 Long Term Incentive Plan" on 17 December 2021. Share options are awarded to management and staff as a mechanism for attracting and retaining key employees. These options vest subject to members of staff remaining employees on each vesting date and on exercise, with one quarter of the options awarded vesting on the anniversary of the vesting start date with the remaining vesting dates and number of remaining options occurring evenly over the remainder of a four-year period from vesting start date. The fair value is assessed using a Type 2, Black Scholes valuation model, linked to the terms, conditions and observable market data at issue and included in equity in the capital contribution reserve.

Year ended 31 December 2021

			Number					
Date of grant	Exercise Period	Exercise price per share Pence	At 31 December 2020	Granted	Exercised	Non-vesting or lapsed	At 31 December 2021	Exercisable
26 October 2018	2021-2028	0.25	40,570	-	(21,353)	-	19,217	19,217
5 July 2019	2022-2029	0.25	126,316	-	-	(63,158)	63,158	-
17 December 2021	2022-2031	52.35	-	3,195,438	-	-	3,195,438	-
			166,886	3,195,438	(21,353)	(63,158)	3,277,813	19,217
Weighted average exercise price of options (pence)			0.25	37.43	0.25	0.25	51.04	0.25

Year ended 31 December 2020

			Number					
Date of grant	Exercise Period	Exercise price per share Pence	At 31 December 2019	Granted	Exercised	Non-vesting or lapsed	At 31 December 2020	Exercisable
24 May 2017	2020-2027	0.25	23,332	-	-	(23,333)	-	-
26 October 2018	2021-2028	0.25	72,598	21,353	-	(53,381)	40,570	21,353
5 July 2019	2022-2029	0.25	126,316	-	-	-	126,316	-
			222,246	21,353	-	(76,714)	166,886	21,353
Weighted average exercise price of options (pence)			0.25	0.25	-	0.25	0.25	0.25

For shares outstanding at the year end, the weighted average remaining contractual life of the options issued in 4D pharma plc. to 4D Pharma Research Limited staff is 9.89 years (2020: 8.34 years).

21,353 share options were exercised during the year (2020: none) and 19,217 share options were exercisable at 31 December 2021 (2020: 21,353).

The following table lists the assumptions used in calculating the fair value of options:

Date of grant	Expected volatility	Risk-free interest rate	Dividend yield	Expected life of options	Weighted average exercise price	Weighted average share price at date of grant	Number of options granted
26 October 2018	54.95%	0.72%	0.00%	3 years	0.25p	140.5p	106,762
5 July 2019	69.62%	0.57%	0.00%	3 years	0.25p	93.19p	126,316
17 December 2021	86.46%	1.22%	0.00%	3 years	52.35p	52.35p	3,195,438

The expected life of the options is based on historical data and is not necessarily indicative of exercise patterns that may occur. The expected volatility reflects the assumption that the historical volatility is indicative of future trends, which may also not necessarily be the actual outcome.

No dividends were assumed to be paid in the foreseeable future.

The model assumes, within the calculation of the charge, delivery of options that are dependent on a judgemental comparison to the total shareholder return against a specified comparator group of companies upon passing of the vesting period.

No other features of options granted were incorporated into the measurement of fair value.

14. OTHER RESERVES

Retained earnings
Retained earnings includes the accumulated profits and losses arising from the Income Statement and certain items from Other Comprehensive Income attributable to equity shareholders, net of any distributions to shareholders.

Share premium
The share premium account is used to record the amounts received in excess of the nominal value on issue of new shares net of any costs of issue.

15. PENSIONS

The company operates two defined contribution pension schemes, one of which is for senior personnel and the other open to all other employees.

Under these schemes pension costs of £48,769 were charged to the Statement of Total Comprehensive Income during the year (2020: £50,809) and at the year-end, £4,153 was due to these schemes (2020: £5,098).

16. RELATED PARTY DISCLOSURES

Group undertakings

The Company has taken advantage of the exemption under FRS 102 in regard to disclosure of transactions and balances with wholly-owned group companies.

Other related party transactions

There were no other related party transactions in the year (2020: £Nil).

17. ULTIMATE PARENT COMPANY

The ultimate parent company is 4D pharma plc, a company registered in England and Wales, company number 08840579. 4D pharma plc registered office is 9 Bond Court, Leeds, LS1 2JZ.

4D pharma plc is the immediate and ultimate parent company, and is the smallest and largest group for which consolidated accounts including 4D Pharma Research Limited are prepared. The consolidated accounts, for the period ending 31 December 2021, are available from 4D pharma plc (as above), or from Companies' House.

18. CONTINGENT LIABILITIES

On 29 July 2021 the parent company entered a loan agreement with Oxford Finance S.A.R.L. for up to $30 million maturing on 1 July 2026 and it is secured against substantially all of the assets of the Group and its subsidiaries. The parent company drew down the first tranche for $12.5 million or £8.990 million at that date.

PARENT

For SC336222

4D pharma plc

4D pharma plc

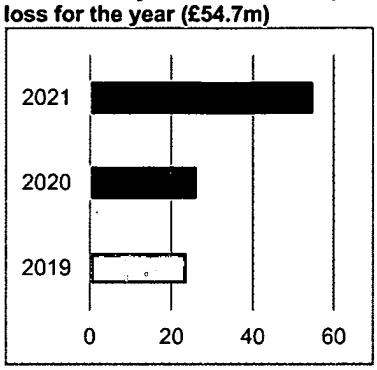
Annual Report and Accounts 2021

Contents

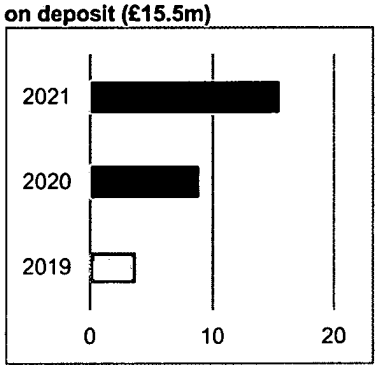
Highlights

Financial highlights

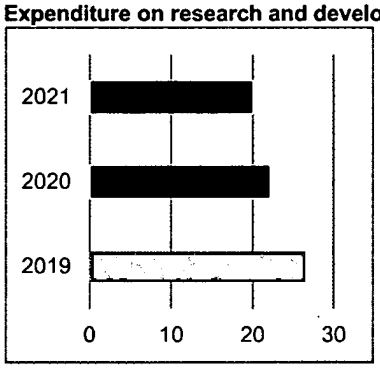
Loss for the year and total comprehensive loss for the year (£54.7m)



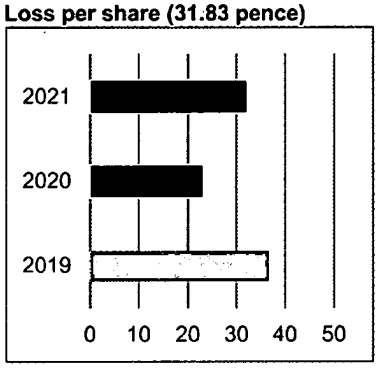
Cash, cash equivalents and cash on deposit (£15.5m)



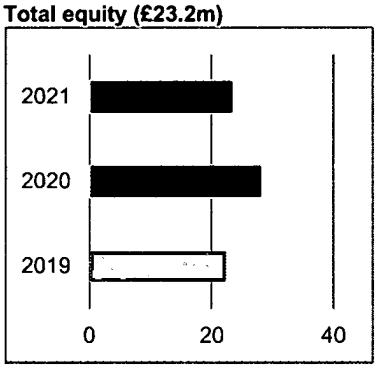
Expenditure on research and development (£19.8m)



Loss per share (31.83 pence)



Total equity (£23.2m)



Highlights (continued)

Operational highlights

- Provided an update on the ongoing clinical trial portfolio for lead oncology candidate MRx0518. This included the first announcement of signals of anti-tumor activity for the combination of MRx0518 with Keytruda® in bladder cancer, adding to the previously reported activity in renal cell carcinoma and non-small cell lung cancer.
- Announced a clinical trial collaboration and supply agreement with Merck KGaA, Darmstadt, Germany, and Pfizer Inc., under which 4D pharma will conduct a clinical trial to evaluate MRx0518 in combination with Bavencio® (avelumab), an anti-PD-L1 immune checkpoint inhibitor, as a first-line maintenance therapy for patients with locally advanced or metastatic urothelial carcinoma that has not progressed with first-line platinum-containing chemotherapy. This study is expected to commence in 2022.
- Presented additional clinical mechanistic data for MRx0518 at the European Society for Medical Oncology (ESMO) Congress, as both a monotherapy and in combination with Keytruda® (pembrolizumab). The results identified baseline biomarkers associated with clinical benefit in patients with solid tumors refractory to immune checkpoint inhibitors (ICIs) treated with MRx0518 in combination with pembrolizumab; and gene and metagene signature changes in solid tumors following treatment with MRx0518 monotherapy.
- Presented further analyses of the completed Phase II clinical trial of Blautix® in patients with irritable bowel syndrome with constipation (IBS-C) or with diarrhea (IBS-D) at Digestive Disease Week (DDW) 2021. The post-hoc analyses revealed strong and statistically significant activity on the key symptom of bowel habit, a potential FDA-approvable primary endpoint. In addition, analysis of the data by geographical region shows that earlier topline results were impacted by an unusually high placebo response in patients in the UK and Ireland, and enhanced positive signals were seen in the larger US population.
- Subsequently, the Company presented additional mechanistic clinical data for Blautix® at Gastro 2021. The results show treatment with Blautix® led to structural changes in the gut microbiota and greater increases in interconnectivity between taxa than placebo, in patients with IBS-C or IBS-D.
- Reported topline results from Part A of our Phase I/II randomized, double-blind, placebo-controlled clinical trial of MRx-4DP0004 as a treatment for asthma. Part A met the primary endpoint showing MRx-4DP0004 was safe and well tolerated. In addition, MRx-4DP0004 generated promising signals of clinical activity which support progression into Part B of the study.
- Published preclinical research relating to second-generation immuno-oncology LBP MRx1299 improving the activity of CAR-T in animal models of cancer, in collaboration with Philipps-University Marburg, Germany, and Universitätsklinikum Würzburg, Germany.
- Completed the merger with special purpose acquisition company (SPAC) Longevity Acquisition Corporation and concurrent private placement, raising total gross proceeds of approximately $39.8 million.
- Entered into a senior secured credit facility for up to $30 million with Oxford Finance LLC, including the initial drawdown of the first tranche for $12.5 million, with the remaining $7.5 million and $10 million tranches dependent on the achievement of certain milestones.
- Announced the appointments of Paul Maier as Non-Executive Director and John Beck as Chief Financial Officer (CFO). Later in the year the Company was saddened to announce the passing of John Beck.

Since the period end

- On 3 January 2022 the Company announced the appointment of John Doyle as Chief Financial Officer (CFO).
- On 22 February 2022 the Company announced that the U.S. Food and Drug Administration (FDA) has cleared investigational new drug (IND) applications for MRx0005 and MRx0029 for the treatment of Parkinson's disease. The Company expects to initiate a first-in-human Phase I clinical trial in people with Parkinson's disease in mid-2022.
- On 23 March 23 we announced that, in Part B of the ongoing Phase I/II study of MRx0518 and Keytruda® in patients with solid tumors that have progressed on a prior immune checkpoint inhibitor (ICI), the renal cell carcinoma (RCC) group met its primary efficacy endpoint ahead of enrolment completion.

Directors, Secretary and Advisors

Executive Directors	Duncan Peyton (Chief Executive Officer) Dr. Alexander (Alex) Stevenson (Chief Scientific Officer)
Non-Executive Directors	Prof. Axel Glasmacher (Chairperson) Dr. Edgardo (Ed) Baracchini Dr. Alexander (Sandy) Macrae Paul Maier Dr. Katrin Rupalla
Company Secretary	Duncan Peyton
Registered Office	9 Bond Court Fifth Floor Leeds LS1 2JZ
Company Number	08840579
Auditor	**RSM UK Audit LLP** Central Square 5th Floor 29 Wellington Street Leeds LS1 4DL
Nominated Advisor and Broker	**Singer Capital Markets** 1 Bartholomew Lane London EC2N 2AX
Joint Broker	**Bryan, Garnier & Co. Limited** Beaufort House 15 St. Botolph Street London EC3A 7BB
Lawyers (English law)	**Pinsent Masons LLP** 30 Crown Place London EC2A 4ES
Lawyers (United States law)	**Wilson Sonsini Goodrich & Rosati** 650 Page Mill Road Palo Alto California 94304
Registrar	**Link Asset Services** The Registry 34 Beckenham Road Beckenham Kent BR3 4TU

Strategic report: Introduction

The Directors present their Strategic Report together with the Corporate Governance Report, audited consolidated financial statements, audited Company financial statements and Auditor's Report for the year ended 31 December 2021.

This Strategic Report is broken down into the following sections:

- Business Strategy;
- Chairperson and CEO's Statement;
- Financial Review; and Business Overview; and
- Principal Risks and Uncertainties.

Strategic report: Business strategy

4D pharma is a pharmaceutical company developing Live Biotherapeutic Products (LBPs), a novel class of drug derived from the human gut microbiome. Our differentiated approach focuses on understanding mechanisms of action and the interactions of our LBPs with host biology, driven by our proprietary MicroRx® platform. This has generated a strong clinical and preclinical pipeline of single strain LBPs targeting major diseases across multiple therapeutic areas.

Our strategy

A novel class of therapeutic

Our LBPs are a novel class of biologics based on live organisms, namely single strains of bacteria. These bacteria are not genetically modified and are originally isolated from healthy human donors. Our therapeutic candidates are therefore 'live' drugs that can provide therapeutic benefit via their interaction with host biology, whether by their structural components such as peptides, primary or secondary metabolites or other means. In contrast, biologics, such as antibodies, are not 'live' compounds and, generally speaking, are not naturally occurring molecules. As naturally occurring, non-engineered, commensal bacteria originally isolated from healthy human donors, our LBPs are expected, and to date have been found, to be well tolerated compared with other drug modalities such as small molecules or to biologics, given that they are single strains of naturally evolved human commensal microbes that act on the gut-body network without significant risk of systemic exposure. To date, this has meant that we can accelerate our therapeutic candidates from discovery and preclinical testing into clinical trials faster than traditional therapeutic modalities such as small molecules or biologics. For all of our clinical-stage LBP candidates to date, regulators, including the US FDA, have allowed us to conduct first-in-human clinical trials in our target patient population without requiring us to first conduct traditional Phase I safety studies in healthy volunteers. These factors reduce the cost and time to generate meaningful, in-patient clinical data for our therapeutic candidates compared to small molecules or biologics targeting the same diseases.

Validated discovery platform – MicroRx®

To further advance our product pipeline, we have developed MicroRx®, our LBP discovery platform. MicroRx® interrogates our proprietary library of bacterial isolates for therapeutic functionality and comprehensively characterizes the bacterial isolates using a range of complementary tools and technologies. By developing a thorough understanding of the mechanism of action of our therapeutic candidates and their interaction with host biology, we can develop LBPs that target disease pathology rationally and effectively, and expand our robust, sector-leading patent portfolio with additional patents relating to LBP functionality.

Harnessing bacterial functionality in high impact disease areas

The functionality of bacteria and their impact on human biology is diverse, and we have developed a broad pipeline of therapeutic candidates across multiple therapeutic areas. We initially focused on the gastrointestinal disease space in inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS), a logical starting point for developing a modality based around organisms found in the human gut. However, as our research expertise and the MicroRx® discovery platform have advanced, we were able to leverage our knowledge of the human microbiome and its diverse interactions with various host systems to realize the potential of LBPs to treat diseases manifest in organs and tissues distal to the gut. Our observation that candidates in our proprietary library were having systemic, not just gut-localized, effects led us to explore new applications and disease areas.

To this end, our key clinical focus areas now include immuno-oncology, central nervous system (CNS) and immunological disorders, with preclinical candidates targeting Parkinson's disease, neurodevelopment/psychiatric diseases and oncology, and additional immune-inflammatory conditions. As of 31 December 2021, we had completed three clinical trials and currently have three ongoing.

Strong position as a leading innovator in Live Biotherapeutics space

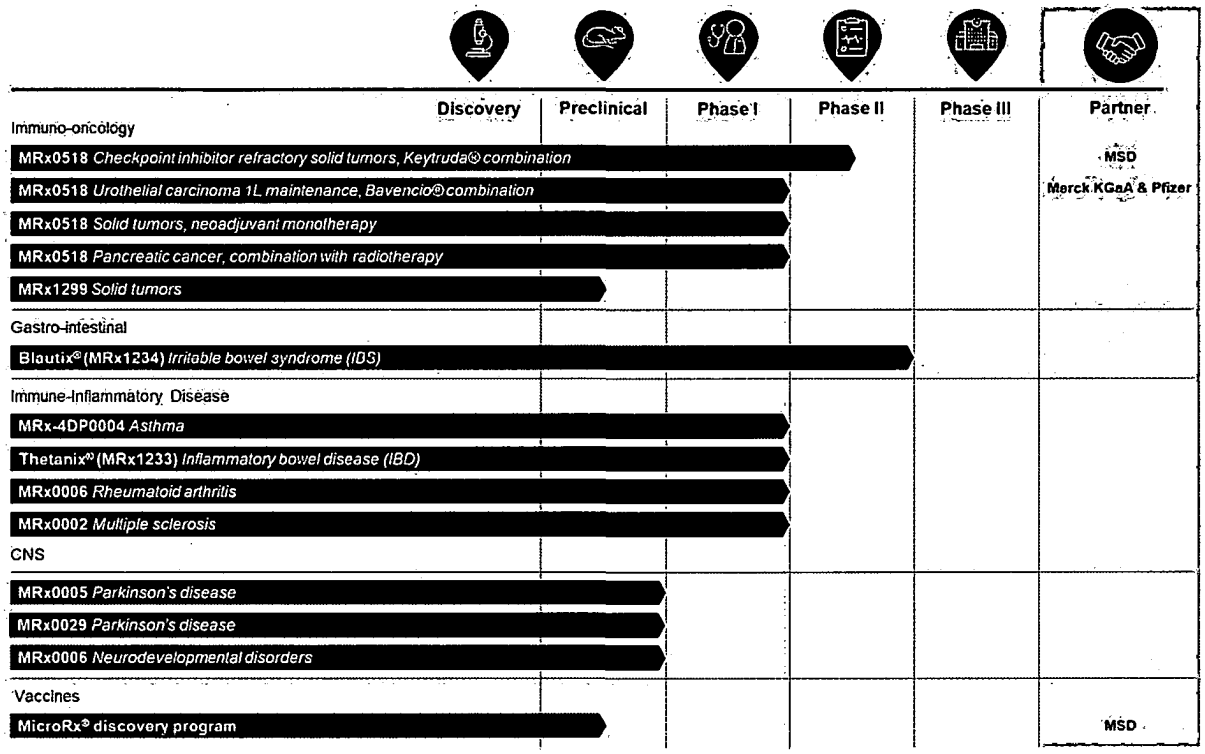
With our lead therapeutic candidate, MRx0518, to our knowledge, we delivered the first positive proof-of-concept data with a Live Biotherapeutic in the treatment of cancer. MRx0518 is being evaluated in three ongoing clinical trials, including a Phase I/II trial in solid tumors in combination with immune checkpoint inhibitor Keytruda® in patients with metastatic solid tumors that are refractory to prior anti-PD-1/PD-L1 therapy, a study of MRx0518 as a neoadjuvant monotherapy in solid tumors, and a study of MRx0518 in combination with stereotactic radiotherapy in patients with potentially resectable pancreatic cancer. A fourth study, a Phase II trial in combination with Bavencio® as first-line maintenance therapy for urothelial carcinoma, is expected to commence in 2022 in collaboration with Merck KGaA and Pfizer. We are engaged in business development activities with the goal of expanding the development of MRx0518 into new settings and are actively exploring additional collaboration opportunities.

We continue to utilize the MicroRx® platform to discover promising new LBP candidates for major diseases with significant unmet need. As part of our CNS portfolio, we have identified novel LBP candidates that act upon multiple aspects of the pathology of neurodegenerative diseases in preclinical models, including gut-barrier function, neuroinflammation and protection of neurons critical to healthy CNS function. Accordingly, we are currently planning a first-in-human clinical study for our lead CNS therapeutic candidates, MRx0029 and MRx0005, in Parkinson's disease patients, which we expect to commence in 2022. We are an industry partner of the Parkinson's Progression Markers Initiative, a longitudinal study sponsored by The Michael J. Fox Foundation for Parkinson's Research to better understand Parkinson's disease and accelerate the development of new treatments. We have also entered into a collaboration with Parkinson's UK, a non-profit organization focused on advancing the understanding of Parkinson's disease and improving treatments, to establish a Patient Advisory Board (PAB) comprised of people living with Parkinson's.

In addition to our internal development programs, we are seeking to realize the value and potential of the MicroRx® platform through collaborations in new areas. In 2019, we entered into a research collaboration and option to license agreement with MSD (the tradename of Merck & Co., Inc., Kenilworth, NJ, USA) to discover and develop LBPs for vaccines. This collaboration pairs our proprietary MicroRx® platform with MSD's expertise in the development and commercialization of novel vaccines, to discover and develop LBPs for use in vaccines in up to three undisclosed indications.

Our development pipeline

4D pharma's MicroRx® platform has generated a strong pipeline with four clinical-stage candidates. In 2021 we delivered clinical data from multiple studies from three of those candidates, while entering into new clinical collaborations and planning new clinical trials. Our clinical candidates are followed by a suite of preclinical candidates in the areas of immuno-oncology, CNS and immunological disorders, as well as our research collaboration with MSD in the vaccines field.



Our goal is to pioneer a novel class of safe and effective therapeutic derived from the gut microbiome that has the potential to transform the way many diseases are treated.

Key elements of our strategy include:

Continuing to be a leading innovator in the microbiome field, with a rigorous approach that focuses highly on the functionality of our LBPs

We continue to make significant investments in our research, manufacturing and clinical capability to put ourselves at the front of the pack in the microbiome space. This expertise has generated what we believe is a comprehensive intellectual property portfolio in the microbiome space.

Delivering what we believe are differentiated LBPs in multiple indications

We intend to deliver what we believe are differentiated therapeutics that leverage the inherent advantages of LBPs in multiple indications. We strive to deliver positive clinical data, complemented with biomarker and mechanistic data, with a goal to develop the first LBP approved for the treatment of diseases such as cancer, asthma and IBS. We continue to work to push LBPs into new therapeutic areas, such as our preclinical LBP therapeutic candidates MRx0029 and MRx0005 that leverage the gut-brain axis and are currently being developed for Parkinson's disease.

Working with partners to realize the full potential of our sector-leading capabilities

MicroRx® is a unique LBP discovery and development platform and, alongside building our internal pipeline of LBP candidates, the platform also enables us to build valuable partnerships and collaborations. We believe the collaboration with MSD to discover and develop LBPs for vaccines, in addition to the proof-of-concept data generated to date across multiple programs, has validated the MicroRx® platform and 4D pharma's approach to LBP development. We will seek to engage additional new partners that wish to explore the potential of LBPs in disease areas of interest through collaborations.

Strategic report: Chairperson and CEO's statement

4D pharma is committed to unlocking the power of the microbiome to develop safe and innovative therapies for serious diseases. With our MicroRx® platform we have been able to do just that, discovering and developing Live Biotherapeutic Products (LBPs) demonstrating systemic functionality, for example by influencing the immune system and modulating the gut-brain axis.

It is well known that a significant proportion of drug candidates fail in the clinic due to safety concerns. One of the core attractions of LBPs as a novel class of drug was the expectation that they would have attractive safety profiles, significantly reducing this major development risk. We have now dosed over 300 patients representing diverse disease areas, and to date all our clinical-stage LBPs have shown placebo-like safety and tolerability. This is a paradigm shift for drug development.

In 2021 we expanded this evidence base, announcing the first safety data for MRx-4DP0004 in asthma patients. Importantly, we continued to demonstrate LBPs can work alongside existing cornerstone medications without creating additional safety and toxicity issues, which resonates with clinicians and patients alike. Moreover, such a profile may position our therapeutics to be prescribed earlier in the treatment pathway and provides opportunities to potentially treat disease earlier.

Drugs not only need to be safe, but also effective. In the past year we generated more clinical data supporting our function-based approach to developing single strains of bacteria as pharmaceutical therapeutics. Building on our ground-breaking data in oncology, demonstrating that a single strain LBP can modulate the immune system to treat cancer, we provided the first clinical data in asthma for MRx-4DP0004. Not only was this an important milestone for 4D pharma, but also represents the first clinical data indicating the efficacy of a Live Biotherapeutic in this setting.

Outside the clinic, March 2021 featured another significant milestone for 4D pharma as we obtained our US listing on Nasdaq under the ticker 'LBPS'. This was a major achievement of a long-term goal for the Company. However, no one predicted that the capital market was on the precipice of an unprecedented rout of life sciences stocks. During 2020 and the early part of 2021, capital was flowing into biotech at an unprecedented rate, driven in part by the pandemic. However, from February 2021 the biotech capital markets entered a period of dramatic decline. By the end of the 2021, whilst the main market had gained (for example the S&P 500 Index was up by around 23%), the biotech market, as measured by reference to the S&P Biotechnology Select Industry Index (XBI), was down over 30%. In the early months of 2022, this trend in life sciences stocks has continued.

Within this general decline across the biotech sector, small cap and emerging areas were hit particularly hard. Microbiome companies encountered challenges, and as a maturing field, readthrough was applied to other public companies under the microbiome umbrella.

However, as 4D pharma and others in the field have continued to educate stakeholders, there is a growing appreciation of the differences of approach and an understanding that not all companies working on microbiome therapeutics are the same, as has been common for other new modalities or therapeutic approaches. Our rapidly evolving field is pursuing a multitude of approaches, from fecal material transplant (FMT) and bacterial consortia of varying complexities, to single strain LBPs, engineered strains, microbial metabolites and compounds targeting bacteria or their products. As the field matures and generates more clinical data, we may see that some approaches are particularly suited to different applications. For example, using FMT and complex consortia as an ecological agent to outcompete an infectious pathogen in the gut has proven to be effective in preventing recurrence of C. difficile infection. This is, though, a very different approach to identifying bacteria that exert systemic therapeutic impacts on human biology, for use in the treatment of systemic diseases such as cancer and asthma.

The latter is the approach taken by 4D pharma. Our hypothesis is that by understanding how bacteria impact host cells, we can use a single strain to modulate specific, disease-relevant pathways to develop safe and innovative therapies for serious systemic diseases. Irrespective of external factors and prevailing market conditions, throughout 2021 we generated more evidence supporting this hypothesis.

Oncology

Throughout 2021 and early 2022 we have continued our progress as a leader in the field of oncology microbiome therapeutics. New clinical biomarker data from multiple studies in different treatment settings has continued to develop our understanding of the mechanism of action of lead immuno-oncology Live Biotherapeutic MRx0518. This complements our preclinical data, an important validation not only of the translational value of the MRx0518 preclinical work, but of the MicroRx® platform more broadly, with positive implications across our pipeline. In conjunction with promising clinical outcomes in our combination study with Keytruda®, this data provides clinical proof of concept of our single strain LBP approach and the ability of gut-targeted single strains of bacteria to exert clinically meaningful effects on systemic diseases away from the gut.

Early in 2021 we reported on the continued progress of our two-part Phase I/II study of MRx0518 in combination with immune checkpoint inhibitor Keytruda® (pembrolizumab) in patients who had developed resistance to a prior checkpoint inhibitor, in collaboration with MSD (tradename of Merck & Co., Inc., Kenilworth, N.J., USA). Part A of the study was focused on demonstrating the safety and tolerability of MRx0518 in combination with a checkpoint inhibitor, but also gave us the first insight into the potential impact of Live Biotherapeutics in the fight against cancer.

Following the successful completion of Part A and progression into Part B in 2020, in early 2021 we reported target tumor reductions in Part B patients at the first scheduled restaging timepoint. Importantly, these included the first signals of anti-tumor activity for the combination in patients with bladder cancer, adding to the activity previously reported in patients in Part A with renal cell carcinoma (RCC) and non-small cell lung cancer (NSCLC). Additionally, three Part A patients that were previously reported to have experienced clinical benefit were continuing on the study, with two of these patients continuing on treatment for over 18 months (as of February 2021) and exhibiting further target tumor reductions or durable disease control.

The results in the clinic also further strengthened the translational value of the preclinical data and the MicroRx® platform. At the European Society for Medical Oncology (ESMO) Congress, we presented biomarker data from two clinical studies, the combination study with Keytruda® and a study of MRx0518 as a neoadjuvant monotherapy in treatment of naïve patients with a variety of solid tumors.

Fundamentally, these results further demonstrate the ability of MicroRx® to identify single strains of bacteria that can impact systemic disease. For MRx0518, the data indicated its ability to safely engage the immune system, with a mechanism of action potentially able to overcome important mechanisms of resistance to checkpoint inhibitors, a major unmet need in cancer treatment. The biomarker data also raises the potential to identify patients most likely to respond to MRx0518 combination therapy. This data will inform the subsequent clinical development strategy for MRx0518, including taking this LBP into earlier lines of treatment.

Oncology (continued)

As part of this strategy, in February 2021, 4D pharma announced a new clinical collaboration with Merck KGaA, Darmstadt, Germany, and Pfizer Inc. to evaluate MRx0518 as a first-line maintenance treatment for patients with locally advanced or metastatic urothelial carcinoma in combination with Bavencio® (avelumab), the first and only checkpoint immunotherapy approved in this setting. Based on our clinical and biomarker data generated to date, supported by emerging evidence in the scientific literature, we believe MRx0518 has the potential to enhance the positive clinical outcomes achieved by Bavencio® for patients in this treatment setting. We have now commenced clinical trial initiation activities and at the time of writing are screening patients.

In addition to our progress in the clinic and our collaborations with MRx0518, we also believe our approach using MicroRx® to select single strains could have impacts in other oncology treatment settings. Expanding our oncology portfolio, in July 2021 we announced the publication of preclinical research in Nature Communications (Luu, *et al.*, 2021) relating to the ability of MRx1299 to enhance the anti-tumor efficacy of cancer cell therapies such as CAR-T in animal models.

Asthma

Having previously presented clinical data supporting the use of MicroRx® to identify LBPs to stimulate the immune system via the gut for the treatment of cancers, in 2021 we generated the first clinical data validating the use of MicroRx® to identify and select single strain LBPs which have an anti-inflammatory effect, with lead clinical program MRx-4DP0004 for the treatment of asthma. Preclinically, of particular interest was the ability of MRx-4DP0004 to reduce levels of both neutrophils and eosinophils in the lung. These cells represent the two major inflammatory pathways associated with asthma.

Asthma represents a serious global health burden affecting over 260 million people worldwide (WHO, 2021). It is a heterogeneous disease consisting of numerous clinical phenotypes, driven by different underlying biology and inflammatory processes. Current therapeutic options are not effective in all patients, and biologics approved for more severe patients mainly address inflammation associated with eosinophils. Thus, there remains a significant unmet need for new treatment options. The goal for asthma patients and the clinicians who treat them is better control and reduced reliance on rescue medications such as short acting beta agonists (SABA), and ultimately a better quality of life for patients.

In December 2021, we reported topline clinical results from Part A of our Phase I/II placebo-controlled trial of MRx-4DP0004 in patients with partly controlled asthma. MRx-4DP0004 was dosed alongside patients' regular medication of inhaled corticosteroid (ICS) with or without long-acting beta agonist (LABA).

As a first-in-human study, the primary goal of Part A was to demonstrate the safety and tolerability of MRx-4DP0004 as an add-on therapy, but we were also able to investigate a number of secondary endpoints evaluating its clinical activity in patients. The trial achieved the primary endpoint, showing MRx-4DP0004 to be safe and well tolerated, as has been the case for all 4D pharma's clinical-stage LBPs to date.

Further, the results also showed that, compared to placebo, those receiving MRx-4DP0004 had improved quality of life and greater control of their asthma, demonstrated by a reduction of SABA rescue inhaler use and a greater proportion of patients showing a reduction in ACQ-6 score (a clinically validated tool widely used to measure asthma control in trials and clinical practice) from baseline. The improvements in ACQ-6 are particularly encouraging, as although Part A was not intended to be powered for significance, the proportion of patients with improvements in ACQ-6 scores was statistically significant across all timepoints. This gives us confidence as we move into Part B, in which the primary endpoint will be the proportion of patients showing a reduction in the ACQ-6 score.

Following these topline results, in early 2022 we hosted a virtual event with Key Opinion Leader (KOL) and Chief Investigator of the MRx-4DP0004 Phase I/II study, Professor Chris Brightling, which highlighted the potentially broad utility of MRx-4DP0004 across the spectrum of asthma severity and different inflammatory phenotypes.

These highly encouraging clinical results for MRx-4DP0004 are not only a world first and important milestone for the microbiome therapeutics field in respiratory disease, but also provide clinical validation of the potential of the MicroRx® platform to identify and develop single strain LBPs with potent systemic activity on the human immune system.

Irritable Bowel Syndrome (IBS)

In late 2020, we announced topline results from our Phase II placebo-controlled signal finding study in IBS patients to evaluate the efficacy of Blautix®, uniquely in both IBS-C (constipation predominant) and IBS-D (diarrhea predominant).

In 2021, at Digestive Disease Week (DDW), we presented further analyses of the clinical data which revealed particularly strong activity on the key symptom of abnormal bowel habit (stool frequency in IBS-C or stool consistency in IBS-D). This is particularly pertinent because published FDA guidelines state that bowel habit can serve as an approvable primary endpoint in pivotal studies.

The additional analyses also revealed that the topline results were impacted by a high placebo response rate in patients in the UK and Ireland, with enhanced positive signals seen in the larger US patient population representing approximately two-thirds of the patients enrolled in the Phase II trial. The activity of Blautix® relative to placebo in this study was competitive with approved therapeutics for IBS-C and IBS-D, though Blautix® is the only potential therapeutic with activity in both subtypes, while demonstrating a highly favourable placebo-like safety profile.

Following the successful Phase II trial 4D pharma has engaged with regulators and potential partners regarding next steps for Blautix® towards a potential pivotal program in IBS, seeking to address a significant unmet need for a safe and innovative therapy across IBS subtypes.

Parkinson's

Over 10 million people are currently living with Parkinson's, and this figure is only expected to grow as the global population ages. The cornerstone of Parkinson's treatment for over half a century has been focused on replacing deficient dopamine in the brain caused by the loss of the nerves which normally produce it. This has some success in treating the symptoms but does not address the underlying causes of neurodegeneration. Its effects also tend to wear off over time and their long-term use results in significant side effects. There is therefore a great need for new and more effective treatments which address the underlying causes of the condition, not simply the symptoms.

4D pharma is seeking to impact key disease processes via the gut-brain axis. Key targets in the drive to develop a novel therapeutic include addressing mitochondrial dysfunction and oxidative stress, neuroinflammation, production of neurotrophic factors, and ultimately neuroprotection. Using MicroRx®, 4D pharma has identified two unique strains, MRx0029 and MRx0005, which have shown activity in preclinical animal models of Parkinson's disease, with positive impacts on these key aspects of Parkinson's pathology.

Throughout 2021 and into 2022, we have continued to make great progress towards the clinic, and in February 2022 the FDA cleared the investigational new drug (IND) applications for both MRx0005 and MRx0029 for the treatment of Parkinson's. We now expect to start our first-in-human clinical trial of both candidates in people with Parkinson's in 2022.

At 4D pharma we recognize the need to involve people affected by Parkinson's at every stage of research in order to bring novel and transformational treatment to people with Parkinson's. We are proud to have entered into collaborations with leading partners, with The Michael J. Fox Foundation as an Industry Partner of the Parkinson's Progression Markers Initiative, and with Parkinson's UK to establish a Patient Advisory Board to better understand Parkinson's disease and provide vital insight to help guide the development of our LBP candidates.

Other research and development activity

In addition to our progress in the clinic on multiple fronts generating in-patient data to support our thesis of using single strains to drive therapeutic activity, we continue to use our MicroRx® platform to both support our internal pipeline and to collaborate with the pharmaceutical industry.

We continue to advance our ground-breaking collaboration with MSD in the field of vaccines. This collaboration, which is associated with potential milestone payments totaling over $1 billion across up to three undisclosed indications, utilizes MicroRx® to discover and develop Live Biotherapeutics for vaccines. In 2021 we continued to make good progress in this collaboration.

As with any new pharmaceutical modality, reliable, consistent, scalable, clinical-grade manufacturing can be a hurdle to progress. At 4D pharma, we invested early in understanding and resolving this issue, investing in our in-house cGMP-certified production facility. We have successfully conducted the manufacturing optimization and scale-up of multiple unique LBPs, allowing us to progress four candidates into clinical trials to date. Our LBPs are produced by a reliable, repeatable process, delivering a consistent and stable product.

As Live Biotherapeutics advance into later stages of clinical trials and towards commercialization, the knowledge, skills and facilities needed to produce cGMP clinical product is increasingly being seen as a true advantage for developers. This also provides further evidence to support the thesis of single strain LBPs in particular, as we continue to show a leading position in our strategy and capabilities for the manufacturing of LBPs.

Impact of COVID-19

As with many industries, our Company felt the impact of the ongoing COVID-19 pandemic during 2021. Recruitment and retention of patients into clinical trials, dosing, and collection of data were negatively impacted by lockdowns and other government enforced restrictions, precautions and staff shortages at clinical sites and external providers such as CROs, and general reluctance among the patient population during the pandemic.

These factors have led to delays in readouts from some of our clinical trials and regulatory interactions. For example, enrolment for our Phase I/II clinical trial of MRx-4DP0004 in asthma was impacted due to factors associated with the COVID-19 pandemic, which delayed expected preliminary data for this clinical trial. Similarly, regulatory interactions regarding next steps for Blautix® in IBS were delayed as a result of the pandemic.

As we have seen with the arrival and spread of new variants over the last two years, the trajectory of the pandemic remains uncertain. We continue to assess the impact that COVID-19 will have going forward on our ability to effectively conduct business operations as planned. We continue to take steps to mitigate disruption where possible, for example enabling a significant proportion of our employees to telecommute and implementing other technology solutions to minimize disruption.

Corporate development activities

In March we completed our merger with special purpose acquisition company (SPAC) Longevity Acquisition Corp. and Nasdaq listing (Nasdaq: LBPS), accessing $14.8 million in the process. In conjunction, we completed a private placement raising gross proceeds of approximately $25 million, with an additional subscription by Duncan Peyton (Chief Executive Officer) and Dr. Alex Stevenson (Chief Scientific Officer) for an additional $2.0 million of new ordinary shares.

In addition to capital raised during the Nasdaq listing, 4D pharma further strengthened its financial position closing a senior secured credit facility for up to $30 million. The initial $12.5 million tranche was drawn down at closing, with an additional $17.5 million available on achievement of certain milestones.

Alongside the Company's progression onto Nasdaq, we looked to strengthen our management team and Board of Directors with additional expertise and experience of the US market. In March 2021 we appointed John Beck as Chief Financial Officer (CFO) and it was with great sadness that John suddenly passed away in July. John truly believed that 4D was pioneering and brought his invaluable financial and pharmaceutical experience in bringing 4D to Nasdaq. He left an indelible mark on the 4D community and is missed by the entire team.

Since the period end, in January 2022 we announced the appointment of John Doyle as our new CFO. John brings over 15 years of experience leading and developing the financial operations, strategy and investor relations functions at public healthcare companies and has already made valuable contributions to the Company's strategic outlook.

Further strengthening our Board, we appointed Paul Maier as Non-Executive Director, with Mr. Maier also serving as a member of our Audit and Risk Committee and the Company's 'audit committee financial expert' under SEC and Nasdaq rules.

Future outlook

We look ahead to building on our understanding of how 4D pharma can unlock the power of the microbiome to develop safe and innovative novel therapeutics for serious disease.

Building on a strong foundation of clinical data in multiple diverse indications validating our single strain LBP approach, in 2022 and beyond we will continue to generate yet more data demonstrating the potential of this new class of drug to treat serious systemic diseases.

Meanwhile we will continue our innovative research, driven by the MicroRx® platform and our in-house development and manufacturing capabilities, to explore additional opportunities for Live Biotherapeutics such as our pioneering work in new areas of cancer therapy, and working with world-leading partners in innovative collaborations.

The work we do both clinically and preclinically is delivering on the promise of using the microbiome to treat systemic disease, and building long-term value in the MicroRx® platform. We look forward to the continued positive evolution we have observed in the wider field in recent months, such as an increased appreciation of the need for mechanistic understanding for the future of LBP development, and awareness of the critical importance of reliable manufacturing in delivering this as a viable new class of drug.

Information about the Group's employees

Information about the Group's employees can be found in our Corporate Governance Report on page 30. The Board has a good relationship with the Group's employees. The Board maintains constructive dialogue with employees through the Chief Executive Officer and other Executive and senior management positions, through virtual 'town hall' all-employee meetings and video conference calls in which management provides updates on strategic progress, and which serve as a forum for answering questions from employees. The Group utilizes multiple internal communications technologies and channels to facilitate communication and collaboration.

The Group is committed to providing a safe and healthy working environment for its employees and to avoiding adverse impact and injury to the environment and the communities in which we do business. To achieve this, Group employees must comply with all applicable external environmental, health and safety laws and other regulations as well as our own internal standards.

Environmental matters

We currently conduct research, development and manufacturing activities in our in-house facilities. We also work with suppliers and service providers to support our activities. These activities are subject to various environmental, health and safety laws and regulations, which govern, among other things, the controlled use, handling, release and disposal of, including the maintenance of a registry for, hazardous materials and biological materials. If we or our partners fail to comply with such laws and regulations, we could be subject to fines or other sanctions.

As with other companies engaged in similar activities, we face a risk of environmental liability that is inherent in our current and historical activities, including liability relating to releases of or exposure to hazardous or biological materials. Environmental, health and safety laws and regulations are becoming more stringent. We may be required to incur substantial expenses in connection with future environmental compliance or remediation activities, in which case, production and development efforts being carried out by ourselves and our partners relating to our products may be interrupted or delayed.

A report on energy consumption and related emissions is included on pages 52 to 53.

Section 172 Companies Act 2006

Under section 172 of the Companies Act 2006, the Directors believe that they have acted in a way they consider, in good faith, would promote the sustainable success of the Group, having regard for the stakeholders and matters set out in section 172, in the decisions taken during the year ended 31 December 2021.

As set out within the content of this Annual Report, the Directors have considered the following matters throughout the year and in formulating the future strategy of the business:

- the likely long-term consequences of any decision, as set out within our Business Strategy and Chairperson and CEO's Statement on pages 7 to 11;
- the interests of the Group's employees as set out within our Corporate Governance Report on page 30;
- the need to foster and maintain business relationships with collaborators, suppliers and others on page 30;
- the impact of the Group's operations on the community and the environment, as set out within our summary of environmental matters on pages 52 to 53;
- the desirability of the Group maintaining a reputation for high standards of business conduct on page 30; and
- the need to act fairly and in the best interests of shareholders of the Group, as set out within our Corporate Governance Report on page 28 to 31.

The Board maintains a healthy dialogue with all of its stakeholders and values regular communications with its various stakeholder groups, and aims to ensure that all communications concerning the Group's activities are timely, clear, fair and accurate.

The Board recognises the need to, and strives to, promote a corporate culture based on strong ethical and moral values, maintaining high standards of integrity and probity in the conduct of the Group's operations. This culture is promoted throughout its employees and relevant suppliers and contractors and is underpinned by the implementation and regular review, enforcement and documentation of relevant policies, including health and safety and environmental policies and share dealing and anti-corruption policies.

Directors seek to speak with institutional shareholders at least twice a year and the Board's engagement with shareholders has influenced our capital structure. The Group also takes into consideration shareholder views and interests in its decision making. We have increased engagement with private investors through a number of channels, and endeavour to respond to all reasonable queries from investors to the best of our ability and within the limits of confidential or inside information.

Section 172 Companies Act 2006 (continued)

We have enhanced internal communication channels to better recognize and celebrate the achievements of our employees, while also providing additional opportunities for our employees to voice thoughts directly to senior management. The Company supports our employees' ongoing professional development through qualifications and other skills development. The Group is committed to providing a safe environment for its employees and all other relevant parties for which the Group is responsible. The Company's management team regularly monitors the Group's cultural environment and seeks to address any concerns that may arise, escalating these to Board level as necessary.

As we progress drug candidates into and through the clinic, the Group has increased its engagement with patient advocacy groups and disease-focused charitable foundations to ensure our work is aligned with the interests and needs of real-world patients. Similarly, engagement with regulators and Key Opinion Leaders (KOLs) to discuss our clinical plans and results is central to informing our development strategy. We have hosted multiple publicly available discussions with KOLs, to better disseminate these conversations to wider audiences including but not limited to our investors, the general public and media.

The Board engages with our partners regularly and at key milestones or decision points to review progress, maximize effectiveness and ensure equitable satisfaction of the collaborations' objectives.

We prioritize maintaining good relationships with our suppliers by contracting, where practicable and appropriate, on their standard business terms and paying them in accordance with the relevant terms agreed. We interact regularly with our key suppliers, to ensure that planned projects are proceeding smoothly, cost-effectively and in accordance with agreed timelines. By doing so, we ensure that the company's objectives and aims our aligned with those of our key suppliers.

Prof. Axel Glasmacher
Non-Executive Chairperson
31 March 2022

Duncan Peyton
Chief Executive Officer
31 March 2022

Oncology

Our lead product candidate in our immuno-oncology program is MRx0518. This candidate is now being assessed in three clinical trials, and to the best of our knowledge has delivered the first proof-of-concept data of a Live Biotherapeutic in a cancer setting.

MRx0518 is currently being assessed in the following clinical trials:

- in combination with anti-PD-1 immune checkpoint inhibitor Keytruda® in patients with solid tumors that are resistant to prior ICIs, in collaboration with MSD;
- as a monotherapy treatment in the neoadjuvant setting in patients undergoing surgical resection of solid tumors; and
- in combination with hypofractionated radiotherapy in the neoadjuvant setting in patients with potentially resectable pancreatic cancer.

Phase I/II clinical trial: MRx0518 in combination with Keytruda® in solid tumors refractory to prior ICI

MRx0518 is being evaluated in an ongoing Phase I/II clinical trial in solid tumors in combination with ICI Keytruda® in patients with metastatic solid tumors that are refractory to prior anti-PD-1/PD-L1 ICI therapy. This trial is a clinical collaboration with MSD (a tradename of Merck & Co., Inc., Kenilworth, N.J., USA). All patients enrolled in this clinical trial had previously responded to ICIs, and then developed resistance and progressive disease. The clinical trial evaluates whether the combination of MRx0518 and Keytruda® can affect a response in patients with resistance to ICIs thus turning non-responders into responders, in addition to safety of MRx0518 in combination with an ICI.

The trial is formed of two parts. Part A was an initial safety phase in 12 patients with RCC or NSCLC, which evaluated the safety and tolerability of the combination with MRx0518 and Keytruda®. Patients enrolled in Part A are eligible to remain on study treatment for up to two years to evaluate clinical benefit. In 2020 we announced the successful completion of Part A and the initiation of Part B of the study.

In February 2021, we reported that target tumor reductions in Part B patients have been observed as patients reach the first scheduled restaging timepoint (nine weeks). These include the first signals of anti-tumor activity for the combination in bladder cancer, adding to the previously reported activity in renal cell carcinoma (RCC) and non-small cell lung cancer (NSCLC) in patients in Part A.

At the European Society for Medical Oncology (ESMO) Congress, in September 2021, we presented new biomarker data from the clinical trial, which identified tumor biomarkers at baseline which were associated with clinical benefit in patients treated with the combination of MRx0518 and Keytruda® compared to patients who experienced progressive disease. Patients who achieved clinical benefit from the combination of MRx0518 with Keytruda®, defined as a complete response, partial response or stable disease for at least six months, had significantly greater densities of regulatory T cells (Tregs) and proliferating T cells (CD3+KI67+) in their tumors at baseline, compared to patients with progressive disease. In addition, significantly lower densities of CD68+ macrophages at baseline were observed in the tumor microenvironment of patients achieving clinical benefit compared to patients with progressive disease.

This data indicates the potential for MRx0518 to overcome Treg-mediated acquired resistance to cancer treatment, and presents a biomarker potentially able to identify patients most likely to respond to immunotherapy based on MRx0518. Further biomarker analyses are ongoing for additional patients recruited into the study.

Part B of the study is ongoing, expected to enrol up to 120 patients. After the period end, in March 2022, we announced that the RCC group in Part B had achieved the primary endpoint. As of 23 March 2021, the study had enrolled 20 patients with RCC, of which four out of the first 16 evaluable patients have achieved clinical benefit, each having achieved at least six months of stable disease. To date, Part B of the study has enrolled 47 patients of up to a total of 120 patients with RCC, non-small cell lung cancer, bladder cancer, and head and neck squamous cell carcinoma. MRx0518 continues to be safe and well tolerated.

Phase I clinical trial: MRx0518 as a neoadjuvant monotherapy

We also have an ongoing Phase I clinical trial of MRx0518 as a neoadjuvant monotherapy in patients undergoing surgical resection of solid tumors, which is being conducted at Imperial College London. MRx0518 was dosed as a monotherapy for two to four weeks prior to resection. Changes in systemic immune and intratumoral biomarkers were analyzed to assess the effect of MRx0518 monotherapy on immune cell populations and gene expression over the dosing period. Initial results from Part A of this trial were announced in Q4 2020.

At the ESMO Congress 2021 we presented additional biomarker results from the patients enrolled in Part A of the study. The new data shows neoadjuvant MRx0518 treatment for just two to four weeks is associated with significant gene and metagene signature changes in solid tumors. Gene expression profiling of paired tumor samples pre- and post-MRx0518 monotherapy across multiple solid tumor types showed that treatment with MRx0518 was associated with increases in anti-tumor immune activity including antigen presentation, innate immune processes, and interferon response. Analysis of paired tumor samples pre- and post-treatment also identified significant increases in mast cells, Th1, CD8+ T cell, neutrophil, endothelial cell and inflammatory chemokine metagene signatures following MRx0518 monotherapy.

Effects were particularly pronounced in the cohort of breast cancer patients, with significant increases observed in total and activated dendritic cells, CD8+ T cells and cytotoxic cells in the tumor micro-environment. Functional metagene analysis also identified positive changes in prognostic indicators and metagene signatures predictive of response to immunotherapy in patients with breast cancer, including inflammatory chemokines, cytotoxicity, lymphoid scores, and the Tumor Inflammation Signature (TIS), an immune signature demonstrated to retrospectively predict clinical benefit of anti-PD-(L)1 ICI therapy efficacy in various cancer types.

The immune biomarker data from this study of MRx0518 as a monotherapy, dosed over a short period of just two to four weeks, demonstrates the potent activity of this oral Live Biotherapeutic directly on the human immune system and tumor microenvironment, and the positive implications for clinical outcomes. Additional analyses from this study are ongoing.

Oncology (continued)

Phase I clinical trial: MRx0518 as a neoadjuvant monotherapy in combination with radiotherapy

A third clinical trial of MRx0518 is ongoing in combination with hypofractionated radiotherapy for resectable pancreatic ductal adenocarcinoma (PDAC). This study is being conducted under our strategic collaboration with the University of Texas MD Anderson Cancer Center. This open-label, Phase I clinical trial will treat 15 potentially resectable pancreatic ductal adenocarcinoma (PDAC) patients for approximately six to nine weeks, before, during and after a course of hypofractionated radiation until resection. The clinical trial is evaluating the safety of MRx0518 with radiation and whether MRx0518 can elicit an immunogenic profile that may be beneficial in decreasing systemic failure and improving local control. Efficacy outcomes will include incidence of major pathologic response, tumor infiltrating lymphocytes, overall survival, progression-free survival, local control, distant control and margin status. The study will evaluate immune infiltrates and stromal cells within and near the tumor as well as evaluating circulating immune cells, tumor cells and tumor DNA. Study treatment has been well tolerated to date.

Recruitment has been impacted by COVID-19 and we expect to complete recruitment in 2022.

Phase II clinical trial: MRx0518 in combination with Bavencio® as a first-line maintenance therapy for locally advanced or metastatic urothelial carcinoma

In February 2021, the Company announced a clinical trial collaboration and supply agreement with Merck KGaA, Darmstadt, Germany, and Pfizer Inc. for Bavencio® (avelumab), the first and only immunotherapy approved as a first-line maintenance treatment for patients with locally advanced or metastatic urothelial carcinoma. Under the collaboration, 4D pharma is conducting a clinical trial to evaluate Bavencio® in combination with MRx0518 as a first-line maintenance therapy for patients with locally advanced or metastatic urothelial carcinoma that has not progressed with first-line platinum-containing chemotherapy. This study is expected to commence in 2022.

Continuing to expand our oncology pipeline

In addition to lead oncology candidate MRx0518, we have second generation oncology LBP candidates in preclinical development, such as MRx1299, which have differentiated mechanisms of action to MRx0518 that may be suitable for the treatment of additional tumor types.

MRx1299 is a strain of *Megasphaera massiliensis*. In July 2021, we and our collaborators at the Philipps-University Marburg, Germany, and Universitätsklinikum Würzburg, Germany, published preclinical research relating to MRx1299 improving the activity of CAR-T. The research, published in *Nature Communications* demonstrates the ability of *Megasphaera massiliensis* or its short chain fatty acid (SCFA) metabolite pentanoate to enhance the anti-tumor activity of cytotoxic T lymphocytes (CTL) and chimeric antigen receptor T cell (CAR-T) therapies in animal models of cancer, resulting in better tumor clearance. 4D pharma identified *M. massiliensis* MRx1299 using its MicroRx® platform and previously showed MRx1299 to have specific histone deacetylase (HDAC) inhibitory activity and be a rare prolific producer of pentanoate. We continue to evaluate MRx1299 preclinically to further demonstrate its anti-tumor therapeutic activity and investigate its anti-cancer mechanism of action.

The new preclinical data for a novel oncology LBP demonstrates not only the importance of Live Biotherapeutics as a new modality potentially able to revolutionize the treatment of a wide range of cancers, but also the power of our MicroRx® platform to continue making significant discoveries and advances in this field.

Irritable bowel syndrome (IBS)

4D pharma's most advanced therapeutic candidate is Blautix® (MRx1234), and single strain Live Biotherapeutic which has demonstrated a placebo-like safety profile and unique activity in two major subtypes of irritable bowel syndrome (IBS), constipation-predominant (IBS-C) and diarrhea-predominant (IBS-D), in a Phase II clinical trial.

Phase II clinical trial: Blautix® for irritable bowel syndrome with diarrhea (IBS-D) or with constipation (IBS-C)

In Q4 2020 we completed a Phase II clinical trial investigating the efficacy of Blautix® in the treatment of irritable bowel syndrome (IBS). The primary efficacy endpoint of the trial was based on whether or not a subject, from either the IBS-C or IBS-D cohorts, was considered an overall responder. For a subject to be classed as an 'overall responder' they must have reported an improvement in their weekly (cohort specific) symptoms (abdominal pain intensity and stool frequency or consistency) for ≥50% of the treatment period. In addition, secondary endpoints included the proportion of 'abdominal pain intensity responders', proportion of 'stool frequency responders' in the IBS-C cohort or the proportion of 'stool consistency responders' in the IBS-D cohort.

Topline results first announced in late 2020 showed Blautix® achieved a statistically significant increase in overall response in the pre-planned analysis of the combined IBS-C/D group compared to placebo, and a positive, though non-significant, increase in overall response in both IBS-C and IBS-D cohorts individually.

In May 2021, we presented additional positive data from the Phase II study at Digestive Disease Week (DDW). Further analysis of the clinical data revealed particularly strong efficacy in the key symptom of bowel habit, a potential approvable primary endpoint per FDA guidelines, which was statistically significant in IBS-D (Blautix® 62.0% vs placebo 47.4%, p=0.042), and nearing significance in IBS-C (Blautix® 53.8% vs placebo 39.3%, p=0.054). Post-hoc analysis of the data by geographical region shows that earlier topline results were impacted by an unusually high placebo response in patients in the UK and Ireland, and enhanced positive signals were seen in the larger US population.

In addition, in December 2021, we presented new fecal microbiome analyses from the Phase II trial at Gastro 2021. Treatment with Blautix® led to structural changes in the gut microbiota of patients with IBS-C and IBS-D. These changes did not occur in placebo treatment groups. Blautix® treatment led to greater increases in interconnectivity between taxa than in the placebo-treated group, also in both IBS-C and IBS-D cohorts. Blautix® (*Blautia hydrogenotrophica*) was associated with a subnetwork of multiple taxa showing high connectivity and ultimately impacting the overall microbiome structure, also in both IBS-C and IBS-D patients. The additional microbiome analyses represent an interesting and important finding, coupled with the positive clinical outcomes further establishing the mechanisms through which Blautix® exerts its beneficial effects in both IBS-C and IBS-D. The results show that administration of a single strain Live Biotherapeutic can have significant positive effects on the composition and structure of the microbiome in these patients.

Irritable bowel syndrome (IBS) (continued)

Phase II clinical trial: Blautix® for irritable bowel syndrome with diarrhea (IBS-D) or with constipation (IBS-C) (continued)

The trial was intended as a signal finding Phase II study, to generate a signal of activity in both IBS-C and IBS-D and generate the clinical data to inform the design of a Phase III pivotal program towards registration. We believe the Phase II results provide a strong foundation for the continued development of Blautix® as the first therapeutic with the potential to treat all major subtypes of IBS. The Phase II data forms the basis of regulatory engagement around the design of a potential Phase III pivotal trial.

Respiratory disease

MicroRx® enabled the discovery of MRx-4DP0004, a Live Biotherapeutic candidate with unique effects on inflammation, particularly in the lungs. MRx-4DP0004 demonstrates an ability to address both neutrophilic and eosinophilic lung inflammation concurrently.

Phase I/II clinical trial: MRx-4DP0004 for partly controlled asthma

MRx-4DP0004 is in an ongoing Phase I/II first-in-human, multi-center, double-blind, placebo-controlled two-part clinical trial in patients with partly controlled asthma, as an add-on therapy to their long-term maintenance asthma medication of inhaled corticosteroid with or without long-acting beta agonist. The trial assesses the safety and tolerability of MRx-4DP0004, in addition to clinical endpoints relating to asthma control, quality of life, lung function, and exacerbations, in addition to a wide panel of host and microbiome biomarkers that will contribute to developing our mechanistic understanding of the candidate in patients. The trial is being conducted in two parts. The primary endpoint of Part A was to evaluate the safety and tolerability of MRx-4DP0004, with secondary endpoints to evaluate clinical activity and inform Part B.

In December 2021 we announced positive topline results from Part A of the clinical trial, and in January 2022 reported additional details of these results. Part A met the primary endpoint, the safety and tolerability profile of MRx-4DP0004 was comparable to placebo and no serious adverse events (SAEs) related to treatment were reported. In addition, MRx-4DP0004 generated encouraging signals of clinical activity in a number of key secondary endpoints of efficacy, which support progression into Part B of the study. At the end of treatment, 83.3% of patients receiving MRx-4DP0004 experienced reductions in ACQ-6 score, compared to 56.3% in the placebo arm. Moreover, at the end of treatment, 50.0% of patients receiving MRx-4DP0004 experienced reductions from baseline in ACQ-6 scores of 0.5 or more, compared to 37.5% in the placebo arm. In addition, at the end of treatment, 50.0% of patients receiving MRx-4DP0004 reduced their use of SABA, compared to 18.8% of patients receiving placebo. Overreliance on SABA rescue medication is associated with a greater risk of exacerbations, hospitalizations and mortality, and reduced SABA use is a key indicator of improved asthma control. 50.0% of patients receiving MRx-4DP0004 experienced a clinically meaningful increase in Asthma Quality of Life Questionnaire (AQLQ) scores of ≥0.5 at the end of treatment, compared to 31.3% receiving placebo. MRx-4DP0004-treated patients' quality of life continued to improve over the treatment period. Mean measures of lung function including forced expiratory volume in the first second (FEV1, percentage of predicted), peak expiratory flow (PEF), and ratio of FEV1 to forced vital capacity (FEV1/FVC) for both MRx-4DP0004 and placebo treatment arms generally remained within normal ranges from baseline to end of treatment. One of 18 patients (5.6%) randomized to MRx-4DP0004 experienced an asthma exacerbation, compared to two of 16 patients (12.5%) randomized to placebo.

To our knowledge, this is the world's first positive clinical data for a single strain Live Biotherapeutic for the treatment of asthma. Part B of the trial will enroll up to 90 patients and will assess clinical efficacy in addition to exploratory immune and microbiome biomarkers. The proportion of patients with reductions in ACQ-6 score at the end of treatment will be the primary endpoint for Part B of the Phase I/II trial.

Nasdaq listing

On 22 March 2021, our previously announced proposed merger with Longevity Acquisition Corp., a special purpose acquisition company (SPAC) completed, and the listing of 4D pharma American Depositary Shares (ADSs) on Nasdaq became effective under the ticker 'LBPS' and the related warrants began trading under the ticker 'LBPSW' the following day. As a result of the combination with Longevity, the Company benefitted from $14.8 million in gross cash held by Longevity ($11.6 million or £ 8.4 million net). In addition, 4D pharma could also benefit from the proceeds of Longevity warrants which have now been converted to purchase shares in the Company. Details of the final transaction are included in note 13.

Also in March 2021, we completed a private placement of new ordinary shares with US institutional investors, accredited investors and Merck Sharp and Dohme Corp raising approximately £18.01 million ($25.03 million) in gross proceeds (approximately £16.9 million net of fees) with a further £1.44 million ($2.0 million) as subscriptions from Duncan Peyton (CEO) and Dr. Alex Stevenson (CSO).

Credit facility with Oxford Finance

In July 2021 we announced the closing of a senior secured credit facility for up to $30 million with Oxford Finance LLC, a specialty finance firm that provides senior debt to life sciences and healthcare services companies. The credit facility provides access to additional capital strengthening the Company's financial position and increasing our financial flexibility. This financing provides 4D pharma with up to $30 million of cash in three tranches: an initial tranche of $12.5 million at closing, with the remaining $7.5 million and $10 million tranches dependent on the achievement of certain milestones. The facility will require 4D pharma to make monthly interest-only payments through to 1 September 2023, or, subject to the achievement of development milestones, 1 September 2024. 4D pharma has also granted Oxford Finance a warrant, exercisable for five years from 29 July 2021, to subscribe for 212,568 new ordinary shares in the Company at $1.18 per share. Further warrants will be granted to Oxford Finance as further tranches are drawn down.

Future outlook

With net proceeds from the Longevity merger completed in March 2021, the fundraise completed in March 2021, the overdraft facility in Spain, and the first tranche of the credit facility with Oxford Finance announced in July 2021, 4D pharma is funded to Q4 2022, providing the Company sufficient balance sheet strength and runway to deliver on a number of our short- to medium-term clinical and strategic goals.

The Directors have prepared detailed financial forecasts and cash flows looking beyond 12 months from the date of the approval of these financial statements. In developing these forecasts, the Directors have made assumptions based upon their view of the current and future economic conditions that are expected to prevail over the forecast period and believe that the current cash position of the Group will be sufficient to support the Group into quarter four of 2022. The Directors are continuing to explore sources of finance available to the Group and have a reasonable expectation that they will be able to secure sufficient cash inflows into the Group to continue its activities for not less than 12 months from the date of approval of these accounts. They have therefore prepared the financial statements on a going concern basis.

Because the additional finance is not committed at the date of approval of these financial statements, these circumstances represent a material uncertainty as to the Group's ability to continue as a going concern. Should the Group be unable to obtain further finance such that the going concern basis of preparation were no longer appropriate, adjustments would be required including to reduce the balance sheet values of assets to their recoverable amounts, and to provide for future liabilities that may arise.

A report on energy consumption and related emissions is included on pages 52 to 53.

Prof. Axel Glasmacher
Non-Executive Chairperson
31 March 2022

Duncan Peyton
Chief Executive Officer
31 March 2022

Key performance indicators

We track a series of metrics focused primarily on science and product development whilst ensuring that the business maintains both sufficient resources and effective allocation of those resources to achieve our strategic goals. The Board and management of 4D pharma monitor the following metrics as an indicator of how we are progressing towards the goal of advancing our Live Biotherapeutic programs:

1. **Clinical trials initiated by phase** – Clinical trials are essential in converting the productivity and potential of our MicroRx® platform and early-stage research into long-term value. Prior to 2019, we had initiated two Phase I clinical studies and one Phase II study. During 2019 we initiated three clinical studies, including one Phase I study in oncology and two Phase I/II studies, in oncology and asthma. In 2020 we commenced two new clinical trials, of which one was Phase I and one was Phase II. No new clinical studies were initiated in the year ended 31 December 2021.

2. **Successful clinical trials** – We are a drug development company and will realize long-term value by successfully progressing its candidates through the clinic to registration and approval. Prior to 2019 we had completed two Phase I clinical trials. No studies were completed in 2019. During 2020, we completed a Phase II trial in IBS, Part A of the Phase I/II clinical study of MRx0518 with Keytruda® in oncology, and Part A of a Phase I trial of MRx0518 as a neoadjuvant monotherapy in oncology. The two studies of MRx0518 remain ongoing. For the year ended 31 December 2021, Part A of a Phase I/II trial in asthma was completed and this study remains ongoing.

3. **Strategic collaborations** – Collaborations enable us to realize the potential of our platform, leveraging the complementary expertise of our partners. Prior to 2019 we had entered into one strategic collaboration, a clinical collaboration with MSD to evaluate MRx0518 in combination with Keytruda®, an anti-PD-1 ICI marketed by MSD, in patients with metastatic solid tumors that are refractory to prior anti-PD-1/PD-L1 therapy. In 2019 we added two new collaborations, a strategic collaboration with the University of Texas MD Anderson Cancer Center to evaluate 4D pharma's Live Biotherapeutic oncology pipeline across a range of cancer settings, and a research collaboration and option to license agreement with MSD to discover and develop vaccines derived from our proprietary gut microbiome-derived commensal bacteria selected from our culture collection for use in up to three indications, combining our MicroRx® platform with MSD's world-leading expertise in vaccine development. In 2020 we became an industry partner of the Parkinson's Progression Markers Initiative (PPMI), a longitudinal study sponsored by The Michael J. Fox Foundation for Parkinson's Research to better understand Parkinson's disease and accelerate the development of new treatments. In the year ended 31 December 2021 we initiated two collaborations. In February 2021 we announced a clinical trial collaboration and supply agreement with Merck KGaA, Darmstadt, Germany, and Pfizer Inc. for Bavencio® (avelumab), under which we are initiating a clinical trial to evaluate Bavencio® in combination with MRx0518 as a first-line maintenance therapy for patients with locally advanced or metastatic urothelial carcinoma that has not progressed with first-line platinum-containing chemotherapy. In April 2021 we announced a collaboration with Parkinson's UK, a non-profit organization focused on advancing the understanding of Parkinson's disease and improving treatments, to establish a Patient Advisory Board (PAB) comprised of people living with Parkinson's. Supported by Parkinson's UK, the PAB provides valuable patient-centric perspective to 4D pharma as we continue to advance novel Live Biotherapeutics into the clinic to treat neurodegenerative conditions such as Parkinson's, as well as raising awareness of the issues people with Parkinson's face with current treatment options.

4. **Intellectual property portfolio** – Intellectual property is essential to our strategy and capturing the value of our world-leading research output. We have continued to invest significantly in expanding our intellectual property rights, and by 31 December 2021, had initiated 69 patent families including over 1,000 granted patents providing coverage for our pipeline and clinical-stage candidates, manufacturing innovations and novel diagnostic approaches across major global markets. This is a 3.0% increase over the 67 patent families initiated as of the year ended 31 December 2020.

5. **Cash and equivalents** – We continue to invest capital from our shareholders and partners into supporting research and clinical development programs, to generate the critical data to advance this novel modality. See the 'Liquidity and Capital Resources' section below for additional information.

6. **Research and development spend** – Investment in research and development (R&D) is central to our progress and returning long-term value. Our unique approach allows rapid translation from bench to bedside. For the year ended 31 December 2021, our R&D spend was £19.8 million compared to £22.0 million for the year ended 31 December 2020. Whilst we still maintain our strategy to invest in our clinical development programs on a long-term basis, the decrease reflects both the periodic nature of expenditure on clinical trials and the effects which COVID-19 has had on both patient recruitment and management's resulting actions to reduce costs.

Comparison of the year ended 31 December 2021 to the year ended 31 December 2020

Operating expenses

We recognize operating expenses as they are incurred in two general categories; general and administrative expenses, and research and development expenses. Our operating expenses also include non-cash components related to depreciation and amortization of property and equipment, intangibles, and stock-based compensation, which are allocated, as appropriate, to general and administrative expenses and research and development expenses.

General and administrative expenses consist of salaries and related expenses for executive, legal, finance and administrative personnel, as well as professional fees, insurance costs, and other general corporate expenses. Management expects general and administrative expenses to increase in future periods as we add personnel and incur additional expenses related to an expansion of our research and development activities and our operation as a public company listed on two markets, including higher legal, accounting, insurance, compliance, compensation and other expenses.

Patent spend has increased slightly since 2020, increasing by £0.1 million, as we continued to add to our significant patent portfolio whilst also reducing the incremental costs to do so.

Staff costs remained relatively consistent in 2021 and 2020. The remaining effects of the staff cost cutting exercise implemented by management during the COVID-19 pandemic reduced average staff numbers and overall payroll costs by £0.3 million though this was offset by additional costs associated with the share options scheme implemented in the year.

Comparison of the year ended 31 December 2021 to the year ended 31 December 2020 (continued)

Operating expenses (continued)

Our research and development expenses consist primarily of salaries and related personnel expenses, contractual commitments, depreciation and amortization, patent costs and other expenses. We charge research and development expenses to operations as they are incurred. Costs are not directly tied to a specific product candidate until such product candidate reaches the clinical trial stage. Product candidates often have more than one associated clinical trial related to different therapeutic areas or clinical indications. Once a product candidate enters a clinical trial, we track costs of such clinical trial but do not track other costs associated with specific clinical indications which are pooled.

The following table discloses the breakdown of research and development expenses:

	31 December 2021 £000	31 December 2020 £000
Contractual commitments including short-term rentals	**5,758**	9,346
Staff costs	**4,388**	4,522
Depreciation and amortization	**745**	922
Patent costs	**4,087**	3,950
Other MRx research costs	**2,804**	2,346
Other MDx research costs	**—**	61
Other manufacturing, research and development costs	**2,036**	894
Total	**19,818**	22,041

Over the last year we have continued to lead the development of Live Biotherapeutics, further expanding our clinical development activities – generating clinical data in multiple indications while launching new trials. Meanwhile, we continued to progress promising new LBP candidates in exciting new areas like Parkinson's disease. While we continue to rapidly progress our proprietary development candidates into and through the clinic, we are also leveraging the MicroRx® platform to generate value through partnerships, such as our research collaboration with MSD in the vaccines space which serves as an example of the potential of the platform and provides a valuable endorsement from an industry-leading partner.

In 2021 we continued to make good progress across our clinical-stage pipeline, with new clinical readouts as well as clinical biomarker data to further develop our understanding of the mechanisms of action of our Live Biotherapeutics.

After successfully completing Part A of the ongoing Phase I/II study of MRx0518 with Keytruda® in patients with RCC or NSCLC refractory to prior ICI therapy, in February we announced the first signals of anti-tumor activity for the combination in bladder cancer in Part B. In addition, we presented biomarker data from this study at ESMO 2021 which identified tumor biomarkers at baseline which were associated with clinical benefit in patients treated with the combination of MRx0518 and Keytruda® compared to patients who experienced progressive disease. At ESMO we also presented further data from another study of MRx0518, as a neoadjuvant monotherapy for solid tumors, showing that MRx0518 treatment for just two to four weeks was associated with significant gene and metagene signature changes in solid tumors associated with increases in anti-tumor immune activity. Furthermore, in February the Company announced a second clinical trial collaboration involving MRx0518, with Merck KGaA, Darmstadt, Germany, and Pfizer Inc. for Bavencio® (avelumab), the first and only immunotherapy approved as a first-line maintenance treatment for patients with locally advanced or metastatic urothelial carcinoma. Under the collaboration, 4D pharma is conducting a clinical trial to evaluate Bavencio® in combination with MRx0518 as a first-line maintenance therapy for patients with locally advanced or metastatic urothelial carcinoma that has not progressed with first-line platinum-containing chemotherapy. This study is expected to commence in 2022.

Beyond oncology, in December 2021 we announced positive topline results from Part A of the clinical trial. Part A met the primary endpoint, the safety and tolerability profile of MRx-4DP0004 was comparable to placebo and no serious adverse events (SAEs) related to treatment were reported. In addition, MRx-4DP0004 generated encouraging signals of clinical activity in a number of key secondary endpoints of efficacy, which support progression into Part B of the study.

Following positive topline results for the Blautix® Phase II trial in IBS-C and IBS-D first announced in late 2020, in May 2021 we presented additional positive data from the Phase II study at Digestive Disease Week (DDW). Further analysis of the clinical data revealed particularly strong efficacy in the key symptom of bowel habit, a potential approvable primary endpoint per FDA guidelines, which was statistically significant in IBS-D (Blautix® 62.0% vs placebo 47.4%, p=0.042), and nearing significance in IBS-C (Blautix® 53.8% vs placebo 39.3%, p=0.054). Post-hoc analysis of the data by geographical region shows that earlier topline results were impacted by an unusually high placebo response in patients in the UK and Ireland, and enhanced positive signals were seen in the larger US population. In addition, in December 2021, we presented new fecal microbiome analyses from the Phase II trial at Gastro 2021. Treatment with Blautix® led to structural changes in the gut microbiota of patients with IBS-C or IBS-D. These changes did not occur in placebo treatment groups.

The completion of the Blautix® trial in the early part of 2020 resulted in reduced comparable costs in 2021. These were partly offset by the uptick in patient recruitment as the effects of COVID-19 started to ease in 2021, helping to accelerate commitments on the Asthma (MRx-4DP0004) and Cancer (MRx0518) reducing overall contractual commitments from £9.3 million in 2020 to £5.8 million in 2021, a decrease of £3.5 million. The easing of COVID-19 related restrictions during 2021, which had resulted in management scaling back costs and operations in 2020, allowed an element of operational normalization during 2021, albeit at a reduced starting cost base in some areas. Staff costs in 2021 remained lower than the previous year by £0.1 million due to reduced average staffing levels established in the previous year. A lack of further investment in new assets reduced depreciation and amortization by £0.2 million. Investment in our MicroRx platform increased as we manufactured product for the Asthma trial in 2021 but we were able to offset some costs against annual supplier cost reductions negotiated during COVID-19 which reduced our trial costs for MRx0518. Overall these elements generated an increase from £2.4 million in 2020 to £2.8 million in 2021, an increase in costs of £0.4 million. Manufacturing, research and development costs increased by £1.1 million between 2020 and 2021 as we invested in developing the manufacturing process for our Parkinson's drugs MRx0005 and MRx0029.

Comparison of the year ended 31 December 2021 to the year ended 31 December 2020 (continued)

Results of operations

Details of the Group's results of operations are included in the Group statement of total comprehensive income on page 62.

Revenues

We have not generated commercial revenues from product sales. To date, we have generated revenues from the collaboration agreement with MSD. Our revenues from our MSD collaboration agreement totaled £0.5 million and £0.5 million for the years ended 31 December 2021 and 2020, respectively. There were no other revenues for the years ended 31 December 2021 and 2020.

Research and development costs

Our research and development costs totaled £19.8 million for the year ended 31 December 2021, representing a decrease of £2.2 million, or 10.0% on the £22.0 million for the year ended 31 December 2020. The opening up of testing centers allowed the completion of Part A of the Asthma trial in 2021. This resulted in cost increasing by £2.8 million to £4.1 million for the year to 31 December 2021 with the comparative being the £1.4 million to set up the trial in the year to 31 December 2020. While there were supplier savings of £0.4 million overall on MRx0518 in the year, the single biggest component in the overall cost reduction between 2021 and 2020 related to the completion of the main components of the Blautix® Phase II clinical trial in 2020 such that comparable annual costs fell by £4.9 million from £6.0 million to £1.1 million. A net balance of £0.3 million of increased costs arose over the equivalent expenditure in 2020 through a mixture of savings and additional costs across staff, contractual commitments and manufacturing, research and development costs.

Administrative expenses

Our administrative expenses totaled £7.3 million for the year ended 31 December 2021, representing an increase of £1.3 million, or 21.7%, compared to £6.0 million for the year ended 31 December 2020. The single largest component of the change being attributable to increased insurance costs from £0.1 million to £1.3 million, an increase of £1.2 million in recognition of the difficult insurance environment for newly listed entities and the increase in potential claims. While payroll costs went down overall, total staff remuneration costs increased by £0.1 million in recognition of the costs associated with the share option scheme. An additional £0.2 million was incurred in 2021 when compared to 2020 as a result of our increase in expenditure on public and investor outreach to cover both markets. Other administrative expenses movements then accounted for the remaining £0.2 million decrease.

Foreign currency gains

For foreign currency transactions included in the statement of total comprehensive income, the exchange rates applicable to the relevant transaction dates are used. Transaction gains or losses arising from changes in the exchange rates used in the translation of such balances are included in operating losses. We recognized foreign currency gains of £0.4 million for both the year ended 31 December 2021 and the year ended 31 December 2020.

Other income

Other income consists of government grants income for a specific research project and there was a small decrease arising from lower grant-based research activity over the prior year.

Operating loss before non-recurring items

As a result of the foregoing, our operating loss before non-recurring items totaled £26.1 million for the year ended 31 December 2021, representing a decrease of £1.0 million, or 3.6%, compared to £27.1 million for the year ended 31 December 2020.

Non-recurring costs

Non-recurring costs include non-cash fair value adjustments associated with the initial costs from the merger with Longevity Acquisition Corporation and the issue of new warrants. The merger with Longevity and subsequent listing on Nasdaq represented a significant milestone in the Company's history and sets the platform for future growth. In completing the transaction, the Company recognized significant fair value adjustments on warrants and the issue of shares (as detailed in note 6) equating to £44.3 million. In addition to the merger with Longevity, warrants with a fair value of £0.1 million were issued to Oxford Finance S.A.R.L. in association with us drawing down the first $12.5 million of a loan facility for up to $30 million (depending on meeting covenants and other criteria) that we set up with them in July 2021. There were no directly comparable transactions during 2020. However, £3.1 million was included from the fair value adjustment on issue of warrants associated with the February equity fundraise of that year.

Finance income and expense

Interest income consists of interest earned on our short-term investments. Reductions in finance income over time have been attributable to the reduction in short-term investment interest. Finance expense increased from £0.2 million at 31 December 2020 to £0.6 million at 31 December 2021 (an increase of £0.4 million or 200%). This increase occurred as a result of interest payments arising from the new loan facility.

Comparison of the year ended 31 December 2021 to the year ended 31 December 2020 (continued)

Fair value adjustment on warrants and units

During the year the Company assumed warrants and units as part of the Longevity transaction and on the drawdown of the first tranche of the Oxford loan. Unlike the warrants issued in February 2020 which are exercisable in GBP, these new warrants were either exercisable in USD, whilst the functional currency of the Company is GBP, or they contained other clauses or factors which meant that they do not meet the 'Fixed for Fixed' criteria outlined under IAS 32. As they are not issued on a 'Fixed for Fixed' basis they should be recorded as financial liabilities with their fair value recognized at each reporting date and any gains or losses being taken to the Income Statement. Between the date they were assumed (or issued) and the year end, both the Company share price and the life of the financial liabilities has decreased. Having recognized the initial fair value at inception in non-recurring costs, this widening of the gap between the exercise price and current share price, in combination with the shortening of the life over which they can be exercised, led to an overall reduction in their assessment of fair value which resulted in a reported gain of £13.6 million for the year to 31 December 2021. There were no comparative transactions in the year to 31 December 2020.

Taxation

Taxation consists of UK, Irish and Spanish research and development tax credits, deferred tax movements and US tax. Research and development tax credits are based on a portion of our research and development expenses. Taxation was £3.5 million for the year ended 31 December 2021, representing a decrease of £0.9 million, or 20.5%, compared to £4.4 million for the year ended 31 December 2020. The decrease relates to the release of deferred tax liabilities of £0.9 million in 2020 for which there is no comparative figure in 2021.

Net loss

As a result of the foregoing, our net loss was £54.0 million for the year ended 31 December 2021, representing an increase of £28.0million, or 107.7%, compared to £26.0 million for the year ended 31 December 2020.

Exchange differences on translating foreign operations

Exchange differences on translating foreign operations arise on consolidation. Exchange differences on translating foreign operations provided reported expenditure of £0.7 million for the year ended 31 December 2021 representing a decrease of £0.8 million on the £0.1 million gain for the year ended 31 December 2020.

Loss for the year and total comprehensive income for the year

The loss and comprehensive income for the year ended 31 December 2021 was £54.7 million, an increase of £28.8 million or 111.2% over the £25.9 million for the year to 31 December 2020.

Liquidity and capital resources

Overview

Since our inception through to 31 December 2021, the majority of the funding for our operations has come from the issuing of ordinary shares. Additional historical and current income has come from research and development tax credits and historically in the form of the MSD collaboration agreement. However, in 2021 we also added a loan facility from Oxford Finance which has added to the cash total for the current year. As of 31 December 2021, we had £15.5 million in cash and cash equivalents.

The table below presents our cash flows for the periods indicated:

	31 December 2021 £000	31 December 2020 £000
Cash used in operating activities	**(25,082)**	(22,673)
Cash used in investing activities	**(203)**	(178)
Cash provided by financing activities	**32,007**	27,790
Net increase in cash and cash equivalents	**6,722**	4,939

Operating activities

Net cash used in operating activities of £25.1 million during the year ended 31 December 2021 was primarily related to £10.5 million for clinical trials and research including other third-party expenses and an aggregate of £5.3 million in salary and other staff costs; a further £4.1 million is attributable to patent spend and £5.4 million to other administrative expense. These expenses were offset by the receipt of £0.2 million in research and development tax credits as the cash related to the 2020 tax credits was received after the year end reducing the quantum for the year. Net cash used in operating activities of £22.7 million during the year ended 31 December 2020 was primarily related to £14.2 million for clinical trials and research including other third-party expenses and an aggregate of £5.6 million in salary and other staff costs; a further £4.0 million is attributable to patent spend and £4.2 million to administrative expenses. These expenses were offset by the £5.3 million in research and development tax credits.

Investing activities

Net cash used in investing activities of £0.2 million for both 31 December 2021 and 31 December 2020 was utilized in the purchases of property and equipment and software.

Liquidity and capital resourced (continued)

Financing activities

Net cash provided by financing activities of £32.0 million during the year to 31 December 2021 represents an increase of £4.2 million on the £27.8 million for the year ended 31 December 2020. The main components of the variance relate to income from the issue of ordinary shares, where net income decreased by £10.1 million from £28.1 million at 31 December 2020 to £18.0 million, the merger with Longevity resulting in net income of £5.6 million and the net income from the Oxford Finance loan of £8.7 million. The balance of financing activities is made up by interest expenses on leases of £0.3 million for the year to 31 December 2021 whereas lease expenses equated to £0.4 million in the year to 31 December 2020.

On 22 March 2021 the Company concluded a private placement for the issue of ordinary shares and, in a separate transaction, completed the merger with Longevity Acquisition Corporation, facilitating our Nasdaq listing. In connection with the merger with Longevity the Company issued 31.0 million ordinary shares and accessed the $14.8 million in cash which Longevity had on its balance sheet at that point; after settling liabilities and transaction costs and adjusting to GBP, this equated to net cash income of £5.6 million. In connection with the transaction, we also assumed:

- 4.0 million public warrants with an exercise price of $11.50, which, if fully exercised, would convert to 15.1 million ordinary shares. The warrants are immediately exercisable and publicly traded, include a redemption threshold price of $18.00, include cashless exercise features and expire five years from issue;
- 0.3 million private warrants with an exercise price of $11.50, which, if fully exercised, would convert to 1.2 million ordinary shares. The warrants are immediately exercisable, convert to public warrants if transferred, include cashless exercise features and expire five years from issue;
- 7.5 million backstop warrants issued on a 1:1 basis for ordinary shares and with an exercise price of £0.0025; backstop warrants are only exercisable in direct proportion to the 4.3 million public and private warrants exercised in the prior month, expire 60 days after they become exercisable and include cashless exercise features; and
- 0.2 million representative units with an exercise price of $11.50 per unit; each unit converts to 8.28465 ordinary shares and a private warrant exercisable for $11.50. If both the units and associated warrants were fully exercised, they would convert to 2.9 million ordinary shares. The representative units are immediately exercisable and expire in August 2023. If exercised the warrants included in the representative units carry all the same terms and conditions as the existing public warrants.

No warrants or units related to the transaction were exercised during the year to 30 December 2021.

The private placing, which also occurred on 22 March 2021, generated £18.0 million in gross proceeds (£16.6 million net of costs) through the issue of 16.4 million ordinary shares at a price of £1.10 per share.

On 16 April 2021, Directors who were not able to participate in the private placing acquired 1.3 million ordinary shares at a price of £1.10 adding a further £1.4 million of cash inflow.

To reduce reliance on the issue of equity and fund the Company through a number of clinical milestones, on 29 July 2021, the Company established a loan agreement for up to $30 million USD with Oxford Finance S.A.R.L. On the date of the agreement, the Company drew down the first tranche for $12.5 million USD or £9.0 million GBP, creating a cash inflow and associated liability. The agreement includes a second tranche for $7.5 million, based on certain milestones which need to be achieved by 31 June 2022, and a third tranche for $10 million, subject to mutual agreement. At 31 December 2021 the Company had either not qualified for nor requested drawdown of the second or third tranche. Interest is charged on the loan balance at a rate of 8.15% plus the greater of 0.1% and the 30-day US LIBOR rate throughout the term such that the Company has recorded an interest expense of £0.3 million in the year to 31 December 2021. The facility also includes a provision for the issue of 2% of amounts drawn down in warrants and 0.2 million warrants were issued on a 1:1 basis for ordinary shares and an exercise price of $1.18 per warrant. No warrants had been exercised at the year end. The loan agreement also includes various customary restrictive covenants which prevent the Company from performing certain functions that could affect the recovery of the loan and which require the Company to maintain a cash balance of at least $7.5 million should certain combinations of equity issue and partnering transactions fail to produce receipts of at least $45.0 million before 1 April 2022.

The loan facility includes restrictive covenants that limit the Group's ability to undertake certain functions that may affect recoverability and include a clause that requires the Group to always maintain a cash balance of $7.5 million if it does not generate at least $45 million of income through the issue of shares and partnering arrangements before 1 April 2022. These transactions are not included in the financial statements as they did not include a constructive obligation on 31 December 2021.

The restrictive covenants may have a significant effect on our current and future business by limiting the availability of cash provided by the loan, or by limiting our ability to perform certain transactions. It is not unreasonable that this could have a short or longer-term effect on our financial condition, changes in financial condition, expenses, results of operations, liquidity, capital expenditures or capital resources in a manner that is material to investors.

Lease and associated interest payment amounted to £0.3 million for the year to 31 December 2021, representing a reduction of £0.1 million on the £0.4 million of costs in 2020 as certain short-term leases expired and were not renewed.

In July 2020, the Company completed the issue of 21.9 million ordinary shares at £0.35 per share for a total of approximately £7.7 million or £7.1 million net of transaction costs.

In February 2020, the Company completed the issue of 44 million ordinary shares at £0.50 per share for a total of £22.0 million or £20.9 million net of transaction costs (which included warrant costs). Warrants were also issued on the basis of one warrant for every two shares acquired. Warrants have an exercise price of £1.00 per share, are immediately exercisable and expire five years from issuance and £0.1 million of warrants have been redeemed to date.

Current outlook

We have financed our operations to date primarily through proceeds from issuing our ordinary shares. We have incurred losses and generated negative cash flows from operations since inception. To date we have not generated significant revenue, and we do not expect to generate significant revenues from the sale of our product candidates in the near future. In order to capture the potential of the platform and maximize value creation, we are actively pursuing additional research collaborations, pairing our expertise in LBP discovery and development and access to our library of well characterized bacterial isolates with the disease-specific expertise of partners. The amounts that we actually spend for any specific purpose may vary significantly and will depend on a number of factors, including, but not limited to, our research and development activities and programs, clinical testing, regulatory approval, market conditions, and changes in or revisions to our business strategy and technology development plans. Investors will be relying on the judgement of our management regarding the application of the proceeds from the sale of our ordinary shares.

As of 31 December 2021, our cash and cash equivalents were £15.5 million. After the year end, but before the signing of these financial statements, the Group received research and development tax credits of £3.2 million on its UK entities. Excluding possible income from warrants, we believe that this additional cash the Spanish loan facility, along with existing cash and cash equivalents but before restrictive covenants on the Oxford loan are sufficient to fund our projected operating requirements until the fourth quarter of 2022. The Directors are continuing to explore sources of finance that are available to the Group and have a reasonable expectation that they will be able to secure sufficient cash inflows into the Group to continue its activities for not less than twelve months from the date of approval of these accounts. However, because the additional finance is not committed at the date of approval of these financial statements, these circumstances represent a material uncertainty as to the Group's ability to continue as a going concern. Should the Group be unable to obtain further finance such that the going concern basis of preparation were no longer appropriate, adjustments would be required including to reduce the balance sheet values of assets to their recoverable amounts, and to provide for future liabilities that may arise.

We currently anticipate that we will require approximately £20.4 million for research and development activities over the course of the next 18 months based on the execution of existing programs but also dependent on exchange rates. We also anticipate that we will require approximately £13.7 million for general and administrative costs over such 18-month period, which consists primarily of expenditures for staff costs, legal and other professional fees and other administrative expenses. We also anticipate receiving approximately £7.2 million in cash for research and development tax credit refunds over this 18-month period and to make around £1.7 million on payments towards loans and interest during this period.

In addition, our operating plans may change as a result of many factors that may currently be unknown to us, and we may need to seek additional funds sooner than planned. Our future capital requirements will depend on many factors, including:

- the continued uncertain effects of the COVID-19 pandemic and its impact on our planned clinical trials, operations and financial condition;
- the progress and costs of our preclinical studies, clinical trials and other research and development activities;
- the scope, prioritization and number of our clinical trials and other research and development programs;
- any cost that we may incur under in and out-licensing arrangements relating to our therapeutic candidates that we may enter into in the future;
- the costs and timing of obtaining regulatory approval for our therapeutic candidates;
- the costs of filing, prosecuting, enforcing and defending patent claims and other intellectual property rights;
- the costs of scaling our manufacturing capabilities for production of sufficient clinical and commercial quantities of our therapeutic candidates;
- the potential costs of contracting with third parties to provide marketing and distribution services for us or for building such capacities internally;
- the costs of acquiring or undertaking the development and commercialization efforts for additional, future therapeutic applications of our product candidates and the magnitude of our general and administrative expenses;
- the timing of payment and changes to tax regimes related to our research and development tax credits;
- changes in the value and taxable position of our warrants and units;
- the costs of operating as a public company in multiple jurisdictions; and
- adverse trial results that would invalidate further investment in a product or products.

Principal commitments

Leased facilities

We have two real estate leases classified as right-of-use operating leases, one in Spain and one in the UK. No additional long-term leases were entered into during the periods.

The UK lease is for our headquarters in Leeds. The premises comprise office space and parking and are for a ten-year term which commenced in May 2017. A tenant lease break clause is available in May 2022 which has not been included in the lease calculations as there is no indication that this would be executed. Lease escalation costs have been included on a fixed rate basis as a practical expedient. The lease includes a provision to return the premises to their original condition on exit; as such an asset retirement obligation of £0.3 million has been included in the valuation.

The Spanish lease relates to our manufacturing premises in Leon. The agreement is for a ten-year term which commenced in April 2016 and includes a tenant lease break clause that can be executed after providing six months' written notice at any point five years from the commencement date; again this break clause has not been included in the lease value as there is no evidence that this will be executed. Lease escalation costs have also been included on a fixed rate basis as a practical expedient. The lease includes the requirement to make certain repairs and as such an asset retirement obligation of £0.1 million has been included in the valuation.

Principal commitments (continued)

Contractual commitments and other commitments

Details of contractual and other commitments can be found in notes 19 and 26.

Off-balance sheet arrangements

The only arrangement related to short-term operating leases that did not meet the requirements under IFRS 16 were not included as a right-of-use asset and associated lease liability.

Strategic report: Principal risks and uncertainties

The Group operates within a complex regulatory environment which is subject to change. The nature of drug development exposes the Group to risks and uncertainties which could affect our ability to meet our strategic goals, our business model and our operating environment.

The Board is accountable for carrying out a robust assessment of the principal risks facing the Group, and has developed a risk management framework which provides the structure within which the principal risks affecting our business are managed and sets the tone, culture and appetite for risk. A key part of this framework is the Board's Audit and Risk Committee, responsible for reviewing all aspects of internal control and financial reporting of the business. Further information is provided in the Report of the Audit and Risk Committee on pages 32 and 33. The key objectives for this process are to ensure that the risk appetite of the Board is embedded throughout the Group and fully understood by all members of the team who have responsibility for managing the risk and making key business decisions. This is also encoded in systems of internal controls, which seek to mitigate the principal risks that could affect the strategy and operation of our business model and to ensure that identified risks are reported to the relevant stakeholders in a timely manner. We are continuously developing and improving our risk management process through ongoing review and evaluation of the risks, clarifying our risk appetite and reviewing the longer-term viability of the business to make sure that we fully understand our risks and are managing them appropriately.

COVID-19 and other public health pandemics

Description

Our operations and financial results have already been adversely impacted by the COVID-19 pandemic in the UK, the US and the rest of the world. Enrolment of patients in our clinical trials and maintaining patients in our ongoing clinical trials were delayed or limited to lesser or greater extent as our clinical trial sites limited their onsite staff, temporarily closed or adjusted the way they worked during the COVID-19 pandemic. As a result of measures imposed by the governments in affected regions, many commercial activities, businesses and schools have been suspended as part of quarantines and other measures intended to contain this pandemic. These factors resulting from COVID-19 remain ongoing and other unforeseen pandemics could have similar or worse consequences, delaying the anticipated readouts from our clinical trials and our regulatory submissions. Additionally, certain third parties with which we engage, including our collaborators, contract organizations, third-party manufacturers, suppliers, clinical trial sites, regulators and other third parties with which we conduct business, are subject to similar risks, and have had to adjust their operations and assess their capacity in light of the COVID-19 pandemic. While the extent of the impact of the current COVID-19 pandemic on our future business and financial results continues to carry uncertainty, the effect of a continued and prolonged public health crisis from further significant mutations to COVID-19 or other pandemics could have a material negative impact on our business, financial condition and operating results.

Mitigation and development to date

The Group has taken reasonable measures to protect the safety of its staff, its patients, and its partners. The Group's IT infrastructure and supplementary technological solutions have been utilized effectively to minimize disruption. 4D maintains close communication with its lead investigators and other clinical site staff, monitoring events closely so as to be able to respond to the evolving situation and reduce risk to patients and staff primarily, while minimizing disruption to clinical timelines. It is reasonable to expect that following the rollout of SARS-CoV-2 vaccines in the UK, the US and other countries the disruption of the pandemic will reduce.

Change

Reduced risk

Successful development of product candidates

Description

We are very early in our development efforts and may not be successful in our efforts to use our platform to build a pipeline of therapeutic candidates and develop marketable drugs. Our therapeutic candidates are Live Biotherapeutics Products, which are an unproven approach to therapeutic intervention. Even if our therapeutic candidates do not cause off-target adverse events, there may be immunotoxicity associated with the fundamental pharmacology of our therapeutic candidates. Even if any of our therapeutic candidates receive marketing approval, they may fail to achieve the degree of market acceptance by physicians, patients, hospitals, third-party payors and others in the medical community necessary for commercial success. We expect to depend on collaborations with third parties for the research, development and commercialization of certain of the therapeutic candidates we may develop. If any such collaborations are not successful, we may not be able to realize the market potential of those therapeutic candidates. Moreover, we rely, and expect to continue to rely, on third parties to conduct our clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials, research and studies.

Mitigation and development to date

The nature of Live Biotherapeutics means they have a lower early clinical development risk. Our diverse portfolio of unique drug candidates with distinct modes of action across key therapeutic areas mitigates the risk of failure of any one program to the Group's operations. We have brought in additional expertise and experience with senior management to supplement internal expertise and we work with highly competent clinical research organizations (CROs) to conduct our clinical trials to the highest standard. We are collaborating with multinational pharmaceutical companies with extensive expertise in successful product development, registration and commercialization.

Change

No change

Manufacturing

Description

Currently, we are dependent on the manufacturing of product for each of our therapeutic candidates at our internal manufacturing facility. Developing our in-house manufacturing facility required, and continues to require, substantial additional funds and hiring and training a significant number of qualified employees to staff this facility. We may not be able to develop commercial-scale manufacturing facilities that are able to produce an adequate supply of materials in the event of significant commercial uptake of one of our LBP therapeutics. We have not yet manufactured our therapeutic candidates at commercial scale, and if we decide to expand our own manufacturing facility, we cannot be sure you that we will be able to manufacture our therapeutic candidates in compliance with regulations at a cost or in quantities necessary to make them commercially viable. If we are found to no longer comply with current good manufacturing practice (cGMP) regulations or similar regulatory requirements outside of the US, or if we cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the MHRA, FDA, EMA or others, we will not be able to secure and/or maintain marketing approval for our manufacturing facility or any future facilities. Catastrophic events at our manufacturing facility or loss of our master cell banks could significantly impair our ability to manufacture our therapeutic candidates.

Mitigation and development to date

We have invested significantly in our in-house manufacturing facility for our therapeutic candidates for production at a commercial scale. We have taken multiple LBP candidate strains through process development and scale-up to be able to manufacture clinic-ready product. Our in-house facility has the ability to produce cGMP drug product, with capacity to support our ongoing trials and potentially small-scale commercial supply. We are investigating external manufacturing capability as we scale our therapeutic candidates and prepare for commercialization of one or more of our therapeutic candidates. Having in-house control of production has been a significant advantage in a field that has experienced significant hurdles relating to manufacturing, and the equipment and facilities employed in the manufacture of pharmaceuticals are subject to stringent qualification requirements by regulatory agencies, including validation of facility, equipment, systems, processes and analytics. In the event of a catastrophic failure or destruction of our master cell banks, recreating and recertifying our cell banks is possible, as we have back-up stocks of our clinical candidates stored remotely from the MCBs, but is not certain and could put at risk the supply of our therapeutic candidates for preclinical studies or clinical trials or any products, if approved, to our customers.

Change

No change

Failure to obtain regulatory approvals

Description

The regulatory approval processes of the MHRA, FDA, EMA and other comparable foreign regulatory authorities are lengthy, time consuming and inherently unpredictable. The clinical trials of our therapeutic candidates may not demonstrate safety and efficacy to the satisfaction of the MHRA, FDA, EMA or other comparable foreign regulatory authorities or otherwise produce positive results. If we experience delays or difficulties in the enrolment of patients in clinical trials, our regulatory submissions or receipt of necessary regulatory approvals could be delayed or prevented. All of our LBP candidates are based on single strains of commensal bacteria. We have not, nor to our knowledge has any other company, received regulatory approval for an oral therapeutic based on this approach. We cannot be certain that our approach will lead to the development of approvable or marketable products. In addition, our LBPs may have different safety profiles and efficacy in various indications. Finally, regulatory agencies may lack experience in evaluating the safety and efficacy of products based on live bacteria, which could result in a longer than expected regulatory review process, increase our expected development costs and delay or prevent commercialization of our therapeutic candidates. If we are ultimately unable to obtain regulatory approval of our therapeutic candidates, we will be unable to generate product revenue and our business will be substantially harmed.

Mitigation and development to date

We have continued to invest in the recruitment, training and upskilling of our clinical and regulatory teams. We have also this year brought in additional regulatory expertise and experience to our Board and senior management team. In addition to continuing to develop our internal expertise, we utilize highly competent regulatory consultants. We have successfully engaged regulators in multiple jurisdictions. We have now dosed patients with four different Live Biotherapeutic drug candidates, with no serious drug-related adverse events reported to date. This increases our confidence in our thesis of the favorable safety profile of Live Biotherapeutics which reduces early development risk.

Change

No change

Continued compliance with new laws and regulations

Description

Our employees, consultants and contractors may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements or insider trading violations, which could significantly harm our business. Healthcare legislative reform measures may have a negative impact on our business and results of operations. If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

Mitigation and development to date

We have adopted a robust compliance program with precautions to prevent, deter and identify employee misconduct. We regularly review and seek to improve our operational, financial and management controls, reporting systems and procedures. The management team and their legal advisors continually monitor the legal and regulatory environment to prepare for, and ensure compliance with, changes in laws or regulations.

Change

No change

Brexit

Description

The withdrawal of the UK from the EU, commonly referred to as 'Brexit', may adversely impact our ability to obtain regulatory approvals of our therapeutic candidates in the EU, result in restrictions or imposition of taxes and duties for importing our therapeutic candidates into the EU, require us to incur additional expenses in order to develop, manufacture and commercialize our therapeutic candidates in the EU, negatively affect our ability to attract and retain employees particularly those from the EU, and make travel by our employees between our UK, Irish and Spanish facilities more difficult, time consuming and expensive than was previously the case. Our business may incur VAT in EU states where it is not established and does not make supplies. The detail of how the UK's access to the European single market for goods, capital, services and labor within the EU, or single market, and the wider commercial, legal and regulatory environment will impact our operations remains to be fully understood. There may continue to be economic uncertainty surrounding the consequences of Brexit, which could adversely affect our business, revenue, financial condition and results of operations. The full impact of Brexit on our business remains unclear.

Mitigation and development to date

While our headquarters are in the UK, we have subsidiaries elsewhere in the EU, currently in Ireland and Spain. This is helpful to us since having an 'establishment' in the EU is now required for compliance with a number of relevant regulatory requirements, for example a clinical trials sponsor must either be established in the EU or, if not, a legal representative must be appointed in an EU country. Following negotiations, the UK and EU agreed on a Trade and Cooperation Agreement (TCA) on 24 December 2020 to regulate their post-Brexit trade relationship. The TCA has been ratified by the UK and was ratified by the EU Parliament with effect from 1 May 2021 (following a period of provisional application). We continue to closely monitor developments relating to the UK's trade, legal and regulatory relationship with the EU which impact our operations or the wider industry.

Change

Reduced risk

Cyber-security risks including loss of data

Description

Our internal computer systems, or those of any of our CROs, manufacturers, other contractors or consultants or potential future collaborators, may fail or suffer security or data privacy breaches or other unauthorized or improper access to, use of, or destruction of our proprietary or confidential data, employee data, or personal data, which could result in additional costs, loss of revenue, significant liabilities, harm to our brand and material disruption of our operations. The collection, processing and cross-border transfer of personal information is subject to restrictive laws and regulations.

Mitigation and development to date

The Group employs internal IT controls, procedures and other security measures to reduce the risk of security or data privacy breaches or other unauthorized or improper access to data or personal information. The collection, processing, transfer and storage of data is tightly controlled. We mandate the use of basic IT security protocols to all our staff and conduct periodic training to ensure all staff are able to use our IT systems effectively, safely and securely.

Change

No change

Intellectual property

Description

If we are unable to obtain and maintain patent and other intellectual property protection for any therapeutic candidates we develop, or if the scope of the patent and other intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products and technology similar or identical to ours, and our ability to successfully commercialize any therapeutic candidates we may develop may be adversely affected. We may become involved in lawsuits to protect or enforce our patents, which could be expensive, time consuming, and unsuccessful and could result in a finding that such patents are unenforceable or invalid. Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment, and other requirements imposed by government patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements. Changes in patent law could diminish the value of patents in general, thereby impairing our ability to protect our therapeutic candidates. If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed. Third parties may assert that our employees, consultants, or advisors have wrongfully used or disclosed confidential information or misappropriated trade secrets.

Mitigation and development to date

We are diligent in carrying out searches to identify potential third-party IP; a comprehensive freedom to operate strategy has been developed and implemented to ensure that no blocking patents owned by third parties are unexpectedly granted. The third-party patent landscape is under continuous review. To ensure that we are in the strongest possible position in the event of any patent dispute, the Group continues to make patent filings across the Group's technology portfolio. There have been a significant number of patents granted since the inception of 4D pharma with a substantial year-on-year growth of the portfolio.

Change

No change

Availability of finance

Description

Since its inception the Group has incurred losses as it seeks to take its candidates through development to an approved product. The Group does not yet have any approved or revenue generating products, and expects to make losses for the foreseeable future. We may not be able to raise the additional funds that may be needed to support development and commercialization of our product candidates and any additional funds that are raised could cause dilution to existing investors.

On 29 July 2021, certain members of the Group entered into a loan and security agreement with Oxford Finance Luxembourg S.À R.L. and the loan is secured by substantially all of the assets of those members of the Group (including shares of certain subsidiaries in 4D pharma plc). The loan and security agreement and related security documentation contain customary representations and warranties and affirmative covenants and also contain certain restrictive covenants. The loan and security agreement also includes a financial covenant that requires the Company to maintain a minimum amount of cash in bank accounts that are subject to a control agreement in favor of the lender if the Company does not achieve a certain equity raise threshold. The loan and security agreement also contains customary events of default. If we fail to comply with all such covenants, payments or other terms of the agreement, our lender could declare an event of default, which would give it the right to cancel any undrawn commitments and declare all borrowings outstanding, together with accrued and unpaid interest and fees, to be immediately due and payable. In addition, our lender would have the right to proceed against the assets we provided as collateral pursuant to the loan and security agreement. If the debt under the loan and security agreement were accelerated, we may not have sufficient cash or be able to sell sufficient assets to repay this debt, which would harm our business and financial condition.

Mitigation and development to date

The Directors continue to keep a close control of overheads and explore potential sources of finance. In March 2021 the Company completed a merger with Longevity Acquisition Corporation. Gross proceeds from the merger were approximately $14.8 million. The Company also completed a fundraise in March 2021 by way of a private placement raising gross proceeds of approximately £18.0 million ($25.0 million) with two Directors also subscribing for a further £1.4 million ($2.0 million) in shares following release by the Company of its financial results. In March 2021 our Spanish subsidiary subscribed for a €1 million COVID-19 relief loan backed by the Spanish government. The loan is unsecured, is charged at an annual interest rate of 2.35% and is repayable in three years. In July 2021, the first tranche of the loan with Oxford Finance Luxembourg S.À R.L. was received which provided $12.5 million. The Group has continued to prioritize key activities and cost saving measures, and the Company's cash sufficiency is now likely to extend until Q4 of 2022.

Change

No change

Constraints in the growth of the Group

Description

In order to successfully implement our plans and strategies, we will need to grow the size of our organization, and we may experience difficulties in managing this growth. Our future success depends in part upon our ability to retain key employees, including Directors and Executive Officers, and to attract, retain and motivate qualified individuals. Management may need to expend additional effort and resources identifying, recruiting, integrating, maintaining and motivating additional employees.

Mitigation and development to date

During the period we made a number of key appointments to senior positions which will be key to fostering the continued growth of the Company, including international growth particularly in the US.

Change

No change

Exchange rate risks

Description

Exchange rate fluctuations may adversely affect our results of operations and cash flows. Our functional currency is Pounds Sterling (GBP), and our transactions are commonly denominated in that currency. However, we receive payments under our collaboration agreements in US Dollars (USD) and we incur a portion of our expenses in other currencies, primarily Euros. As a result, fluctuations in exchange rates, particularly between GBP on the one hand and the USD and Euro on the other hand, may adversely affect our reported results of operations and cash flows. Since the Brexit referendum in 2016, there has been a significant increase in the volatility of these exchange rates and an overall weakening of GBP. Our business may be affected by fluctuations in foreign exchange rates between GBP and these and other currencies, any of which may have a significant impact on our results of operations and cash flows from period to period.

Mitigation and development to date

We constantly monitor currencies and their movements against GBP. As the Group is currently pre-revenue, the exposure affects the cost of operations and although the size of the exposure is significant, we regularly review cash resources to manage these changes and have planned these prudently into our forward forecasts.

Change

No change

Accounting estimates and valuation fluctuations

Description

Whether immediate or foreseeable actual or anticipated changes to our estimates regarding future expenses, revenues and needs for additional financing, including values on financial instruments, such as warrants and share options, may create unforeseen fluctuations in profits and tax liability and materially impact our financial results.

Actual or anticipated changes to our estimates regarding future expenses, revenues and needs for additional financing, whether immediate or foreseeable, could result in our having to recognize additional assets, liabilities or write-downs, creating unforeseen fluctuations in our profits and tax liabilities, or which could alter our trading status on AIM or Nasdaq resulting in changes affecting shareholders and our subsequent ability to raise future funds. Collectively or individually accounting estimates and valuation fluctuations may have a material adverse effect on our business, results of operations and outlook.

Mitigation and development to date

We have appointed expert financial advisors, experienced in advising UK and US listed businesses, and implemented rigorous financial controls internally. We have also appointed a Non-Executive Director, Paul Maier, who is considered to be a 'financial expert' under Nasdaq rules, as well as a highly experienced CFO, John Doyle.

Change

Increased risk

The Strategic Report was approved by Board on 31 March 2022 and signed on its behalf by:

Duncan Peyton
Chief Executive Officer
31 March 2022

Corporate governance: Corporate governance report

Chairperson's introduction

On behalf of the Board, I am pleased to present our Corporate Governance Report for the year ended 31 December 2021.

This section of the Annual Report describes the Group's corporate governance structures and processes and how they have been applied during the year ended 31 December 2021. As Chairperson, I am responsible for the leadership of the Board, ensuring its effectiveness in all aspects of its functions and, within that role, for promoting good governance throughout the Group.

The Board recognizes the importance of good corporate governance and has, since the Company's initial public offering and as the Group has grown, maintained a regular review and evaluation of its effectiveness, and that of the wider governance structure of the Group.

I believe that the Company's governance structure has facilitated the growth and development of the Group, while remaining accountable to all of its stakeholders, including shareholders, employees, collaborators and regulators. As the Group continues to grow, we will continue to evaluate this structure and will take the governance steps necessary to support the Group's development.

Prof. Axel Glasmacher
Non-Executive Chairperson
31 March 2022

The Quoted Companies Alliance Code

The AIM Rules for Companies require the Board to apply a recognized corporate governance code. As an AIM-listed company, the Board has chosen to formally apply the Quoted Companies Alliance Corporate Governance Code, updated in 2018 (the 'QCA Code'). The QCA Code was developed by the Quoted Companies Alliance, an independent membership organization championing the interests of small to mid-sized quoted companies, one of whose aims is to promote high quality corporate governance in quoted companies. In consultation with a number of significant institutional small company investors, it has developed the QCA Code as an alternative corporate governance code applicable to quoted companies that do not have a premium listing of equity shares, including AIM companies.

The QCA Code is constructed around 10 broad principles and a set of disclosures grouped under three broad headings: deliver growth; maintain a dynamic management framework; and build trust. An overview of how the Company aims to comply with these principles can be found on our website at https://www.4dpharmaplc.com/en/investors/qca-code-compliance and further information is provided below.

Strategy and business model

The Strategic Report outlines the Group and Company strategy and business model in detail and can be found on pages 12 to 27. Our strategy is to lead the world in the development of Live Biotherapeutics, a novel and revolutionary class of medicines, creating an "end-to-end" microbiome company, from research to development and manufacture. We build upon our leading research and our discovery platform and seek to secure and consolidate our leading position by means of patent protection.

Our goal is to dramatically reduce overall clinical timelines: exploiting the enhanced safety profiles of therapeutics that originate from a healthy human, reducing pre-clinical testing and lead optimisation timelines (4D targets its programmes to be ready for patient trials within 24 months from concept); and allowing first-in-man clinical studies in patients as well as healthy individuals (which in turn allows us to mine clinically relevant data more swiftly).

With its own in house GMP-certified development and manufacture facility, 4D can address and control manufacture and delivery issues early on, to ensure against any loss of flexibility and pace of development and maintain speed to the clinic and is continually expanding and refining proprietary know-how key to the development of Live Biotherapeutics.

Board composition and responsibility

The Board consists of seven Directors, five of whom are Non-Executive including Paul Maier, who was appointed as a Non-Executive Director in February 2021 and the Chair of the Audit and Risk Committee in March 2021. The names of the Directors, together with their biographical details, are set out on pages 49 and 50.

The Board has determined that each of Dr. Ed Baracchini, Prof. Axel Glasmacher, Dr. Sandy Macrae, Paul Maier and Dr. Katrin Rupalla are independent in character and judgement, and that there are no relationships or circumstances which could materially affect or interfere with the exercise of their independent judgement.

In identifying candidates for the Board of Directors the Company identifies both weaknesses and complementary attributes in the existing skill sets, experience and viewpoint of Directors to create overall balance across the Board. In doing so, during the previous year a lack of gender diversity was identified within the Board and positive first steps were taken towards redressing balance through the appointment of Dr. Katrin Rupalla in August 2020.

The Board is satisfied with its composition and the balance between Executive and Non-Executive Directors, which allows it to exercise objectivity in decision making and proper control of the Group's business.

All members of the Board bring relevant sector, market and financial experience. The Board believes that its blend of relevant experience, skills and personal qualities and capabilities is sufficient to enable it to successfully execute its strategy.

The Board considers that its gender diversity is acceptable and will continue trying to balance its representation as roles on the Board become available.

Governance Structures and Processes, Decision making

The Board's primary objective is to focus on adding value to the assets of the Group by identifying and assessing business opportunities and ensuring that potential risks are identified, monitored and controlled.

Material issues are reserved to a decision of the Board, including approval (and review of performance) of the Group's strategic aims and objectives; approval of the annual operating and capital expenditure budgets (and any material changes to them); approval of all financial statements and results; and maintenance of a sound system of internal control and risk management. The implementation of Board decisions and day-to-day operations of the Group are delegated to Executive Directors.

The Chairperson, Axel Glasmacher, is responsible for the leadership of the Board, ensuring its effectiveness in all aspects of its functions and, within that role, for promoting good governance throughout the Group and ensuring effective communication with shareholders.

The Chief Executive Officer, Duncan Peyton, leads the Group's management team and is responsible, together with the Chief Scientific Officer Dr. Alex Stevenson, for implementing and delivering the Group's strategy and the operational decisions agreed by the Board, and the day-to-day operation of the Group.

As an AIM-listed company, the Board has approved the adoption of the QCA Code as its governance framework against which this statement has been prepared and will monitor the suitability of this code on at least an annual basis and revise its governance framework as appropriate as the Group evolves.

The Board meets both at regular intervals and also at short notice to consider specific matters (for example proposed material transactions). The Board receives appropriate and timely information prior to each meeting, with a formal agenda and Board and Committee papers being distributed several days before meetings take place. Any Director may challenge Group proposals and decisions are taken democratically after discussion.

Any Director who feels that any concern remains unresolved after discussion may ask for that concern to be noted in the minutes of the meeting. Any specific actions arising from such meetings are agreed by the Board and then followed up by management.

The Non-Executive Directors constructively challenge and help develop proposals on strategy and bring strong, independent judgement, knowledge and experience to the Board's deliberations. The Directors are given access to independent professional advice at the Group's expense when the Directors deem it is necessary in order for them to carry out their responsibilities.

The Group has effective procedures in place to deal with conflicts of interest. The Board is aware of other commitments of its Directors and changes to these commitments are reported to the Board.

Each of the Directors is subject to retirement by rotation and re-election in accordance with the articles of association of the Company. All Directors appointed by the Board are subject to election by shareholders at the first Annual General Meeting after their appointment.

Board evaluation

Given its composition and flexibility, the Board has been able, since the admission of the Company's shares to trading on AIM, to maintain a regular evaluation of its effectiveness and that of its Committees. It is believed that the Board and its Committees have functioned well throughout this period, meeting with appropriate regularity and with Directors free to voice differing opinions. In particular, the Board considers its composition to be appropriate (in view of the size and requirements of the Group's business, and the need to maintain a practical balance between Executives and Non-Executives). As the business of the Group grows and evolves, the Board continues to actively consider potential candidates to occupy Board positions.

Committees

The Board has established an Audit and Risk Committee and a Remuneration Committee, with formally delegated duties and responsibilities. The Board has, since the admission of the Company's shares to trading on AIM, kept under regular review the possible establishment of a Nomination Committee. The Board remains of the view that, given the current composition of the Board, it is not appropriate to have a Nomination Committee. This will continue to be kept under regular review by the Board.

The Audit and Risk Committee

The Audit and Risk Committee comprises Paul Maier as Chair alongside Dr. Ed Baracchini and Dr. Katrin Rupalla as the other members of the Committee. Paul Maier is an independent Director and has recent and relevant financial expertise. The Committee's responsibilities include:

- monitoring the integrity of our financial and narrative reporting, preliminary announcements and any other formal announcements relating to our financial performance;
- advising the Board on whether, taken as a whole, the Annual Report and Accounts is fair, balanced and understandable;
- reviewing the appropriateness and completeness of our risk management and internal controls;
- considering annually whether we should have an internal audit function;
- overseeing our relationship with the external auditor and assessing the effectiveness of the external audit process, including in relation to appointment and tendering, remuneration and other terms of engagement, and appropriate planning ahead of each annual audit cycle;
- maintaining regular, timely, open and honest communication with the external auditor, ensuring the external auditor reports to the Committee on all relevant matters to enable the Committee to carry out its oversight responsibilities; and
- monitoring risk.

Committees (continued)

The Remuneration Committee

The Company has established a formal and transparent procedure for developing policy on Executive remuneration and for fixing the remuneration packages of individual Directors and senior management. The Remuneration Committee comprises Dr. Sandy Macrae as Chair and Prof. Axel Glasmacher as the other member of the Committee.

The Remuneration Committee's responsibilities additionally include:

- setting a remuneration policy that is designed to promote our long-term success having due regard to the interests of shareholders;
- ensuring that the remuneration of Executive Directors and other senior executives reflects both their individual performance and their contribution to our overall results;
- determining the terms of employment and remuneration of Executive Directors and other senior executives, including recruitment and retention terms;
- approving the design and performance targets of any annual incentive schemes that include the Executive Directors and other senior executives;
- agreeing upon the design and performance targets, where applicable, of all share incentive plans;
- gathering and analyzing appropriate data from comparator companies in the biotechnology sector; and
- the selection and appointment of external advisors to the Remuneration Committee, if any, to provide independent remuneration advice where necessary.

The Board believes that the Audit and Risk Committee and the Remuneration Committee have the necessary character, skills and knowledge to discharge their duties and responsibilities effectively, notwithstanding that (given the overall composition of the Board) there is a majority of *members who are independent Non-Executive Directors. Each Committee is chaired by an independent Non-Executive Director.*

Corporate culture, wider stakeholders and social responsibilities

The Board recognizes the need, and strives, to promote a corporate culture based on strong ethical and moral values, maintaining high standards of integrity and probity in the conduct of the Group's operations. This culture is promoted throughout its employees and relevant suppliers and contractors and is underpinned by the implementation and regular review, enforcement and documentation of relevant policies, including health and safety and environmental policies and share dealing and anti-corruption policies.

The Group is committed to providing a safe environment for its employees and all other relevant parties for which the Group is responsible. An open culture is encouraged within the Group, with regular communications to staff regarding progress and staff feedback regularly sought. The Company's management team regularly monitors the Group's cultural environment and seeks to address any concerns than may arise, escalating these to Board level as necessary.

The Group encourages its employees to understand all aspects of the Group's business and seeks to remunerate its employees fairly, being flexible where practicable. The Group gives full and fair consideration to applications for employment received regardless of age, gender, color, ethnicity, disability, nationality, religious beliefs, transgender status or sexual orientation. The Board takes account of employees' interests when making decisions, and suggestions from employees aimed at improving the Group's performance are welcomed.

To support its world-leading research, the Group works with contract research organizations and, in its collaborations, with leading academic institutions and commercial partners, as well as individual key opinion leaders. In development, the Group works closely with its key third party suppliers to continually enhance and improve the development process for our Live Biotherapeutics. In such a new and swiftly evolving field as Live Biotherapeutics an effective working relationship with regulatory authorities and clinicians is key to understand and indeed define the regulatory environment and clinical processes affecting Live Biotherapeutics.

The Group is aware of its corporate social responsibilities and the need to maintain effective working relationships across its broad range of stakeholder groups. The Group's business model addresses the need to balance the interests and needs of all of these stakeholder groups while maintaining focus on the Board's primary responsibility to promote the success of the Company for the benefit of its shareholders as a whole.

The Group takes due account of any impact that its activities may have on the environment and seeks to minimize this impact wherever possible.

Details of our commitment to our wider stakeholders and social responsibilities is included in the Strategic Report: Director and Chairperson's statements under the Section 172 Companies Act 2006 header.

Approach to risk and internal control

The Board is responsible for establishing and maintaining the Group's systems of internal control. The primary responsibility for monitoring the quality of internal control has been delegated to the Audit and Risk Committee. Reference is made to the principal risks and uncertainties on pages 23 to 27.

Communicating vision and strategy

We are committed to communicating openly with our shareholders to ensure that our strategy and performance are clearly understood. The Directors seek to engage with institutional shareholders at least twice a year. In addition, all shareholders can attend the Company's Annual General Meeting, where there is an opportunity to question the Directors as part of the agenda, or more informally after the meeting. A range of corporate information (including all 4D announcements) is also available to shareholders, investors and the public on our website.

The Company maintains a dedicated email address which investors may use to contact the Company which, together with the Company's address, are prominently displayed here on the Company's website.

Communication with shareholders is seen as an important part of the Board's responsibilities, and care is taken to ensure that all price-sensitive information is made available to all shareholders at the same time. Responsibility for investor relations rests with the Chief Executive Officer.

Reports for the year ended 31 December 2020 from the Chairman of the Audit and Risk Committee and the Chairman of the Remuneration Committee are in the Company's Annual Report available to download at https://www.4dpharmaplc.com/en/investors/reports-presentations.

Notices of all of the Company's previous general meetings can be found here and the results of each such meeting are posted immediately to the Company's RNS feed.

Meeting attendance in 2021

	Full Board	Audit and Risk Committee	Remuneration Committee
Number of meetings in year	5	5	8
Attendance:			
Executive Directors			
Duncan Peyton[5]	5	•	3
Dr. Alex Stevenson	5	•	•
Non-Executive Directors			
Dr. Ed Baracchini[1]	5	4	•
Prof. Axel Glasmacher[2]	5	2	8
Dr. Sandy Macrae	5	•	8
Dr. Katrin Rupalla[3]	5	2	•
Paul Maier[4]	5	4	•

1. Dr. Ed Baracchini stepped down as Chair of the Audit and Risk Committee in March 2021.
2. Prof. Axel Glasmacher resigned as a member of the Audit and Risk Committee in July 2021.
3. Dr. Katrin Rupalla was appointed as a member of the Audit and Risk Committee in July 2021.
4. Paul Maier joined the Board of Directors in February 2021 and was appointed as Chair of the Audit and Risk Committee in March 2021.
5. Duncan Peyton attended certain Remuneration Committee meetings to provide updates and recommendations.

Details of voting information and recent announcements can be found within the RNS Announcements (http://www.4dpharmaplc.com/investors/rns) and SEC Filings (http://www.4dpharmaplc.com/en/investors/sec-filings) sections on our website.

Corporate governance: Report of the Audit and Risk Committee

The Committee acts independently of management to ensure the interests of shareholders are protected in relation to financial reporting, internal controls and risk management.

As Chair of the Audit and Risk Committee, I am pleased to present our report for the year ended 31 December 2021. The Audit and Risk Committee is a sub-committee of the Board and is responsible for reviewing all aspects of the financial reporting of the business and all aspects of internal control. The Committee represents the interests of our shareholders in relation to the integrity of information and the effectiveness of the audit processes in place.

Key responsibilities

The principal duties of the Committee are to:

- monitor the integrity of the Group's financial reporting including the review of significant financial reporting judgements;
- advise the Board on whether, taken as a whole, the Annual Report and Accounts is fair, balanced and understandable;
- advise the Board on principal risks, their mitigation and risk appetite;
- review the robustness of our risk management and internal controls;
- oversee the external audit process including monitoring the auditor's independence, objectivity, effectiveness and performance; and
- approve any engagement by the external auditor outside of the Group's audit.

The Committee manages the relationship with the external auditor on behalf of the Board to ensure that the external auditor continues to be independent, objective and effective in its work, and also considers the re-appointment of the auditor each year.

RSM UK Audit LLP was appointed as auditor in 2014 following a comprehensive tender process. Each year the Committee considers the continued independence of the external auditor and the effectiveness of the external audit process, to determine whether to recommend to the Board that the current auditor be re-appointed.

The Committee has reviewed the external audit process in the year through meetings and reviewing the reports from the external audit team. The Committee has concluded that the external audit process was effective and is satisfied that the scope of the audit is appropriate and that significant judgements have been robustly challenged.

Composition and meetings

The Audit and Risk Committee during the year under review has consisted of three Non-Executive Directors. The Committee is chaired by me, Paul Maier; serving alongside me are Dr. Ed Baracchini and Dr. Katrin Rupalla who took over form Prof. Axel Glasmacher after he stepped down from his role on the Audit and Risk Committee to ensure independence from his role as Chairperson of the Board of Directors. I am an independent Director and have recent and relevant financial experience.

There were five meetings held in the year ended 31 December 2021; these took place in February, March, May, September and November.

Committee meetings are also attended by the Chief Finance Officer, the Vice President of Finance, representatives from the external auditor and our SEC legal advisors.

Significant issues relating to the financial statements

The specific issues considered by the Audit and Risk Committee in the year under review, in relation to the financial statements, are shown below.

Accounting matters related to the merger

The accounting for the merger with Longevity Acquisition Corporation is more complex as SPAC's do not constitute businesses and so are not accounted for under IFRS 3 'Business Combinations'. Instead, management viewed the accounting for the transaction of a 'cash shell' as the purchase of shares for a consideration.

Several steps were involved in the accounting for the reverse-merger with Longevity Acquisition Corporation with the initial acquisition via a subsidiary company, 4D pharma (BVI) limited. Initial cash received on acquisition was recorded as an asset in 4D pharma (BVI) limited before being loaned to 4D pharma plc. Shares issued for the transaction were recorded as an investment in 4D pharma (BVI) limited at fair value on the date of issue by 4D pharma plc. Subsequently, 4D pharma (BVI) limited issued a distribution to 4D pharma plc, equal to the cash balance minus interest, which reduced the inter-company loan balance to nil. Upon distribution and settlement of the loan balance, 4D Pharma (BVI) limited held no further assets or liabilities and the investment was impaired to nil in the books and records of 4D pharma plc.

In addition to the shares issued the transaction 4D pharma plc. assumed or issued several classes of warrants and units. In accounting for these the Company followed guidance from the March 2013 IFRIC discussion paper topic 2.8.6 'Reversal into a listed entity' resulting in the classification of the warrants and units as equity instruments under IFRS 2 at the date of the transaction.

The committee reviewed the treatment and concluded that the accounting treatment and disclosures accurately reflected the transaction.

Significant issues relating to the financial statements (continued)

Valuation and accounting for warrants and units

Management review transactions at inception and subsequently at each reporting date to ensure that its assertions remain correct and that the financial statements present a true and fair view. As part of this review the treatment of warrants and units was examined to ensure that disclosures and accounting are appropriate and accurate. In forming an options management reviewed the reporting requirements of IFRS 2, the requirement of IAS-32 and the recent IFRIC discussion "Transactions with a special purpose acquisition company (SPAC): how should founder and public warrants be classified after a SPAC has been acquired' from February 2022.

Having considered these factors Management noted that there were several instances where warrants or units would not meet the 'Fixed-for-Fixed' criteria under IAS 32 and that they should be treated as liabilities. While the warrants issued to Oxford finance always met this definition, and were treated as liabilities, the warrants and units include in the Longevity transaction require subsequent re-classification.

Warrants and units included as financial liabilities in the financial statements were classified in accordance with these principles are adjusted to their fair values at 31 December 2021 with gains and losses on valuation reported in the income statement.

Management have valued public warrants by reference to their market value and have used either the Black Scholes valuation technique or a Monte Carlo simulation to value its' remaining warrants and units dependent on the nature of the variables and suitability of the model.

The Committee reviewed the reports together with the assumptions, judgements and sensitivities applied to the valuations and underlying models. Following this review and after discussions with management, the Committee is satisfied that the treatment is adequate and appropriate to the financial statements.

Valuation of goodwill and other intangible assets

Testing of goodwill and other intangible assets for potential impairment is complex and requires a number of management estimates and sensitivities to be applied, which inevitably requires judgement and is a recurring matter.

The forecasting tools developed by management to help assess the values of intangible assets and goodwill were updated for variables that were known to have changed.

The Committee reviewed the reports together with the assumptions, judgements and sensitivities applied to the valuations and underlying models for impairment testing purposes. Following this review and after discussions with management, the Committee is satisfied that there is no impairment to intangible assets or goodwill at this time.

Recoverability of inter-company balances

There are various inter-group balances within the Group. For inter-group balances held with entities in a current or shareholder deficit position there is a potential that these recoverable balances may not be realized in full. The committee concluded that, after reviewing the existing impairment provisions, they are considered adequate and appropriate to the financial statements.

Paul Maier
Chair of the Audit and Risk Committee
31 March 2022

Corporate governance: Directors' remuneration report: Letter

Dear Shareholder,

Introduction

As Chair of the Remuneration Committee (the 'Committee'), I am pleased to present, on behalf of the Board of Directors of 4D pharma plc (the 'Company') the Directors' Remuneration Report for the year ended 31 December 2021 (the 'Report'). The requirement to prepare this report for the first time in accordance with the provisions of the Companies Act 2006 and Schedule 8 of the Large and Medium-sized Companies and Groups (Accounts and Reports) (Amendment) Regulations 2013 as amended (the 'Regulations') is as a result of the Company's listing in the US on the Nasdaq Global Market in March 2021.

In 2021, the Committee completed a remuneration benchmarking exercise across the Company which found that the remuneration levels were not consistent with its peers. To ensure that the Company attracts and retains key employees, a series of changes have been and will be implemented (discussed below) to give the Company the best prospects of achieving its key objectives.

This Report will be subject to an advisory vote and our Remuneration Policy (the 'Policy') will be subject to a binding vote under resolutions to be proposed at a general meeting of the Company to be convened later this year (the 'General Meeting'). The outcome of these votes will be considered carefully by the Committee in the formulation and approval of the Company's future remuneration strategy.

Company performance in 2021

Despite challenges faced in 2021, the Company made substantial progress and delivered on many operational objectives during the performance period, reflective of the dedication, hard work and support provided by the Company's employees.

Key achievements during the 2021 performance period include:

- completion of the Company's US listing on the Nasdaq Global Market in March 2021 and the successful completion of private placings in March and April 2021, raising gross proceeds of £19.45 million. In addition, the Company is now listed on the Nasdaq Global Market and has delivered its first financial year as dual-listed company;
- made significant progress in the MRx0518/Keytruda® study by increasing the number of active trial sites and patient populations being investigated in the study;
- executed a clinical trial collaboration and supply agreement with Merck KGaA to evaluate MRx0518 in combination with Bavencio® for the treatment of locally advanced or metastatic urothelial carcinoma. Under the collaboration, the Company will commence a clinical trial to evaluate Bavencio® in combination with MRx0518 as a first-line maintenance therapy for patients with locally advanced or metastatic urothelial carcinoma that has not progressed with first-line platinum-containing chemotherapy. Work has been progressing throughout 2021 to make preparations to initiate the study which is expected to commence shortly;
- the Company presented multiple data following the successful completion of its Phase II study of Blautix® in patients with irritable bowel syndrome (IBS) subtypes IBS-C and IBS-D. The data presented demonstrated that Blautix® is the first therapeutic globally to have demonstrated efficacy in both IBS-C and IBS-D. The clinically meaningful overall response rates and improvements in bowel habit in both IBS-C and IBS-D, in spite of an unexpectedly high placebo response in certain patient groups, are highly encouraging for subsequent larger studies with increased statistical power; and
- in December 2021, the Company announced positive data from Part A of its Phase I/II trial of MRx-4DP0004 for the treatment of partly controlled asthma. To the Company's knowledge, this is the first ever clinical trial of an LBP in this indication. Not only did Part A meet the primary endpoint, with the safety profile of MRx-4DP0004 being found to be comparable to placebo, MRx-4DP0004 also generated promising signals of clinical activity, which supports progression into Part B of the study. Part B is expected to enroll up to 90 patients, informed by the clinical signals identified in Part A.

Key activities and remuneration decisions for the year ended 31 December 2021

Since 1 January 2021, the Committee has undertaken the following key decisions and activities:

- in the first half of the year, we engaged an external consultant to support the Committee to conduct a benchmarking exercise over the remuneration structure and strategy in advance and following the completion of the Company's US listing on the Nasdaq Global Market. This benchmarking exercise covered both Executive and Non-Executive Directors and considered a comparator group of companies that were at a similar development stage to 4D and that had a range of market capitalizations. The comparator group also included companies with dual listings (London and the US). The overall remuneration structure was found to be in line with other companies of a similar size and complexity and the remuneration strategy is aligned to our industry and 4D's geographic locations;
- agreed the first ever salary increase for the Executive Directors to move forward on a more commercial footing. This increase will be phased with the first increase effective from 1 July 2021 and the second increase to be made in 2023, subject to performance and financial affordability;
- adopted a new equity incentive award plan for employees (including Executive Directors). The new equity incentive award plan allows the Committee to grant equity-based incentive awards to eligible individuals at all levels in the company, in order to retain, recruit and reward the workforce required to create sustainable growth and progress the development of our products; and
- awarded employees (and agreed to award Executive Directors) market value share options under the newly adopted equity incentive award plan – the first time ever that such awards had been made across the Company.

Reward for the 2021 financial year

As a result of the review, the Committee concluded that the Executive Directors should be paid on a commercial basis going forward. Since the CEO and CSO's appointments in February 2014 when the Company was founded, they have both received £100,000 per annum as remuneration. The proposed salary increases are being phased. From 1 July 2021, the salary paid to the CEO increased to £264,500 per annum and increased to £212,600 per annum for the CSO.

No bonus plan was operated for the 2021 financial year and there were no in-flight LTI awards vesting.

A company-wide option grant made in December 2021, which was agreed but the grant delayed until January 2022 for Executive Directors. This was the first company-wide equity award to have been made since the company's founding in 2014. This award was made, in recognition of the work and commitment since the Company was founded and to retain and incentivise key talent to drive the success of the Company. The options are not subject to performance conditions and will vest equally over a period of four years, beginning on 1 June 2022.

Remuneration Policy

This is the first year that the Company has been required to put the Policy to shareholders for approval. The Policy is set out in full within this Report and will be proposed at a General Meeting of the Company, a notice of which will be sent out in due course setting out the time, date and location of such General Meeting, together with resolutions to be proposed at such meeting.

The Policy is intended to attract and retain high caliber individuals. Fixed pay is intended to be competitive in the relevant markets. A proportion of total remuneration is based on performance-related variable pay. Variable pay plans incentivize the achievement of key performance measures that underpin the business strategy. Achievement of demanding short-term performance objectives is rewarded through the annual bonus, which also builds the foundations for the achievement of longer-term corporate goals. Our Executive Directors have built up and maintained a shareholding in the Company since its founding and will be expected to do so from equity awards received under the LTIP, thus continuing to demonstrate long-term commitment and aligned interests to those of other shareholders. The remuneration structure avoids being unnecessarily complex.

The Policy also covers Non-Executive Directors. The current remuneration strategy provides an appropriate level of remuneration for their services reflecting the time commitments of the role and their skills and experience. Our approach is designed to balance the challenges of attracting high caliber NEDs, who have experience and insights of value to our Company and also other Nasdaq listed businesses, with the expectations of a UK AIM listed company. Fee levels for the NEDs have remained flat since the Company was formed. During 2021, the Chairperson's fee was increased. The base fee for NEDs was not increased but an additional fee for the chairing of a Board Committee was introduced. The Policy provides for the ability to grant of market value options to our NEDs to reflect the market practice of peers listed on the exchange/s on which the Company is listed.

Implementing the Policy for the 2022 financial year

Given that salaries were increased in July 2021, and that a further planned increase will be made in 2023 subject to performance and financial affordability, no salary increases for Executive Directors are being made for the 2022 financial year.

The Executive Directors do not receive a pension contribution.

Since the Company's formation, no bonuses have been paid to the Executive Directors. For the 2022 financial year, the Committee intends to operate a discretionary annual bonus plan. The maximum annual bonus opportunity for 2022 will be 100% of salary. Performance will take into account individual contribution, business performance, technical and commercial progress and/or financial results. The Committee will assess the bonus outturn to ensure the scale of the award is proportionate and always linked to performance.

Going forward, an approved Policy will operate for future awards granted after the date of the AGM.

The Policy provides for the ability to make an LTIP award of up to 200% of salary (PSP equivalent face value on grant). No decision has yet been made but for any awards made for the 2022 financial year, the Committee will determine individual awards within this approved policy limit.

Corporate governance

4D pharma is a dual-listed Company whose shares are traded on the AIM Market of the London Stock Exchange (AIM) and Nasdaq Global Market. Therefore, we are subject to corporate governance standards and regulations applicable in both the US and UK. It is the Committee's view that the Policy ensures relevant corporate governance standards and regulations with regard to ensuring that remuneration practices are met.

The Committee comprises two members who are both independent Non-Executive Directors under the Corporate Governance Code as published by the Quoted Companies Alliance (the 'QCA Code'), under US securities laws and Nasdaq listing rules.

Summary

The Committee considers that this Report and the Policy contained within the Report provide a remuneration structure and quantum that encourage both Executive and Non-Executive Directors to serve in the best interests of the Company to support the delivery of value to shareholders in the future in a sustainable way.

Further, the Committee trusts that the both the Report and the Policy are helpful and looks forward to the Company's General Meeting where we hope to have your support.

Yours sincerely,

Dr. Sandy Macrae
Chair of the Remuneration Committee
31 March 2022

Corporate governance: Directors' remuneration report: Policy

Remuneration Policy principles

The Company's approach is that the remuneration structure is aligned to the wider business strategy and takes account of the performance of the Company, the individual, economic conditions and market practice. The Remuneration Policy (the 'Policy') underpins our ability to attract, incentivize and retain high caliber individuals.

In determining the design, implementation and assessment of remuneration, the Remuneration Committee (the 'Committee') follows the key principles of remuneration as set out in the supporting Remuneration Committee Guide to the QCA Code.

The following section of this report describes our Policy for 4D pharma's Executive and Non-Executive Directors.

Executive Director Remuneration Policy

In determining the Policy for Executive Directors, the Committee considers the Company's development and performance and reviews the profile and performance of the Executive Directors. The scale and structure of their remuneration and the basis of their service agreements is set with due regard to the regulatory landscape, views of our major shareholders and the wider stakeholder group and developments in market practice. As an AIM-listed company, the Committee applies the principles of the QCA Code and considers the expectations of the wider stakeholder group in the development and implementation of the Remuneration Policy. The Committee seeks to determine that the remuneration is sufficiently competitive to attract and retain a high calibre of Executive Director. The Policy has a strong performance-related component, with a proportion of the total remuneration being based on variable pay and delivered in shares, ensuring poor performance is not rewarded.

The Policy is designed to ensure that executive management is provided with appropriate incentives to encourage enhanced performance and, in a fair and responsible manner, rewarded for its contribution to the success of the Company. The Committee considers the external market and geographic location in which the Company operates and uses remuneration data from time to time to inform its decisions, together with a comparison of the pay and practices in the wider Company.

The following table summarizes each element of the proposed Remuneration Policy, explaining how each component operates. The Policy will be formally effective following shareholder approval at the 2022 AGM, with those parts of the Policy applicable to the annual bonus applying for the full 2022 financial year. Awards made prior to the approval of the Policy remain subject to the prevailing provisions of grant.

Base salary

Purpose and link to strategy

- Provides a core level of reward for the completion of Executive Directors' duties. Set at a level that allows the Company to attract and retain employees of the calibre required to drive the Company's success at the appropriate level.

Operation

- *The Committee normally reviews salaries annually.*
- Base salary for each Director is determined by the Committee taking into account a number of factors including, but not limited to, the performance of the individual and the Company, increases for the wider local population, as well as external peer group market data for comparable organizations.
- On occasion, larger increases may be required to recognize, for example, a change in the scope and responsibility of the role or development in role.
- The Committee considers the impact of any increases in salary on total remuneration.
- Salary (and other components of remuneration) may be paid in different currencies as appropriate to reflect their geographic location.
- Pensionable.

Maximum opportunity

- There is no prescribed maximum salary or annual increase.
- When considering salary levels, the Committee will consider the specific nature and responsibilities of the role, the capabilities and experience of the individual, in addition to pay levels in relevant talent markets for companies of similar size and complexity.
- Increases will not normally exceed those available to the wider workforce, taking into account the location in which the executive is based. Increases above those available to the wider workforce may apply in certain circumstances, including but not limited to increases in responsibility/size of the role, and changes in the size and complexity of the Company.

Performance framework

- Not applicable.

Executive Director Remuneration Policy (continued)

Pension

Purpose and link to strategy

- Provides Executive Directors with long-term savings for their future.

Operation

- Only salary is pensionable.
- Where applicable, payments are made directly to a nominated pension scheme, or, if payments are made as a cash allowance in lieu of pension, they are delivered monthly through payroll.

Maximum opportunity

- Executive Directors may be eligible for Company pension contributions or an equivalent cash payment in lieu. Where made, contribution levels will not exceed those available to the wider local workforce from time to time.
- Currently, the Company does not make payments into an occupational pension scheme for Executive Directors, nor does it make contributions into the private pension schemes of Executive Directors.

Performance framework

- Not applicable.

Benefits

Purpose and link to strategy

- Provides market competitive benefits in line with the Executive Directors' local market and those offered to the wider workforce in that market.

Operation

- Executive Directors may be eligible for benefits as operated locally from time to time as deemed appropriate by the Committee.
- Executive Directors may be eligible for other benefits which are introduced for the wider workforce on broadly similar terms.
- Executive Directors may be eligible to participate in any employee share plans.
- Any reasonable business-related expenses may be reimbursed, including any taxes payable thereon, if determined to be a taxable benefit.

Maximum opportunity

- There is no defined maximum value for benefits.
- The Committee will consider the aggregate value of any benefits when determining what should be offered, avoiding paying more than is necessary.

Performance framework

- Not applicable.

Executive Director Remuneration Policy (continued)

Annual Bonus Plan

Purpose and link to strategy

- To incentivize and reward the achievement of the Company's short-term objectives, in complement to the LTIP which is focused on achievement of long-term objectives.

Operation

- Awards are based on annual performance against a balanced scorecard of relevant metrics as determined by the Committee, normally at the start of each year.
- Performance criteria may include annual targets based on clear and measurable objectives that are key to the achievement of the business strategy.
- Performance may take into account individual contribution, business performance, technical and/or commercial progress and financial results.
- At the end of the performance period, the Committee will assess the extent to which the performance targets have been met.
- The annual bonus may be delivered in cash and/or shares.
- Malus and clawback provisions may apply to both the cash and share-based element of the award in the event of:
    i. material misstatement of financial results;
    ii. misstatement of performance;
    iii. material failure of risk management;
    iv. serious misconduct or material error by a participant;
    v. corporate failure;
    vi. serious reputational damage;
    vii. the use of personal hedging undermining the effects of the shareholding policy;
    viii. breach of employment contract; or
    ix. any other circumstances similar in nature or effect to those above.
- Non-pensionable.
- All bonus payments are at the ultimate discretion of the Committee. The Committee has discretion to override formulaic outturns and scale back awards, including to zero to ensure the overall bonus payout is reflective of the business performance of the Company.

Maximum opportunity

- The maximum annual bonus opportunity is 100% of salary in any financial year.
- The Committee will determine annual award opportunity and retains the discretion to set the actual opportunity below the Policy maximum.

Performance framework

- Performance measures will be set each year by the Committee taking into account the Company's key strategic objectives for the year. The performance measures are reviewed each year to ensure they remain appropriate and alternative measures will be set if appropriate.
- The Committee retains the ability in exceptional circumstances to adjust targets and/or set alternative measures and alter weightings if certain events occur that cause it to determine that they are no longer appropriate and a change is required to ensure they achieve their original purpose and are not materially less difficult to satisfy.

Executive Director Remuneration Policy (continued)

Long Term Incentive Plan

Purpose and link to strategy

- To provide incentive and reward for the delivery of the Company's long-term strategic objectives and align the long-term interests of shareholders and management through the use of shares to build an increased shareholding.

Operation

- Individuals may be considered for an award under the 4D pharma Long Term Incentive Plan, each financial year, subject to individual performance and Committee discretion.
- Awards may take the form of market value options (with or without performance conditions), performance share awards or restricted share awards. However the current intention is to only grant market value options, with performance conditions, to the Executive Directors.
- Awards may be structured as options or as contingent awards.
- Performance conditions are normally set by the Committee on or before each grant.
- The Committee will determine the extent to which the award vests subject to the extent that any performance conditions have been met and subject to continued employment, in accordance with the plan rules.
- The Committee has the ability to cash settle awards in exceptional circumstances. There is no current intention for awards held by Executive Directors to be cash settled.
- The vesting outcome may be reduced, if necessary, to reflect the underlying Company financial performance.
- A post-vesting holding period (normally of two years) may apply at the discretion of the Committee for LTIP awards that vest (net of tax). Any holding requirement will continue to apply if the Executive Director leaves employment during the holding period or is permitted to retain any part of an award as a good leaver. The shares will count towards the Executive Director's in-employment shareholding requirement.
- Dividend equivalents, payable in either cash or additional shares, may be paid.
- Malus and clawback provisions apply in the event of:
    i. material misstatement of financial results;
    ii. misstatement of performance;
    iii. material failure of risk management;
    iv. serious misconduct or material error by a participant;
    v. corporate failure;
    vi. serious reputational damage;
    vii. the use of personal hedging undermining the effects of the shareholding policy;
    viii. breach of employment contract; or
    ix. any other circumstances similar in nature or effect to those above.
- The Committee has discretion to override formulaic outturns and scale back awards, including to zero, to reflect the wider business performance.
- Awards are subject to discretions set out in the relevant LTIP rules.
- Non-transferable, except on death to the option holder's personal representative, and may not be assigned or charged.

Maximum opportunity

- From the date of approval of this Policy, the normal maximum LTIP grant limit is 200% of salary on the assumption that awards are made as performance share awards. For the purposes of this limit, where market value options with performance conditions are awarded, the maximum face value of shares subject to options will be divided by 2.75 (giving a maximum face value of 550% of salary) *if there are performance conditions and by 2.2 (giving a maximum face value of 440% of salary) if there are no performance conditions.* Where restricted share awards are awarded the face value of shares subject to the awards will be multiplied by 2 (giving a maximum face value of 100% of salary).
- The Committee will determine individual awards annually, within the approved Policy limit.

Performance framework

- Performance measures, their respective weightings and targets are set by the Committee.
- Vesting of awards will normally be based on achievement of key strategic measures, selected by the Committee and measured over a period of no less than three financial years.
- *Different performance measures and/or weightings may be used for future awards.*
- The Committee retains the ability in exceptional circumstances to adjust targets and/or set alternative measures and alter weightings if certain events occur that cause it to determine that they are no longer appropriate and a change is required to ensure they achieve their original purpose and are not materially less difficult to satisfy.

Executive Director Remuneration Policy (continued)

Shareholding requirements

Purpose and link to strategy

- The Committee considers that share ownership by the Executive Directors strengthens the link between their personal interests and those of shareholders.

Operation

In-employment requirement

- Executive Directors are expected to build up their shareholding requirement over a period of time, through the retention of shares received under the Company's equity incentive plans, net of sales tax and/or shares purchased from the Directors' own funds. Awards vesting under the LTIP shall be retained until the shareholding is met.
- Vested but unexercised LTIP awards/LTIP shares that have vested, including those within the two-year post-vesting holding period, on a net of tax basis count towards this limit.

Maximum opportunity

- There is no maximum; however, Executive Directors are expected to build and maintain a minimum shareholding equivalent to 200% of salary for the CEO and 200% for all other Executive Directors.
- A newly appointed Executive Director is normally required to meet the minimum shareholding requirement within a period of five years of appointment to the Board.

Performance framework

- Not applicable.

Committee discretion in the operation of incentive plans

The Committee operates the Company's incentive plans according to the respective plan rules and in accordance with local tax authorities. The Committee retains discretion over a number of areas relating to the operation and administration of the Policy. These include, but are not limited to:

- who participates in incentive plans;
- the timing of award grants and/or payments;
- the type of an award (market value option, performance share award or restricted share award);
- the size of an award and/or a payment (within the limits of the Policy as set out in the table above), including determining the actual number of shares, taking into account the share price and wider factors;
- the discretion to make one-off awards (within the limit of the Policy as set out in the table above);
- the choice, weighting and targets of performance metrics;
- determining the delivery vehicle of the award;
- discretion relating to the measurement of performance in the event of a change of control or restructuring;
- *determination of 'good leaver' status for incentive plan purposes based on the rules of each plan and the appropriate treatment and* treatment of leavers' awards;
- determining the extent of vesting of awards and pay outturns, based on the assessment of any performance conditions, including overriding formulaic outcomes and scaling back awards;
- the form of payment;
- the net settling of awards and/or cash settling of tax, to the extent permitted under the prevailing plan rules;
- whether, and if so to what extent, malus and clawback shall apply;
- adjustments made in certain circumstances, e.g. change of control, rights issue, or corporate restructuring, including but not limited to the assessment of performance on any modified basis taking into account a curtailed vesting period; and
- ability to adjust existing performance conditions for exceptional events so that they can still fulfil their original purposes but are no less stretching.

Legacy arrangements

The Policy will be formally effective following shareholder approval at the 2022 AGM, with those parts of the Policy applicable to the annual bonus applying for the full 2022 financial year. For payments and commitments made prior to the approval of this Policy, the Company may make payments and honor any commitments entered into with current or former Directors. Details of any payments will be set out in the Annual Report on Remuneration as they arise.

Executive Directors' external appointments

Executive Directors may undertake external appointments as Non-Executive Directors of other companies and retain the fees, with the approval of the Board, on a case-by-case basis.

Non-Executive Director Remuneration Policy

NED fees

Purpose and link to strategy

- Supports the recruitment and retention of high calibre Non-Executive Directors with the required skills and experience.
- To provide fees which take account of the responsibilities and the time commitment of the role.

Operation

- The Chairperson's fee is determined and recommended to the Board by the Committee.
- Fees are reviewed annually.
- Remuneration for Non-Executive Directors, other than the Chairperson, comprises a basic annual fee for acting as Non- Executive Director of the Company. The annual fee covers all duties, including service on any Board Committee.
- Supplementary fees may be paid for chairing Board Committees.
- The Chair receives an all-inclusive fee.
- NEDs are not eligible to participate in any pension, bonus or benefits plans.
- At the discretion of the Board/Committee, NEDs may be eligible to receive option grants to reflect the market practice of peers listed on the same exchange as the Company.
- Reasonable business-related expenses, including tax thereon if applicable, may be reimbursed if determined to be a taxable benefit, including the independent professional advice.
- If there is a temporary yet material increase in the time commitments for Non-Executive Directors, the Board may pay extra fees on a pro-rata basis to recognize the additional workload.

Maximum opportunity

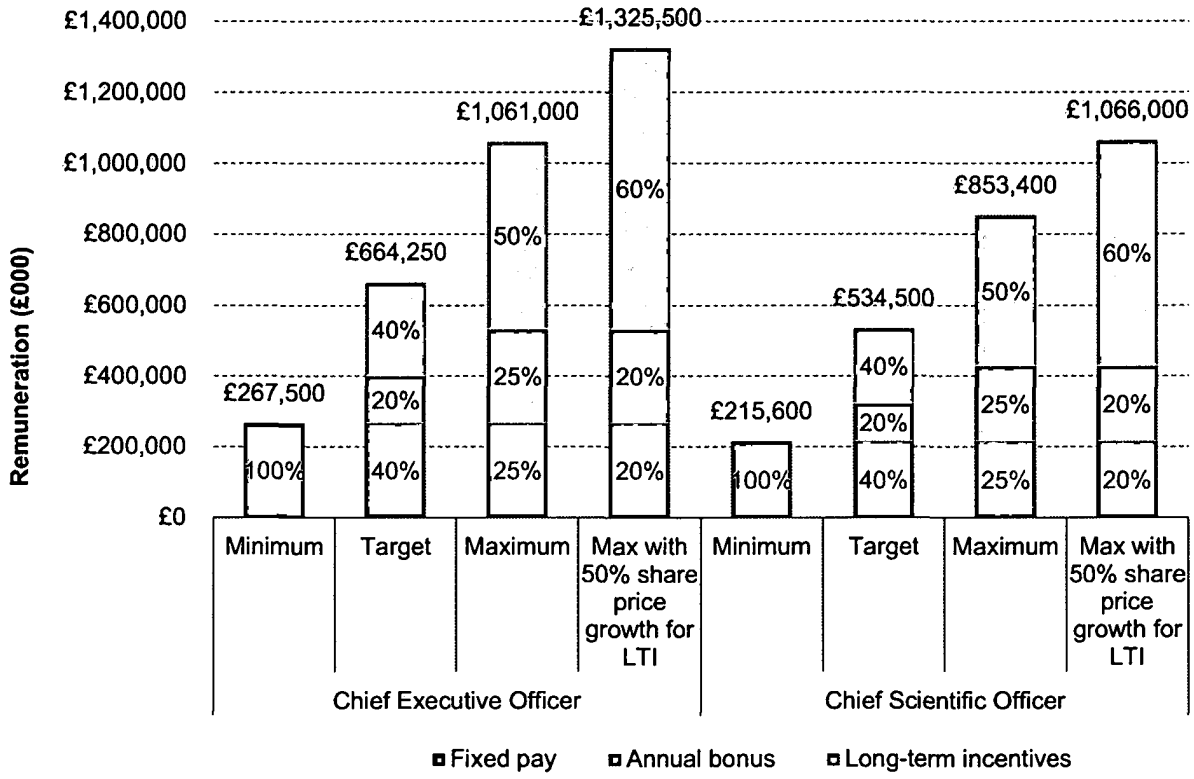
- There is no maximum fee level but fees are set by reference to current market rates.
- Aggregate fees are subject to the limit set out in the articles of association.

Performance framework

- Not applicable.

Executive Director Remuneration Policy scenario analysis

The charts below illustrate the amounts that each of the Executive Directors would be paid under different annual performance scenarios, based on the Directors' Remuneration Policy.



The underlying assumptions for each of the above performance scenarios are detailed below:

	Fixed remuneration	Variable remuneration	
Performance scenario	Salary, pension and benefits	Annual bonus	LTIP
Threshold	✓	×	×
On-target	✓	✓	✓
		On-target bonus of 50% of maximum opportunity (50% of salary)	50% LTIP vesting
Stretch	✓	✓	✓
		100% of maximum opportunity (100% of salary)	Full LTIP vesting
Stretch + 50%	✓	✓	✓
		100% of maximum opportunity (100% of salary)	As above but with the assumption that share price has appreciated by 50%

Selection of performance measures and targets

The performance measures are selected based on the strategic priorities of the Company. The measures and their respective weightings may change from time to time. For the current performance period, short-term corporate objectives include measures relating to clinical development, corporate development, commercial planning, finance, manufacturing and intellectual property/legal.

Selection of performance measures and targets (continued)
Full details of the measures and targets used for any bonus and/or LTI will be disclosed in the annual report on remuneration for the relevant year.

Statement of consideration of shareholder views
The views expressed by shareholders and proxies in respect of our disclosures and at the AGM are considered by the Committee as part of the development of the Policy. The Company also engages with investors through our investor relations inbox and, recognizing the reach of social media, via regular updates through Twitter and LinkedIn, providing an alternative and valuable platform for investors to share their views.

The Company continues to engage with investors to address any aspects of general investor concern, typically led by the CEO and the Chairperson, and regularly hosts update seminars and presentations to institutional investors and wider stakeholders.

Statement of consideration of employment conditions elsewhere in the Company
The Committee does not formally consult with employees; however, the Committee is updated by the HR Director on the results of engagement surveys/employee forums. The Committee is provided with details of salary increases for the wider employee workforce, benefits made available and the participation in any bonus and LTIPs. The Committee is aware of how the average total remuneration of employees generally compares to that of the Executive Directors.

Difference in the Policy for Executive Directors relative to the broader employee population
The broad themes and philosophy are consistent throughout the Company. There are good reasons for the structure and/or quantum for Executive Directors to differ from that of the broader employee population, including a greater proportion of the remuneration being 'at risk' performance-related variable pay. Key themes and philosophy include:

- Salaries throughout the Company are reviewed annually, taking account of the same factors for both Executive Directors and the wider workforce.
- Eligibility for benefits will be assessed on similar terms.
- All employees, including Executive Directors are eligible to participate in any bonus plan.
- Executive Directors and individuals at all levels in the Company are eligible to participate in the new equity incentive award plan. The only equity awards made since the Company was founded were made on a Company-wide basis.

Approach to recruitment
The Committee will set an appropriate level of base salary to secure high caliber candidates either from the external market or internal promotion, paying no more than is necessary to secure the candidate.

The Committee may set initial base salary below the market rate with the aim to make multi-year staged increases to achieve the desired market position over time. Where necessary these increases may be above those of the wider workforce, but will be subject to continued development in the role. Base salary, together with benefits will reflect the skills and experience of the individual and the role and take into account location, internal relativities, the external market and the candidate's current remuneration.

Annual bonus opportunity will be consistent with the Policy above and subject to the maximum level referred to in it. LTI awards will not exceed 1.5 times the limit set out in the Policy above.

In addition, the Committee may consider making a one-off award, for example a buy-out award, either in cash or shares, to compensate for deferred awards forfeited by the individual on leaving their previous employer, if this is in the best interests of the Company and its shareholders. The award will normally attempt to reflect the type of award, and the time horizons and performance conditions attached to the awards being forfeited to the extent possible.

Depending on the timing of the appointment, the Committee may consider it appropriate to set different annual bonus performance conditions and/or to pro-rate the award in the first financial year of appointment. An LTI award may be made shortly following appointment, or as soon as practical after once the Company is no longer in a close period.

The cost of reasonable relocation expenses and legal fees may be made, as necessary.

Existing terms and incentive awards and benefits will be ringfenced for internal appointees (where different structures are in place below Board).

Policy on leaving office

There is no fixed end date to the service agreements. A 12-month notice period is set under the Executive Directors' service agreements. On termination of the Executive Directors' service agreement, the Committee will take into account the Director's duty to mitigate loss when determining the compensation.

The Company may terminate the contract immediately in the event of default, which includes, but is not limited to, circumstances where the individual is disqualified from acting as a Director, convicted of a criminal offence, declared bankrupt, found guilty of fraud or conducting gross misconduct.

In the event of an early termination, not as a result of default, the Committee may exercise discretion to make a payment in lieu of notice equivalent to the basic salary that would have been payable on the date of termination.

The policy on the treatment of Executive Directors on departure from office is summarized in the following table:

Element of remuneration	Leaver, other than as a good leaver or on a change of control/winding up	Good leaver*
Salary, benefits and pension	Paid/provided for proportion of notice period worked. Any accrued but untaken holiday pro-rated to the date of leaving.	Paid up to the date of departure, or death, or for a period up to the end of a benefit plan period at the discretion of the Committee. Pro-rata accrued but untaken holidays to date of departure.
Annual bonus	Departure during the bonus year will normally mean no bonus is payable.	Departure during the bonus year, or in the period to the normal payment date, will normally mean a pro-rata bonus is payable, based on the extent of the performance period employed and performance achieved.
LTIP	Awards will ordinarily lapse on cessation of employment.	Subject to the discretion of the Committee, unvested awards will normally be retained by the individual for the remainder of the vesting period and remain subject to the relevant performance conditions and will ordinarily be subject to time pro-ration. In the event of death, the Committee will determine the extent to which the unvested awards may be exercised. The award may ordinarily be exercised within 12 months of death.
Other	The Committee may pay reasonable outplacement and legal fees where considered appropriate. The Committee may pay any statutory entitlements or settle or compromise claims in connection with a termination of employment, where considered in the best interests of the Company.	

* Cessation due to ill health, injury or disability of such severity as to result in their leaving, any reason (other than gross misconduct) after 15 years' continuous service has been accrued, with the Company, change of control or any other reason (other than gross misconduct) at the Committee's discretion.

Non-Executive Directors are entitled to fees that have accrued up to the date of termination, together with the reimbursement of expenses incurred before that date.

Executive Directors' service contracts

The table below summarizes the key details in respect of each Executive Director's service contract. The contracts have an equal notice period from the individual and the Company of a maximum of 12 months.

Executive Directors

Name	Title	Contract date	Notice period
Duncan Peyton	Chief Executive Officer	10 February 2014	12 months
Dr. Alex Stevenson	Chief Scientific Officer	10 February 2014	12 months

Non-Executive Directors' terms of appointment

Non-Executive Directors

Name	Appointment date	Notice period
Prof. Axel Glasmacher	7 January 2019	3 months
Dr. Ed Baracchini	6 December 2018	3 months
Dr. Sandy Macrae	19 August 2019	3 months
Dr. Katrin Rupalla	23 September 2020	3 months
Paul Maier	9 February 2021	3 months

This report sets out the elements of remuneration paid to, or earned by, the Directors in respect of the financial year 2021.

Single total figure of remuneration of each Director (unaudited)

The Directors' proportion of fixed and variable remuneration is shown in the below table for the years ended 31 December 2021 and 2020. Fixed remuneration is the sum of salary, taxable benefits and pension (columns a, b and e of the single total figure table). Variable remuneration is the sum of any annual bonus, share options or other types of remuneration (columns c, d and other of the single total figure table).

Year ended 31 December 2021	(a) Salary/fees £000	(b) Benefits (i) £000	(c) Bonus £000	(d) LTIP (ii) £000	(e) Pension £000	2021 Total £000	Fixed remuneration (a, b and e) £000	Variable remuneration (c, d and other) £000
Executive								
Duncan Peyton	182	3	—	—	—	185	185	—
Dr. Alex Stevenson	156	3	—	—	—	159	159	—
Non-Executive								
Prof. Axel Glasmacher(1)	75	—	—	—	—	75	75	—
Dr. Ed Baracchini	50	—	—	—	—	50	50	—
Dr. Sandy Macrae(2)	54	—	—	—	—	54	54	—
Dr. Katrin Rupalla	50	—	—	—	—	50	50	—
Paul Maier(3), (4)	49	—	—	—	—	49	49	—

Year ended 31 December 2020	(a) Salary/ fees £000	(b) Benefits (i) £000	(c) Bonus £000	(d) LTIP (ii) £000	(e) Pension £000	2020 Total £000	Fixed remuneration (a, b and e) £000	Variable remuneration (c, d and other) £000
Executive								
Duncan Peyton	100	2	—	—	—	102	102	—
Dr. Alex Stevenson	100	2	—	—	—	102	102	—
Non-Executive								
Prof. Axel Glasmacher	50	—	—	—	—	50	50	—
Dr. Ed Baracchini	50	—	—	—	—	50	50	—
Dr. Sandy Macrae	50	—	—	—	—	50	50	—
Dr. Katrin Rupalla(5)	15	—	—	—	—	15	15	—
Thomas Engelen(6)	10	—	—	—	—	10	10	—
David Norwood(7)	8	—	—	—	—	8	8	—

(i) Benefits represent private medical insurance during the years ended 31 December 2021 and 2020.
(ii) No options or other share-based awards vest during the 2020 or 2021 financial year.
(1) Prof. Axel Glasmacher's fee was increased from £50,000 to £100,000 effective as of 1 July 2021.
(2) Dr. Sandy Macrae's fee was increased from £50,000 to £57,300 effective as of 1 July 2021.
(3) Paul Maier was appointed on 9 February 2021.
(4) Paul Maier's fee was increased from £50,000 to £61,000 effective as of 1 July 2021.
(5) Dr. Katrin Rupalla was appointed on 18 August 2020.
(6) Thomas Engelen resigned as a Director on 21 May 2020.
(7) David Norwood resigned as a Director on 30 September 2020.

Performance against annual bonus targets (unaudited)

Executive Directors are eligible to participate in an annual bonus plan. For the 2021 financial year, no annual bonus plan was operated.

Non-Executive Directors are not eligible to participate in the annual bonus plan.

Long-term incentive grants/awards with performance periods ending in 2021 (unaudited)

Executive Directors may be granted long-term incentive awards at the discretion of the Committee. During the year ended 31 December 2021, there were no in-flight LTIP awards to vest.

LTIP interests awarded during the financial year (unaudited)

No LTIP awards were granted to Directors during the 2021 financial year.

Payments to past Directors (unaudited)

There were no payments to past Directors made during the financial year ending 31 December 2021.

Payments for loss of office (unaudited)

There were no payments made to Directors for loss of office during the financial year ending 31 December 2021.

Statement of Directors' shareholdings and share interests (unaudited)

The table below sets out, as at 31 December 2021, the beneficial interest in the Company's shares of the Directors (together with interests held by his or her connected persons). In addition, the table below also sets out the total number of shares held by Directors which are unvested, the total number of options held by Directors, as at 31 December 2021, which are vested but not yet exercised and the total number of options held by Directors which are unvested.

	Share vested	Warrants	Shares unvested	Options vested but not exercised	Unvested options
Director	Beneficially owned shares	Beneficially owned warrants[1]	LTIP	LTIP	LTIP
Executive					
Duncan Peyton	9,514,771	666,666	—	—	—
Dr. Alex Stevenson	9,358,464	666,666	—	—	—
Non-Executive					
Prof. Axel Glasmacher	30,000	—	—	—	—
Dr. Ed Baracchini	—	—	—	—	—
Dr. Sandy Macrae	—	—	—	—	—
Dr. Katrin Rupalla	—	—	—	—	—
Paul Maier	—	—	—	—	—

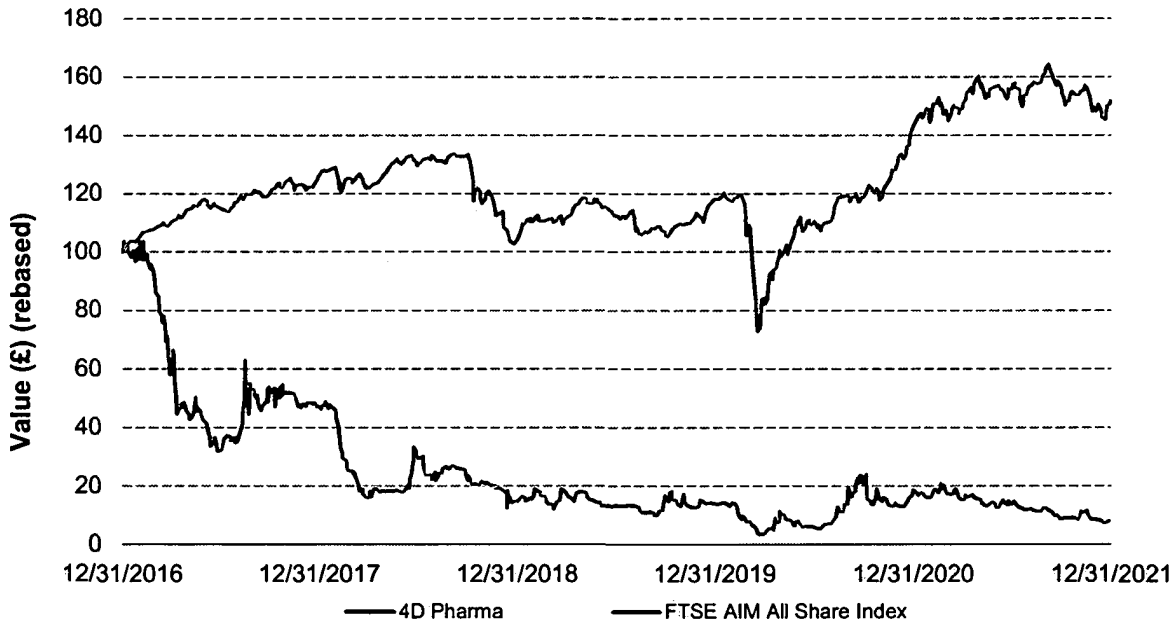
(1) Warrants were acquired as part of private placing. Exercisable at £1.00.

Executive Directors are expected to maintain a minimum shareholding equivalent to 200% of salary. Both Executive Directors have achieved, and exceeded, this level of shareholding. Non-Executive Directors have not received awards under the Company's LTIP. There is no formal policy on Non-Executive Directors' shareholdings.

Performance graph and table (unaudited)

The graph below shows the Company's performance, measured by total shareholder return, for UK ordinary shares listed on AIM Market of the London Stock Exchange (AIM) against the AIM All Share Index. The AIM All Share Index has been selected for this comparison because the Company has been trading on this exchange since 2014 and is therefore considered to be the most suitable comparator index.

Total shareholder return
Source: Datastream



This graph shows the value, by 31 December 2016, of £100 invested in 4D Pharma on 31 December 2016, compared with the value of £100 invested in the FTSE AIM All Share Index on the same date.

Chief Executive Officer total remuneration history

Since the CEO and CSO's appointment in February 2014 when the Company was founded, they have both received £100,000 per annum as remuneration, with no bonus or equity awards made during that time. From 1 July 2021, the salary paid to the CEO increased to £264,500 per annum and increased to £212,600 per annum for the CSO, as part of a phased increase.

The table below summarizes the Chief Executive Officer's total single figure of remuneration, annual bonus and long-term incentive outturns, as a percentage of maximum opportunity for 2021 and the previous four years.

	2017 £000	2018 £000	2019 £000	2020 £000	2021 £000
Total single figure of remuneration	100	100	100	100	182
Annual bonus	—	—	—	—	—
LTIP	—	—	—	—	—

No bonuses were paid and no LTIP awards vested in the five-year period shown above.

Annual percentage change in Directors' and employees' remuneration

	Salary/fees		Benefits		Annual bonus	
Director	2020	2021	2020	2021	2020	2021
Executive						
Duncan Peyton	0%	82.5%	0%	28.4%	—	—
Dr. Alex Stevenson	0%	56.6%	0%	29.5%	—	—
Non-Executive						
Prof. Axel Glasmacher	0%	50%	n/a	n/a	n/a	n/a
Dr. Ed Baracchini	0%	0%	n/a	n/a	n/a	n/a
Dr. Sandy Macrae	194%	7.3%	n/a	n/a	n/a	n/a
Dr. Katrin Rupalla[1]	n/a	n/a	n/a	n/a	n/a	n/a
Paul Maier[2]	n/a	n/a	n/a	n/a	n/a	n/a
Average for UK employees[3]	-11.7%	10.8%	n/a	n/a	n/a	n/a

(1) Dr. Katrin Rupalla was appointed on 18 August 2020.
(2) Paul Maier was appointed on 9 February 2021.
(3) In 2019, the Company had 57 employees in the UK. In 2020, the Company had 49 employees in the UK. In 2021, the Company had 35 employees in the UK.

Relative importance of spend on pay (unaudited)

The Remuneration Committee considers the Company's research and development (R&D) expenditure relative to salary expenditure for all employees to be the most appropriate metric for assessing overall spend on pay due to the nature and stage of the Company's business. Dividend distribution and share buy-back comparators have not been included because the Company has no history of such transactions. The table below illustrates the gross pay to all employees, per year, as compared to R&D expenditure and illustrates the year-on-year change.

	2021 £000	2020 £000	% change
Gross pay to all employees	4,405	4,758	(7.4%)
R&D expenditure	19,818	22,041	(10.1%)

Membership of the Remuneration Committee and its advisors (unaudited)

The Remuneration Committee currently comprises two independent Non-Executive Directors: Dr. Sandy Macrae (Chair) and Prof. Axel Glasmacher. In May 2020 Dr. Macrae assumed the role of Chair of the Committee from Dr. Glasmacher. The Chief Executive Officer, Chief Financial Officer and Interim General Counsel, while not members of the Committee, as well as others, are invited to attend Remuneration Committee meetings as required to provide advice and assistance. No Director plays any part in determining his own remuneration. The terms of reference of the Committee can be found on our website at www.4dpharmaplc.com.

Committee membership

	Date of appointment to the Committee	Meetings eligible to attend	Meetings attended
Dr. Sandy Macrae (Chair)	May 2020	8	8
Prof. Axel Glasmacher	September 2020	8	8

Membership of the Remuneration Committee and its advisors (unaudited) (continued)

Committee membership (continued)

In carrying out its responsibilities, the Committee seeks external remuneration advice as required. During the year, the Remuneration Committee engaged Radford (part of Aon plc) to provide advice on certain remuneration matters, including:

- an evaluation of the compensation provided to the Non-Executive Directors during the financial year and recommendations for a go-forward compensation program;
- a cash compensation benchmarking analysis (competitive assessment) for the European and US workforce;
- a further review of cash compensation provided to Executive Directors and other members of the senior management team, with recommendations for a go-forward compensation program; and
- strategic review of equity compensation practices in Europe and the US given the Company's listing on the Nasdaq Global Market.

The Remuneration Committee is satisfied that Radford (part of Aon plc) provided independent and objective advice. During 2021, total fees of approximately £117,000 were paid to Radford (part of Aon plc).

Statement of voting at a general meeting of the Company

The Company will hold a general meeting on a date to be announced in due course. At this general meeting, shareholders will be asked to approve the Remuneration Policy through a binding vote for the first time, and the annual report on remuneration through an advisory vote. Results of these two votes will be included in next year's Directors' Remuneration Report.

Statement of implementation of Remuneration Policy for 2022

Annual salary (unaudited)

Following a review of compensation in 2021, the Committee decided to increase the salaries for the Executive Directors, as the Company moves to a more commercial footing. This increase is being phased – an initial increase was made, effective 1 July 2021, with the balance of the proposed increase to be made in 2023 subject to financial affordability. As a result, no increases are being made for 2022.

	Salary (1 January 2022)	Salary (1 January 2021)	Increase in salary 2021 to 2022
Duncan Peyton	£264,500	£100,000	£164,500
Dr. Alex Stevenson	£212,600	£100,000	£112,600

Benefits and pension

Both Executive Directors will continue to receive private medical insurance coverage. No changes are proposed be made to the provision of benefits.

Bonus

In line with the Policy provided within this Directors' Remuneration Report, Executive Directors will be eligible to participate in the annual bonus for the 2022 financial year.

The bonus will be subject to the achievement of key short-term corporate objectives which have been set by the Committee with respect to the current performance period. Performance will be assessed against a balanced scorecard of relevant metrics that are key to the achievement of the business strategy.

For the current performance period, short-term corporate objectives include measures relating to clinical development, corporate development, commercial planning, finance, manufacturing and intellectual property/legal.

The amount of bonus payable is at the discretion of the Committee subject to review of performance against the short-term corporate objectives at the end of the performance period (which is aligned with the financial year).

Long Term Incentive Plan

As announced in an RNS statement of the same date, on 4 January 2022 an option grant was made to the Executive Directors. This company-wide award was made in December 2021 for all eligible employees but the grant for the Executive Directors was delayed until January 2022. This is the first LTIP award either Executive Director had been granted since their appointment in February 2014 when the Company was founded. The granting of options was part of the first ever Company-wide award, taking into account the recent Nasdaq listing and the need to attract, retain and incentivize talent to drive the success of the Company.

Each Executive Director was granted market value options over 2,730,486 shares, with an exercise price of 53.6 pence per share. The options are not subject to performance conditions and will vest in equal parts annually over a period of four years, beginning on 1 June 2022.

Going forward, any future annual grants are expected to be lower and will be made under the approved Remuneration Policy, which is effective for grants made after the approval of the Policy at the 2022 AGM, and will be subject to the Policy limits.

Statement of implementation of Remuneration Policy for 2022 (continued)

Chairperson's and Non-Executive Directors' fees for 2022

	Fees (1 January 2022) £000	Fees (1 January 2021) £000	Increase in fees 2021 to 2022 £000
Chairperson[1]	100	50	50
Non-Executive Director base fee	50	50	—
Additional fees:			
Senior Independent Director	—	—	—
Remuneration Committee Chair[2]	7	—	7
Audit and Risk Committee Chair[3]	11	—	11

(1) Chairperson fee was increased from £50,000 to £100,000 with effect from 1 July 2021.
(2) Remuneration Committee Chair additional fee of £7,300 introduced with effect from 1 July 2021.
(3) Audit and Risk Committee Chair additional fee of £11,000 introduced with effect from 1 July 2021.

At the discretion of the Board/Committee, NEDs may be eligible to receive option grants to reflect the market practice of peers listed on the same exchange/s as the Company.

Board of Directors

As 4D has grown and developed from an R&D organization to a fully-fledged clinical-stage drug development biotech, the Company has made key additions to its Board. The Company appointed one new Non-Executive Director, in addition to a new Chief Financial Officer and a new Chief Business Officer in 2021, bringing valuable experience in the clinical development of novel therapies, biopharma finance and business development activities.

Prof. Dr. Axel Glasmacher, Non-Executive Chairman

Appointment date: April 2020 (current role)

Axel joined our board of directors in January 2019, and he has served as our Chairman since April 2020. Prof. Glasmacher currently serves as the Owner of AG Life Science Consulting GmbH & Co. KG since March 2018. Previously, Prof. Glasmacher served as Senior Vice President, Global Clinical Research & Development at Celgene, from April 2016 to February 2018, as Corporate Vice President, Clinical Research and Development from January 2015 to April 2016, as Head/Vice-President of Medical Affairs for Europe, Middle East, and Africa from 2010 to 2014. From May 2006 to December 2009 he worked as Medical Director for Celgene in Germany. Prior to Celgene, Professor Glasmacher worked within the field of hematology-oncology at the University Hospital in Bonn from August 1988 to April 2006. Prof. Glasmacher currently serves on the board of Active Biotech AB (Lund, Sweden) and Ryvu Therapeutics (Kraków, Poland) as well as the Cancer Drug Development Forum (a non-profit association in Belgium). Prof. Glasmacher holds a Medical Doctorate from and serves as adjunct professor of medicine at the University of Bonn.

Duncan Peyton, Chief Executive Officer

Appointment date: June 2014

Duncan has a proven track record in identifying, investing in and growing businesses within the pharmaceutical sector. He was the founder of Aquarius Equity, a specialist investor in businesses within the life sciences sector, which provided investors with access to innovative, high growth potential companies that delivered significant capital growth. Duncan started his career in a bioscience start-up business, which ultimately went on to list on the London Stock Exchange, subsequently qualified as a corporate finance lawyer with Addleshaw Goddard (then Addleshaw Booth & Co), and later joined 3i plc as an investment manager. Duncan founded Aquarius in 2005, which made founding investments into Nanoco Technologies Limited, Auralis Limited (subsequently sold to ViroPharma), Tissue Regenix Group plc, Brabant Pharma (subsequently sold to Zogenix, Inc.) and C4X Discovery plc. Duncan is a co-founder of 4D pharma plc and has served as Chief Executive Officer since 2014.

Dr. Alex Stevenson, Chief Scientific Officer

Appointment date: June 2014

Alex began his career as a microbiologist, working in research for a number of years before joining an NYSE-quoted drug development company. He subsequently moved into pharmaceutical and healthcare investment and has fulfilled a number of board-level investment and operational management roles. He was a director and shareholder in Aquarius Equity from 2008, where he was responsible for identifying new investments and developing and implementing scientific strategies both pre and post-investment. These included Tissue Regenix Group plc, C4X Discovery Holdings plc and Brabant Pharma (subsequently sold to Zogenix, Inc.). Prior to joining Aquarius Equity, Alex worked for IP Group plc, where he specialized in life sciences investments identifying, developing and advising a number of companies in its portfolio, some of which went on to list on AIM. He joined IP Group following its acquisition of Techtran Group Limited in 2005. Alex is a co-founder of 4D pharma plc and has served as Chief Scientific Officer since 2014.

Board of Directors (continued)

Dr. Edgardo (Ed) Baracchini, Non-Executive Director

Appointment date: January 2019

Dr. Baracchini served as the Chief Business Officer of Imago BioSciences, Inc., a biotechnology company, from April 2020 January 2021. Prior to joining us, Dr. Baracchini served as Chief Business Officer at Xencor Inc, from January 2010 to September 2018. Dr. Baracchini has also served as the SVP, Business Development for Metabasis Therapeutics (which was acquired by Ligand Pharmaceuticals, Inc.) from May 2002 to November 2009. Dr. Baracchini currently serves on the board of INmune Bio, Inc., a Nasdaq listed company, and Colmmune, Inc., a privately held company. Dr. Baracchini holds a B.S.in Microbiology from University of Notre Dame, a Ph.D. in Molecular and Cell Biology from the University of Texas at Dallas, and an MBA from the University of California, Irvine — Paul Merage School of Business.

Dr. Sandy Macrae, Non-Executive Director

Appointment date: August 2019

Dr. Sandy Macrae has over 20 years of experience in the pharmaceutical industry, with a combination of scientific, medical and commercial expertise. Dr. Macrae currently serves as President and Chief Executive Officer of Sangamo Therapeutics, Inc., a leading genomic medicine company active in developing cell and gene therapies across a range of rare and large indications. Dr. Macrae has previously served as Global Medical Officer of Takeda Pharmaceuticals, overseeing medical affairs, regulatory affairs, pharmacovigilance, outcomes research and epidemiology, quantitative sciences, and knowledge and informatics. Prior to that, Dr. Macrae held roles of increasing responsibility at GlaxoSmithKline, including Senior Vice President, Emerging Markets Research and Development (R&D), and Vice President, Business Development. Earlier in his career, he worked for SmithKline Beecham, where he was responsible for clinical development in the therapeutic areas of neurology and gastroenterology.

Dr. Katrin Rupalla, Non-Executive Director

Appointment date: September 2020

Dr. Rupalla brings to 4D pharma over 20 years of experience in the pharmaceutical industry, extensive regulatory and clinical expertise in the fields of oncology and neuroscience. Dr. Rupalla has previously served in senior positions at Merck & Co., Roche, Celgene and BristolMyers Squibb (BMS). While at BMS, Dr. Rupalla was Vice President Head R&D China and Global Development Team Leader for Opdivo/Yervoy in China, and then Vice President, Head Oncology Global Regulatory Sciences. Throughout her career, she has led regional and global teams responsible for obtaining approvals for multiple new therapeutics and indications, including Opdivo, Yervoy, Rituxan, Xeloda, Avastin, Revlimid and Vidaza, among others. After this, Dr Rupalla previously served as Senior Vice President, Global Head Regulatory Affairs, Medical Documentation and R&D Quality at Lundbeck, a leading biopharmaceutical developing novel therapeutics for diseases of the central nervous system (CNS). Dr Rupalla is a co-founder and CEO of Ymmunobio AG, an immuno-oncology biotech launched in December 2021. She is currently a member of the Board of Directors of Ambrx. She has a PhD in CNS Pharmacology from the Philipps-University Marburg, Germany, and an MBA from Jones International University, CO, US.

Paul Maier, Non-Executive Director

Appointment date: March 2021

Paul Maier has over 25 years of investor and public relations, operational, regulatory, and finance expertise in the healthcare industry. Mr. Maier was previously the Chief Financial Officer of Sequenom Inc., where he was responsible for raising over $360 million in equity and debt financings, expanding institutional sell side research analyst coverage, as well as overseeing and establishing internal financial infrastructure. Previously, he was Senior Vice President and Chief Financial Officer of Ligand Pharmaceuticals (NASDAQ: LGND) where he helped build Ligand from a venture stage company to a commercial, integrated biopharmaceutical organisation, raising over $1 billion in equity and debt financings including a successful IPO, and helped negotiate multiple R&D and commercial partnerships and transactions. He has also acted as an independent financial consultant to life sciences companies. Mr. Maier is currently a Board member of Eton Pharmaceuticals, Inc., Biological Dynamics and International Stem Cell Corporation (OTCQB: ISCO). He holds an MBA from Harvard University and a BS in Business Logistics from the Pennsylvania State University. Dr. Sandy Macrae Chairman of the Remuneration Committee 31 March 2021.

Dr. Sandy Macrae
Chair of the Remuneration Committee
31 March 2022

Corporate governance: Directors' report

The Directors present their report together with the audited consolidated financial statements, along with the Independent Auditor's Report for the year ended 31 December 2021.

Pages 4 to 108 inclusive (together with sections of the Annual Report incorporated by reference) comprise a Directors' Report that has been drawn up and presented in accordance with and in reliance upon applicable English company law and the liabilities of Directors in connection with that report shall be subject to the limitations and restrictions provided by such law.

Strategic Report

In accordance with section 414C(11) of the Companies Act 2006 and the Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013, the Group has chosen to set out in the Strategic Report information required by schedule 7 of the Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008. Information has been included in the Strategic report rather than the Directors' report to avoid duplication of the details of the Group's research programs and future developments as these are considered to be of strategic importance to the Group.

Directors

The Directors who held office during the year, and as at the date of signing the financial statements, and brief biographical descriptions of the Directors, are set out on pages 49 and 50.

The beneficial and non-beneficial interests of the Directors in the Company's ordinary shares of 0.25 pence are disclosed in the Report of the Remuneration Committee on page 46.

No Director had an interest in any contract that was significant in relation to the Group's business at any time during the year.

Directors' indemnity insurance

The Group has maintained insurance throughout the year for its Directors and officers against the consequences of actions brought against them in relation to their duties for the Group. Such provision remains in force as at the date of approval of the Directors' Report.

Research and development activities

The principal activity of the Group is research and development, a review of which is included in the Chairperson and CEO's statement on pages 7 to 11.

Total research and development spend in the year to 31 December 2021 was £19.8 million (year to 31 December 2020: £22.0 million). No development expenditure was capitalized in the current year or prior year.

Dividends

The Directors do not recommend payment of a dividend nor was there a dividend in the year to 31 December 2020.

Employment policies

The Group is committed to ensuring the health and safety of its employees in the workplace. This includes the provision of regular medical checks.

The Group is committed to keeping employees as fully informed as possible with regard to the Group's performance and prospects and seeks their views, wherever possible, on matters which affect them as employees.

Financial instruments

Details of the Group's financial risk management objectives and policies are disclosed in note 27 to the financial statements.

Share capital and funding

As at 31 December 2021 share capital comprised 180,300,967 ordinary shares of 0.25 pence each. There is only one class of share and all shares are fully paid. No share carries any right to fixed income, and each share carries the right to one vote at general meetings of the Company.

Streamlined Energy and Carbon Reporting

At the start of 2021 the Company instigated a more formal review and reporting regime for its energy consumption and CO_2 emissions in all its locations. We have analyzed the emissions from the different locations, and its distribution among several categories: electricity, gas, travel and cooling. The conversions have been made from the data provided by the suppliers, and where not available, estimates have been made based on the existing information. For employees working from home, the electricity and CO_2 data has been based on annual costs of 175kg of CO_2 per computer plus 0.7 tons of CO_2 per person.

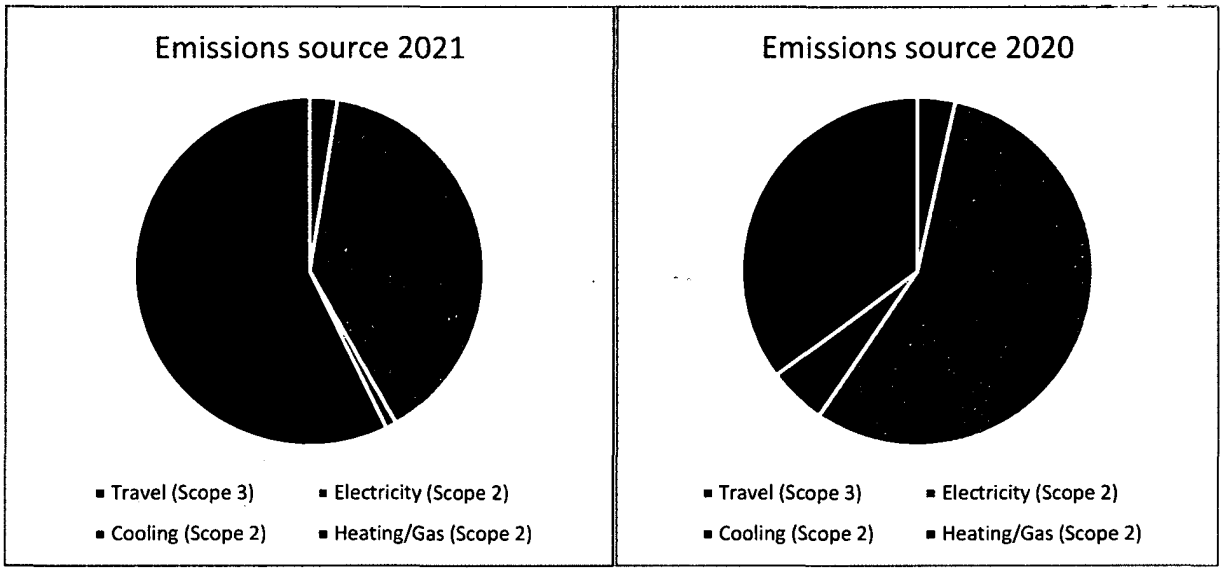
The following table shows the distribution of the CO_2 emissions per site, and the global emissions for the Group:

Site	Year to 31 December 2021 kWh	Year to 31 December 2021 kg CO_2e	Year to 31 December 2020 kWh	Year to 31 December 2020 kg CO_2e
4D pharma plc (Leeds, UK)	151,757	24,390	86,056	29,748
4D Pharma Research Limited (Aberdeen, UK)	279,773	46,150	250,003	57,942
Total (UK)	431,530	70,540	336,059	87,690
4D Pharma León S.L.U. (León, Spain)*	2,172,919	375,010	1,073,879	215,840
4D Pharma Cork Limited (Cork, Ireland)	2,200	350	28,303	7,744
Total (Europe)	2,606,649	445,900	1,438,241	311,274
4D Pharma Delaware Inc. (CA, USA)	725	130	—	—
Total (global)	2,607,374	446,030	1,438,241	311,274

* The kg CO_2e calculation includes fluorinated gases that are not included in the kWh calculation.

Our manufacturing plant, in León, Spain, contributed the majority of the Group emissions at 84% of the total in the year to 31 December 2021 compared to 69% of total Group emissions in the year to 31 December 2020. In early 2021 4D Pharma León implemented an Environmental Management System, which includes the goals of reduction of emissions and waste. The system has been audited, and an ISO 14000 certificate will be requested in 2022.

The Group is currently reporting an increase of 43% on CO_2 emissions from last year, mainly due to the change in operational activity that had a more pronounced effect in 2020 than in 2021 as COVID-19 restrictions reduced. Group CO_2 emissions are further exacerbated in 2021 due to a cumulative correction from our gas provider in León, Spain, which arose from a meter defect detected during the year; we have not tried to correct for the effect of this in prior years as the information is not available. The following graphs show the distribution of emissions by category:



Due to the pandemic and associated restriction to traveling, lower staff numbers, and increased utilization of working from home conditions among staff, emissions associated with traveling remained similar in 2021 despite the relative easing of restrictions during the year (when compared to 2020). The Group policy has been updated to try to maintain these working policies, albeit with an anticipated increase in attendance at local offices, by actively promoting technological solutions over travel. The calculation of emissions associated with travel has been made using the carbon emissions calculator of the Spanish government.

Streamlined Energy and Carbon Reporting (continued)

Cooling-associated emissions have been calculated using the official conversion factors from the volume of fluorinated gases used in the regulation of temperature management systems.

Regarding the sustainability of our activity, efforts are devoted to use as much energy obtained from renewable sources as possible with 32% of the energy utilized in the Group being from certified renewable sources.

Intensity metric

The intensity metric utilized is tCO_2e per FTE. The commitment of the Company to improve energy efficiency will be measured by this metric in the comparison with future years. The intensity metric for 2021 is 4.63 tCO_2e/FTE. The increase in intensity comes from the increase in the industrial production level between 2020 and 2021. Efforts will be dedicated to reducing the total emissions and the intensity metric.

Substantial shareholders

	Number of ordinary shares 0.25 pence each as at 31 December 2021	% of issued capital	Number of ordinary shares 0.25 pence each as at 31 December 2020	% of issued capital
Hargreaves Lansdown Asset Management	**25,139,905**	**13.94%**	16,853,258	12.82%
4D pharma Directors and related holdings	**18,025,411**	**10.00%**	16,707,731	12.71%
South Ocean Capital Management LLC and connected parties	**13,863,075**	**7.69%**	14,442,698	10.99%
Interactive Investor Trading	**13,274,017**	**7.36%**	7,495,859	5.70%
Halifax Share Dealing	**8,978,509**	**4.98%**	5,129,953	3.90%
Merck Sharp & Dohme Corp (Merck & Co./MSD)	**8,315,023**	**4.61%**	7,661,000	5.83%
Fidelity Management & Research Company	**7,152,255**	**3.97%**	—	0.00%
A J Bell Securities	**6,576,128**	**3.65%**	3,947,699	3.00%
Barclays Bank	**6,316,420**	**3.50%**	6,060,085	4.61%
American Depositary Receipts (ADRs)	**24,850,880**	**13.78%**	—	0.00%

Full details of the Group's and the Company's share capital movements during the year are given in note 23 to the financial statements.

Details of shares under option are provided in note 21 to the financial statements.

Corporate Governance Statement

The Group's statement on corporate governance can be found in the Corporate Governance Report on pages 28 to 31.

Going concern

The Chairperson and CEO's Statement on pages 7 to 11 outlines the business activities of the Group, along with the factors which may affect its future development and performance, and discusses the Group's financial position, along with details of its cash flow and liquidity. Reference is made to the statement on principal risks and uncertainties on pages 23 to 27.

The Group and parent company are subject to a number of risks similar to those of other development stage pharmaceutical companies. These risks include, amongst others, generation of revenues in due course from the development portfolio and risks associated with research, development and obtaining regulatory approvals of its products. Ultimately, the attainment of profitable operations is dependent on future uncertain events which include obtaining adequate financing to fulfil the Group's commercial and development activities and generating a level of revenue to support the Group's cost structure.

The Directors have prepared detailed financial forecasts and cash flows looking beyond 12 months from the date of the approval of these financial statements. In developing these forecasts, the Directors have made assumptions based upon their view of the current and future economic conditions that are expected to prevail over the forecast period and believe that the current cash position of the Group will be sufficient to support the Group into quarter four of 2022.The Directors are continuing to explore sources of finance available to the Group and have a reasonable expectation that they will be able to secure sufficient cash inflows into the Group to continue its activities for not less than 12 months from the date of approval of these accounts. They have therefore prepared the financial statements on a going concern basis.

Because the additional finance is not committed at the date of approval of these financial statements, these circumstances represent a material uncertainty as to the Group's ability to continue as a going concern. Should the Group be unable to obtain further finance such that the going concern basis of preparation were no longer appropriate, adjustments would be required including to reduce the balance sheet values of assets to their recoverable amounts, and to provide for future liabilities that may arise.

Disclosure of information to the auditor

The Directors who held office at the date of approval of this Directors' Report confirm that:

- so far as they are each aware, there is no relevant audit information of which the Group's auditor is unaware; and
- each Director has taken all the steps that they ought to have taken as a Director to make himself aware of any relevant audit information, and to establish that the Group's auditor is aware of that information.

Auditor

RSM UK Audit LLP has indicated its willingness to continue in office. Ordinary resolutions to re-appoint RSM UK Audit LLP as auditor and to authorize the Directors to agree its remuneration will be proposed at the forthcoming Annual General Meeting.

Annual General Meeting

The Annual General Meeting of the Company will be held at 9 Bond Court, Leeds, UK, LS1 2JZ. The date and time of the AGM will be confirmed in the near future.

The Directors' Report was approved by the Board on 31 March 2022 and was signed on its behalf by:

Duncan Peyton
Chief Executive Officer
31 March 2022

Corporate governance: Statement of Directors' responsibilities

The Directors are responsible for preparing the Strategic Report, the Directors' Report and the financial statements in accordance with applicable law and regulations.

Company law requires the directors to prepare Group and Company financial statements for each financial year. The Directors have elected under company law and are required by the AIM Rules of the London Stock Exchange to prepare Group financial statements in accordance with UK-adopted International Accounting Standards and have elected under company law to prepare the Company financial statements in accordance with UK-adopted International Accounting Standards.

The Group and Company financial statements are required by law and UK-adopted International Accounting Standards to present fairly the financial position and performance of the group. The Companies Act 2006 provides in relation to such financial statements that references in the relevant part of that Act to financial statements giving a true and fair view are references to their achieving a fair presentation.

Under company law the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Group and the Company and of the profit or loss of the Group for that period.

In preparing each of the Group and Company financial statements, the Directors are required to:

a. select suitable accounting policies and then apply them consistently;

b. make judgements and accounting estimates that are reasonable and prudent;

c. state whether they have been prepared in accordance with UK-adopted International Accounting Standards in conformity with the requirements of the Companies Act 2006; and

d. prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Group and the Company will continue in business.

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Group's and the Company's transactions and disclose with reasonable accuracy at any time the financial position of the Group and the Company and enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the Group and the Company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

The Directors are responsible for the maintenance and integrity of the corporate and financial information included on the 4D pharma plc website.

Legislation in the UK governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Independent auditor's report to the members of 4D pharma plc

Opinion

We have audited the financial statements of 4D pharma plc (the 'parent company') and its subsidiaries (the 'group') for the year ended 31 December 2021 which comprise the Group Statement of Total Comprehensive Income, the Group and Parent Company Statement of Financial Position, the Group and Parent Company Statement of Changes in Equity, the Group and Parent Company Cash Flow Statement and notes to the financial statements, including significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and UK-adopted International Accounting Standards and, as regards the parent company financial statements, as applied in accordance with the provisions of the Companies Act 2006.

In our opinion:

- the financial statements give a true and fair view of the state of the group's and of the parent company's affairs as at 31 December 2021 and of the group's loss for the year then ended;
- the group financial statements have been properly prepared in accordance with UK-adopted International Accounting Standards;
- the parent company financial statements have been properly prepared in accordance with UK-adopted International Accounting Standards and as applied in accordance with the Companies Act 2006; and
- the financial statements have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the group and parent company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard as applied to listed entities and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Summary of our audit approach

Key audit matters	***Group*** • Longevity "Merger" accounting • Impairment of Intangibles • Warrant issue accounting and valuation ***Parent Company*** • Longevity "Merger" accounting • Warrant issue accounting and valuation • Impairment of intercompany receivables
Materiality	***Group*** • Overall materiality: £539,000 (2020: £588,000) • Performance materiality: £404,000 (2020: £441,000) ***Parent Company*** • Overall materiality: £249,000 (2020: £330,000) • Performance materiality: £186,000 (2020: £247,000)
Scope	Our audit procedures covered 100% of revenue, total assets and loss before tax.

Key audit matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the group and parent company financial statements of the current period and include the most significant assessed risks of material misstatement (whether or not due to fraud) we identified, including those which had the greatest effect on the overall audit strategy, the allocation of resources in the audit and directing the efforts of the engagement team. These matters were addressed in the context of our audit of the group and parent company financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

In addition to the matter described in the Material uncertainty related to going concern section we have determined the matters described below to be the key audit matters to be communicated in our report.

Longevity "Merger" Accounting (Group and parent)

Key audit matter description	On 22 March 2021, the Group "merged" with Longevity Acquisition Corporation ("Longevity"), a Special Purpose Acquisition Company ("SPAC"), and listed on Nasdaq. Details relating to the transaction are set out in Note 13 to the Financial Statements and the basis of accounting set out in Accounting Policy 3(a)(ii) Acquisition of Special Purpose Acquisition Companies. The specific nature of activity of a SPAC means that any transaction involving such a vehicle does not meet the normal criteria for a Business Combination under IFRS3 and as a result the accounting becomes more complex. Application of incorrect accounting principles can lead to a material mis-statement of the Group and Parent Statement of Financial Position in terms of the values applied to the recognition of the assets acquired, the equity issued as part of the transaction and the investment held in the Parent Company Financial Statements.
How the matter was addressed in the audit	The Directors prepared a detailed paper setting out the basis of the transaction, along with underlying calculations to support the accounting adopted in the financial statements. We performed work on the Directors' assessment as follows: • Reviewing the underlying legal agreements and documents setting out the status of Longevity as a SPAC and the basis of the transaction as a result to ensure that the basis of the transaction was consistent with this. • Challenging the Board as to the basis of the accounting set out in their Paper and the alternative approaches that had been considered. • Reviewing the accounting adopted by management to ensure that the valuation applied to both the investment acquired and the consideration issued was in accordance with the applicable accounting standard and underlying legal agreements.

Warrant issue accounting and valuation (group and parent)

Key audit matter description	During the year, the Group issued various warrants to subscribe for Ordinary Shares in the parent company both as part of the Longevity "Merger" and the raising of loan finance. Details concerning these transactions are set out in Notes 21and 23 respectively to the Financial Statements and the accounting policies applied to the warrant issues in Notes 3(t) and 3(u). Accounting for warrants is a complex area involving judgements and estimates around the applicable accounting treatment on initial issue and the valuation thereof and whether there is the need to subsequently re-value these instruments. Judgements around the models applicable for the valuation of the instruments and the key estimates and inputs into these models have to be made by management and evaluated by the auditor.
How the matter was addressed in the audit	The Directors prepared detailed papers to set out the accounting treatment of the warrants as part of their assessment of the accounting for the Longevity "Merger" (as noted above) and raising of loan finance. Our audit work on this area included: • Reviewing the legal agreements issued in respect of the various warrants to establish the basis of conclusions reached by the Directors. • Challenging the Directors' assessment of the basis of accounting of each of the warrant instruments. • Reviewing the models used by the Board to value / re-value the instruments, challenging management on the estimates used and the sensitivity of the estimates to variance. • Reviewing the disclosures in the Financial Statements to ensure the consistency with the underlying agreements and accounting policies.

Key audit matters (continued)

Impairment of intangibles (group)

Key audit matter description	The Group carries goodwill and other intangibles amounting to £13,686,000 (2019: £14,025,000) in respect of past business combinations and subsequent purchases of intangible assets. As set out in note 12 the recoverability (and timing thereof) of the goodwill and other intangibles arising on these acquisitions is dependent on the cash generating units to which the intangible is allocated generating sufficient cash flows in the future. We considered this to be a key audit matter because of the significant management judgement in forecasting the cash flows and selecting an appropriate discount rate. There is a high level of estimation uncertainty which results in there being a significant risk associated with determining whether goodwill and other intangible assets are impaired and useful economic lives remain appropriate.
How the matter was addressed in the audit	We performed work on the Directors' impairment assessment as follows: • Reviewing the underlying models, corroborating the inputs thereto and challenging the judgements and assumptions used by management and the need or otherwise for these to be updated based on new matters arising in their assessment of whether goodwill and other intangible assets had been impaired; • Performing sensitivity analysis on the cash flow model; • Considering whether the models used in the prior year are still appropriate given the developments within the business during the year and the stages of the programme lifecycles; and • Assessing management's sensitivity analysis of key assumptions and how these have been updated, including those in relation to the likelihood of successful product development, timing of sales and associated cash inflows, pricing, and discount rate, and considered whether the disclosures about the sensitivity of the outcome of the impairment assessment to reasonably possible changes in key assumptions were adequate and properly reflecting the risks inherent in the assessment of the carrying value of goodwill and other intangibles.

Impairment of intercompany receivables (parent)

Key audit matter description	At 31 December 2021 the parent company balance sheet includes gross amounts owed by subsidiary undertakings of £86,900,000 (2020: £74,078,000). The risk is that this balance may not be recoverable owing to the ongoing losses sustained in the group's subsidiary undertakings. The recoverability of these balances is judgemental, and the Directors have provided us with their assessment of recoverability through multiple scenarios, including the present value of future cashflows, the saleable value of liquid assets, and also through assessing the value of the group (including assessment of the current market capitalisation). A cumulative provision of £1,408,000 (2020: £1,408,000) has been recognised against the receivable from 4D Pharma Cork Limited. No other intercompany receivables were impaired.
How the matter was addressed in the audit	We identified amounts due from each subsidiary undertaking and discussed with management whether each balance is recoverable taking into account the strategic plans established by the Board in respect of each subsidiary undertaking. We also obtained management's impairment reviews and underlying calculations prepared to support the carrying value of the financial assets. We performed work on the Directors assessment as follows: • Reviewing forecasts, and challenging the assumptions and inputs used in the determining the present value of future cashflows, including the likelihood of successful product development, timing of sales, pricing, and discount rate; • Considering the sensitivity of key assumptions in relation to the recoverability of saleable assets; • Challenging management on their assessment of the valuation of the group including their consideration of recent transactions involving similar type businesses; and • Ensuring adequate disclosure in the notes to the financial statements.

Our application of materiality

When establishing our overall audit strategy, we set certain thresholds which help us to determine the nature, timing and extent of our audit procedures. When evaluating whether the effects of misstatements, both individually and on the financial statements as a whole, could reasonably influence the economic decisions of the users we take into account the qualitative nature and the size of the misstatements. Based on our professional judgement, we determined materiality as follows:

	Group	Parent company
Overall materiality	£539,000 (2020: £588,000)	£249,000 (2020: £330,000)
Basis for determining overall materiality	2.2% of total expenditure, excluding one off warrant and share option costs arising in respect of instruments issued as part of the Longevity "Merger" and the raising of the loan finance.	2.2% of total expenditure, excluding one off warrant and share option costs arising in respect of instruments issued as part of the Longevity "Merger" and the raising of the loan finance
Rationale for benchmark applied	The Group is an early revenue bioscience business and continues to apply the funds it has raised in the application of scientific research – these costs are expensed as incurred so users of the financial statements will consider the application of the funds as the relevant measure. Material costs incurred that are not a direct function of this activity have been excluded to provide a consistent benchmark.	As per Group
Performance materiality	£404,000 (2020: £441,000)	£186,000 (2020: £247,000)
Basis for determining performance materiality	75% of overall materiality	75% of overall materiality
Reporting of misstatements to the Audit Committee	Misstatements in excess of £26,900 and misstatements below that threshold that, in our view, warranted reporting on qualitative grounds.	Misstatements in excess of £12,400 and misstatements below that threshold that, in our view, warranted reporting on qualitative grounds.

An overview of the scope of our audit

The group consists of 6 components, located in the following countries: United Kingdom, Republic of Ireland, Spain, United States of America, British Virgin Islands.

The coverage achieved by our audit procedures was:

Full scope audits were performed for 2 components, specific audit procedures for 2 components and analytical procedures at group level for the remaining 2 components.

	Number of components	Revenue	Total assets	Profit before tax
Full scope audit	2	100%	100%	97%
Specific audit procedures	2	—	0%	3%
Total	4	100%	100%	100%

Specific audit procedures were performed in respect of the components located in Spain and the Republic of Ireland, targeted to address the risk of material misstatement in the consolidated financial statements. These included specific procedures to address the Key Audit Matters identified as part of the Group audit. Analytical procedures were performed in respect of the United States of America and British Virgin Isles components which have not to date undertaken significant activity.

Material uncertainty related to going concern

We draw attention to the accounting policy on going concern on page 69 in the financial statements, which indicates that the group currently does not have sufficient funds to enable it to meet all of its planned operating expenditure as set out in the detailed forecasts prepared by management for a period of at least twelve months from the date of approval of these financial statements and will therefore have to raise additional funds over and above the level of those already announced and included in those forecasts. As stated in the accounting policy on going concern, these events or conditions, along with the other matters as set forth in note 2c, indicate that a material uncertainty exists that may cast significant doubt on the group's and parent company's ability to continue as a going concern. Our opinion is not modified in respect of this matter.

In auditing the financial statements, we have concluded that the director's use of the going concern basis of accounting in the preparation of the financial statements is appropriate. Our evaluation of the directors' assessment of the entity's ability to continue to adopt the going concern basis of accounting included:

- challenging the directors on the key assumptions in their forecasts including the timing of cash inflows and outflows;
- considering the directors assessment of the sensitivity of the conclusions drawn in the forecasts to changes in the assumptions; and
- reviewing evidence of the significant transactions occurring following the year end date and how they impact on the directors' forecasts.

Material uncertainty related to going concern (continued)

No matters came to our attention to indicate that the directors' assumptions with regard to contractual cashflows were unreasonable, nor that the expected cash inflows arising from fundraising and business combination activities were inconsistent with the information available to support these transactions.

Our responsibilities and the responsibilities of the directors with respect to going concern are described in the relevant sections of this report.

Other information

The other information comprises the information included in the annual report, other than the financial statements and our auditor's report thereon. The directors are responsible for the other information contained within the annual report. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

Our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the course of the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether this gives rise to a material misstatement in the financial statements themselves. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the Strategic Report and the Directors' Report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Strategic Report and the Directors' Report have been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception

In the light of the knowledge and understanding of the group and the parent company and their environment obtained in the course of the audit, we have not identified material misstatements in the Strategic Report or the Directors' Report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept by the parent company, or returns adequate for our audit have not been received from branches not visited by us; or
- the parent company financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit.

Responsibilities of directors

As explained more fully in the directors' responsibilities statement set out on page 55, the directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the group's and the parent company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the group or the parent company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

The extent to which the audit was considered capable of detecting irregularities, including fraud

Irregularities are instances of non-compliance with laws and regulations. The objectives of our audit are to obtain sufficient appropriate audit evidence regarding compliance with laws and regulations that have a direct effect on the determination of material amounts and disclosures in the financial statements, to perform audit procedures to help identify instances of non-compliance with other laws and regulations that may have a material effect on the financial statements, and to respond appropriately to identified or suspected non-compliance with laws and regulations identified during the audit.

In relation to fraud, the objectives of our audit are to identify and assess the risk of material misstatement of the financial statements due to fraud, to obtain sufficient appropriate audit evidence regarding the assessed risks of material misstatement due to fraud through designing and implementing appropriate responses and to respond appropriately to fraud or suspected fraud identified during the audit.

The extent to which the audit was considered capable of detecting irregularities, including fraud (continued)
However, it is the primary responsibility of management, with the oversight of those charged with governance, to ensure that the entity's operations are conducted in accordance with the provisions of laws and regulations and for the prevention and detection of fraud.
In identifying and assessing risks of material misstatement in respect of irregularities, including fraud, the group audit engagement team:

- obtained an understanding of the nature of the industry and sector, including the legal and regulatory frameworks that the group and parent company operate in and how the group and parent company are complying with the legal and regulatory frameworks;
- inquired of management, and those charged with governance, about their own identification and assessment of the risks of irregularities, including any known actual, suspected or alleged instances of fraud; and
- discussed matters about non-compliance with laws and regulations and how fraud might occur including assessment of how and where the financial statements may be susceptible to fraud.

The most significant laws and regulations were determined as follows:

Legislation/Regulation	Additional audit procedures performed by the audit engagement team included:
IFRS and Companies Act 2006	Review of the financial statement disclosures and testing to supporting documentation Completion of disclosure checklists to identify areas of non-compliance
Tax compliance regulations	Inspection of advice received from internal / external tax advisors Inspection of correspondence with local tax authorities Input from a tax specialist was obtained regarding the tax impact of the employee share scheme introduced during the year and changes to the group's transfer pricing arrangement
Patent maintenance and compliance	Inspection of documentation to support the patents held and the ongoing maintenance of thereof
Good Laboratory Practice	Enquiry of the Directors and other management, and inspection of regulatory and legal correspondence
FDA Regulations in the USA	Enquiry of management and those charged with governance as to whether the Group is in compliance with these laws and regulations and whether any correspondence existed with the Regulatory Authorities

The areas that we identified as being susceptible to material misstatement due to fraud were:

Risk	Audit procedures performed by the audit engagement team:
Revenue recognition	Testing the calculation of the stage of completion of the collaboration agreement in place, including consideration of any variance from plan and ensuring the appropriate proportion of revenue had been recognised; and Reviewing both the existing collaboration agreement in place for amendment and for the existence of new similar such arrangements.
Management override of controls	Testing the appropriateness of journal entries and other adjustments; Assessing whether the judgements made in making accounting estimates are indicative of a potential bias; and Evaluating the business rationale of any significant transactions that are unusual or outside the normal course of business.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at: http://www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

Use of our report
This report is made solely to the company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and the company's members as a body, for our audit work, for this report, or for the opinions we have formed.

Andrew Allchin FCA (Senior Statutory Auditor)
For and on behalf of RSM UK Audit LLP, Statutory Auditor
Chartered Accountants
Central Square,
5th Floor
29 Wellington Street
Leeds
LS1 4DL
31 March 2022

Group statement of total comprehensive income

For the year ended 31 December 2021

	Notes	31 December 2021 £000	31 December 2020 £000
Revenue	4	**522**	534
Research and development costs	5	**(19,818)**	(22,041)
Administrative expenses	5	**(7,283)**	(5,969)
Foreign currency gains	5	**441**	363
Other income	5	**36**	45
Operating loss before non-recurring items		**(26,102)**	(27,068)
Non-recurring items	6	**(44,381)**	(3,110)
Operating loss after non-recurring items		**(70,483)**	(30,178)
Finance income	8	**1**	5
Finance expense	8	**(610)**	(173)
Fair value adjustment on warrants and units	8	**13,627**	—
Loss before taxation		**(57,465)**	(30,346)
Taxation	9	**3,505**	4,383
Loss for the year		**(53,960)**	(25,963)
Other comprehensive income:			
Exchange differences on translating foreign operations		**(714)**	110
Loss for the year and total comprehensive loss for the year		**(54,674)**	(25,853)
Loss per share			
Basic and diluted for the year	10	**(31.83)p**	(22.80)p

The basic and diluted loss per share are the same as the effect of share options and warrants is anti-dilutive.

The notes on pages 69 to 108 form an integral part of these financial statements.

Group statement of financial position

At 31 December 2021
Registered no. 08840579

	Notes	At 31 December 2021 £000	At 31 December 2020 £000
Assets			
Non-current assets			
Property, plant and equipment:			
– Owned assets	11	**2,885**	3,659
– Right-of-use assets	11	**677**	835
Intangible assets	12	**13,686**	14,025
Taxation receivables	16	**199**	177
		17,447	18,696
Current assets			
Inventories	14	**272**	291
Trade and other receivables	15	**2,167**	3,223
Taxation receivables	16	**7,557**	4,436
Cash and cash equivalents	17	**15,497**	8,775
		25,493	16,725
Total assets		**42,940**	35,421
Liabilities			
Current liabilities			
Trade and other payables	18	**4,810**	6,379
Lease liabilities	1980		73
		4,890	6,452
Non-current liabilities			
Lease liabilities	19	**889**	986
Loans	20	**8,961**	—
Warrants and units	21	**4,992**	—
Deferred tax	22	**10**	13
		14,852	999
Total liabilities		**19,742**	7,451
Net assets		**23,198**	27,970
Capital and reserves			
Share capital	23	**451**	329
Share premium account	23	**185,703**	136,278
Merger reserve	25	**958**	958
Translation reserve	25	**(159)**	555
Other reserve	25	**(864)**	(864)
Share-based payments reserve	24	**3,717**	3,497
Retained earnings	25	**(166,608)**	(112,783)
Total equity		**23,198**	27,970

Approved by the Board and authorized for issue on 31 March 2022.

The notes on pages 69 to 108 form an integral part of these financial statements.

Duncan Peyton
Director
31 March 2022

Company statement of financial position

At 31 December 2021
Registered no. 08840579

	Notes	At 31 December 2021 £000	At 31 December 2020 £000
Assets			
Non-current assets			
Property, plant and equipment:			
– Owned assets	11	**103**	189
– Right-of-use assets	11	**475**	569
Intangible assets	12	**15**	119
Investment in subsidiaries	13	**11,997**	11,713
Loans to subsidiaries	13	**85,492**	72,670
		98,082	85,260
Current assets			
Trade and other receivables	15	**891**	1,910
Taxation receivables	16	**2,176**	1,551
Cash and cash equivalents	17	**14,363**	6,213
		17,430	9,674
Total assets		**115,512**	94,934
Liabilities			
Current liabilities			
Trade and other payables	18	**1,306**	3,575
Lease liabilities	19	**44**	37
		1,350	3,612
Non-current liabilities			
Lease liabilities	19	**671**	716
Loans	20	**8,961**	—
Warrants and units	21	**4,992**	—
		14,624	716
Total liabilities		**15,974**	4,328
Net assets		**99,538**	90,606
Capital and reserves			
Share capital	23	**451**	329
Share premium account	23	**185,703**	136,278
Merger reserve	25	**958**	958
Share-based payments reserve	24	**3,717**	3,497
Retained earnings	25	**(91,291)**	(50,456)
Total equity		**99,538**	90,606

The Company has elected to take the exemptions under section 408 of the Companies Act 2006 not to present the parent company's Statement of Comprehensive Income. The Company's loss for the year was £40.92 million (31 December 2020: £16.13 million).

Approved by the Board and authorized for issue on 31 March 2022.

The notes on pages 69 to 108 form an integral part of these financial statements.

Duncan Peyton
Director
31 March 2022

Group statement of changes in equity

For the year ended 31 December 2021

	Share capital £000	Share premium £000	Merger reserve £000	Translation reserve £000	Other reserve £000	Share-based payment reserve £000	Retained earnings £000	Total equity £000
At 1 January 2020	164	108,296	958	446	(864)	367	(87,024)	22,343
Issue of share capital (net of expenses)	165	27,906	—	—	—	—	—	28,071
Issue of warrants (net of expenses)	—	—	—	—	—	3,110	—	3,110
Exercise of warrants	—	76	—	—	—	(11)	—	65
Total transactions with owners recognized in equity for the year	165	27,982	—	—	—	3,099	—	31,246
Loss and total comprehensive loss for the year	—	—	—	109	—	—	(25,963)	(25,854)
Lapsed options	—	—	—	—	—	(204)	204	—
Issue of share-based compensation	—	—	—	—	—	235	—	235
At 31 December 2020	329	136,278	958	555	(864)	3,497	(112,783)	27,970
Issue of shares as part of merger on 22 March 2021 (net of expenses)	78	31,270	—	—	—	—	—	31,348
Issued and assumed warrants on merger on 22 March 2021	—	—	—	—	—	18,517	—	18,517
Reclassification of warrants as liabilities	—	—	—	—	—	(18,517)	—	(18,517)
Share issue and placing on 22 March 2021 (net of expenses)	41	16,551	—	—	—	—	—	16,592
Directors' subscription for shares on 16 April 2021	3	1,446	—	—	—	—	—	1,449
Exercise of share options	—	94	—	—	—	(224)	—	(130)
Exercise of warrants	—	64	—	—	—	(4)	—	60
Total transactions with owners recognized in equity for the year	122	49,425	—	—	—	(228)	—	49,319
Loss and total comprehensive loss for the year	—	—	—	(714)	—	—	(53,960)	(54,674)
Lapsed options	—	—	—	—	—	(135)	135	—
Issue of share-based compensation	—	—	—	—	—	583	—	583
At 31 December 2021	**451**	**185,703**	**958**	**(159)**	**(864)**	**3,717**	**(166,608)**	**23,198**

Details regarding the purpose of each reserve within equity are given in note 25.

Company statement of changes in equity

For the year ended 31 December 2021

	Share capital £000	Share premium £000	Merger reserve £000	Share-based payment reserve £000	Retained earnings £000	Total £000
At 1 January 2020	164	108,296	958	367	(34,434)	75,351
Issue of share capital (net of expenses)	165	27,906	—	—	—	28,071
Issue of warrants (net of expenses)	—	—	—	3,110	—	3,110
Exercise of warrants	—	76	—	(11)	—	65
Total transactions with owners recognized in equity for the year	165	27,982	—	3,099	—	31,246
Loss and total comprehensive loss for the year	—	—	—	—	(16,128)	(16,128)
Lapsed options	—	—	—	(106)	106	—
Lapsed options relating to investment in Group companies	—	—	—	10	—	10
Issue of share-based compensation	—	—	—	127	—	127
At 31 December 2020	329	136,278	958	3,497	(50,456)	90,606
Issue of shares as part of merger on 22 March 2021 (net of expenses)	78	31,270	—	—	—	31,348
Issued and assumed warrants on merger on 22 March 2022	—	—	—	18,517	—	18,517
Reclassification of warrants as liabilities	—	—	—	(18,517)	—	(18,517)
Share issue and placing on 22 March 2021 (net of expenses)	41	16,551	—	—	—	16,592
Directors' subscription for shares on 16 April 2021	3	1,446	—	—	—	1,449
Exercise of share options in the Company	—	28	—	(68)	—	(40)
Exercise of share options relating to investment in Group companies	—	66	—	(156)	—	(90)
Exercise of warrants	—	64	—	(4)	—	60
Total transactions with owners recognized in equity for the year	122	49,425	—	(228)	—	49,319
Loss and total comprehensive loss for the year	—	—	—	—	(40,918)	(40,918)
Lapsed options	—	—	—	(83)	83	—
Issue of options relating to investment in Group companies	—	—	—	375	—	375
Issue of share-based compensation	—	—	—	156	—	156
At 31 December 2021	**451**	**185,703**	**958**	**3,717**	**(91,291)**	**99,538**

Details regarding the purpose of each reserve within equity are given in note 25.

Group cash flow statement

For the year ended 31 December 2021

	Notes	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Loss after taxation		**(53,960)**	(25,963)
Adjustments for:			
Depreciation of property, plant and equipment	11	**889**	1,003
Amortization of intangible assets	12	**87**	203
Loss on disposal of property, plant and equipment		**14**	—
Short-term rentals included in the Income Statement		**104**	135
Finance income	8	**(1)**	(5)
Finance expense	8	**610**	173
Fair value adjustments on equity, warrants and units	30	**32,323**	3,110
Share-based compensation	24	**583**	224
Cash outflows from operations before movements in working capital		**(19,351)**	(21,120)
Changes in working capital:			
Decrease/(increase) in inventories		**19**	(93)
Increase in trade and other receivables		**(415)**	(2,105)
(Increase)/decrease in taxation receivables		**(3,143)**	1,697
Decrease in trade and other payables		**(2,192)**	(1,052)
Cash outflow from operating activities		**(25,082)**	(22,673)
Cash flows from investing activities			
Purchases of property, plant and equipment	11	**(203)**	(163)
Purchase of software and other intangibles	12	**—**	(15)
Net cash outflow from investing activities		**(203)**	(178)
Cash flows from financing activities			
Proceeds from issues of ordinary share capital		**27,904**	29,740
Expenses on issue of shares	23	**(4,217)**	(1,594)
Loan income received	20	**8,990**	—
Lease and short-term rentals payments		**(176)**	(188)
Interest received	8	**1**	5
Interest paid	8	**(495)**	(173)
Net cash inflow from financing activities		**32,007**	27,790
Increase in cash and cash equivalents		**6,722**	4,939
Cash and cash equivalents at the start of the year		**8,775**	3,836
Cash and cash equivalents at the end of the year	17	**15,497**	8,775

Company cash flow statement

For the year ended 31 December 2021

	Notes	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Loss after taxation		**(40,918)**	(16,128)
Adjustments for:			
Depreciation of property, plant and equipment	11	**209**	221
Amortization of intangible assets	12	**104**	263
Short-term rentals included in the income statement		**2**	2
Finance income		**(3)**	(5)
Finance expense		**562**	123
Impairment of inter-company loans	13	**—**	1,230
Fair value adjustments on equity, warrants and units	30	**32,185**	—
Share-based compensation	24	**156**	3,226
Cash outflows from operations before movements in working capital		**(7,703)**	(11,068)
Changes in working capital:			
Increase in trade and other receivables		**(452)**	(1,539)
(Increase)/decrease in taxation receivables		**(625)**	440
(Decrease)/increase in trade and other payables		**(2,412)**	1,735
Cash outflow from operating activities		**(11,192)**	(10,432)
Cash flows from investing activities			
Purchases of property, plant and equipment	11	**(29)**	(4)
Purchase of software and other intangibles	12	**—**	(9)
Loans to subsidiary undertakings	13	**(12,819)**	(14,257)
Net cash outflow from investing activities		**(12,848)**	(14,270)
Cash flows from financing activities			
Proceeds from issues of ordinary share capital	23	**27,904**	29,740
Expenses on issue of shares	23	**(4,217)**	(1,594)
Loan income received	20	**8,990**	—
Lease liability payments		**(40)**	(34)
Interest received		**—**	5
Interest paid		**(447)**	(123)
Net cash (outflow)/inflow from financing activities		**(32,190)**	27,994
Increase in cash and cash equivalents		**8,150**	3,292
Cash and cash equivalents at the start of the year		**6,213**	2,921
Cash and cash equivalents at the end of the year	17	**14,363**	6,213

Notes to the financial statements
For the year ended 31 December 2021

1. General Information
4D pharma plc (the 'Company') is an AIM-quoted and Nasdaq-listed company incorporated and domiciled in the UK. The locations and principal activities of the subsidiaries are set out in note 13. The Company is incorporated in England and Wales. The registered office is Fifth Floor, 9 Bond Court, Leeds LS1 2JZ. These Group financial statements consolidate those of the Company and its subsidiaries (together referred to as the 'Group' and individually as 'Group entities') for the year ended 31 December 2021.

The financial statements of 4D pharma plc and its subsidiaries for the year ended 31 December 2021 were authorized for issue by the Board of Directors on 31 March 2022 and the Statement of Financial Position were signed on the Board's behalf by Duncan Peyton.

The Company has elected to take the exemption under section 408 of the Companies Act 2006 not to present the parent company's Statement of Total Comprehensive Income.

The significant accounting policies adopted by the Group are set out in note 3.

2. Basis of preparation
(a) Statement of compliance
The Group's financial statements have been prepared in accordance with UK-adopted International Financial Reporting Standards as adopted by the UK (UK-IFRS) and IFRS Interpretations Committee (IFRSIC) interpretations as they apply to the financial statements of the Group for the year ended 31 December 2021 and the requirements of the Companies Act 2006 applicable to companies reporting under IFRS.

Further details of the transitional arrangements can be found in the significant accounting policies in note 3(w).

(b) Basis of measurement
The parent company and Group financial statements have been prepared on the historical cost basis except for the methods used to measure fair values of assets and liabilities, which are discussed in the respective notes and in note 3.

(c) Going concern
The Chairperson and CEO's Statement on pages 7 to 11 outlines the business activities of the Group along with the factors which may affect its future development and performance. The Group's financial position is discussed in the Financial Review on pages 16 to 22 along with details of its cash flow and liquidity. Note 27 to the financial statements sets out the Group's financial risks and the management of those risks.

The Group and parent company are subject to a number of risks similar to those of other development stage pharmaceutical companies. These risks include, amongst others, generation of revenues in due course from the development portfolio and risks associated with research, development and obtaining regulatory approvals of its products. Ultimately, the attainment of profitable operations is dependent on future uncertain events which include obtaining adequate financing to fulfil the Group's commercial and development activities and generating a level of revenue to support the Group's cost structure.

The Directors have prepared detailed financial forecasts and cash flows looking beyond 12 months from the date of the approval of these financial statements. In developing these forecasts, the Directors have made assumptions based upon their view of the current and future economic conditions that are expected to prevail over the forecast period and believe that the current cash position of the Group will be sufficient to support the Group into quarter four of 2022.The Directors are continuing to explore sources of finance available to the Group and have a reasonable expectation that they will be able to secure sufficient cash inflows into the Group to continue its activities for not less than 12 months from the date of approval of these accounts. They have therefore prepared the financial statements on a going concern basis.

Because the additional finance is not committed at the date of approval of these financial statements, these circumstances represent a material uncertainty as to the Group's ability to continue as a going concern. Should the Group be unable to obtain further finance such that the going concern basis of preparation were no longer appropriate, adjustments would be required including to reduce the balance sheet values of assets to their recoverable amounts, and to provide for future liabilities that may arise.

(d) Functional and presentational currency
These financial statements are presented in Pounds Sterling, which is the Group's functional currency. Unless otherwise stated, all financial information presented has been rounded to the nearest thousand.

(e) Use of estimates and judgements
The preparation of financial statements requires management to make estimates and judgements that affect the amounts reported for assets and liabilities as at the reporting date and the amounts reported for revenues and expenses during the year. The nature of estimation means that actual amounts could differ from those estimates. Estimates and judgements used in the preparation of the financial statements are continually reviewed and revised as necessary. While every effort is made to ensure that such estimates and judgements are reasonable, by their nature they are uncertain and, as such, changes in estimates and judgements may have a material impact on the financial statements.

The key sources of estimation uncertainty and critical accounting policies that have a significant risk of causing material adjustment to the carrying amount of assets and liabilities within the next financial year are discussed below:

(i)Taxation

Management judgement is required to determine the amount of tax assets that can be recognized, based upon the likely timing and level of future taxable profits together with an assessment of the effect of future tax planning strategies.

2. Basis of preparation (continued)

(e) Use of estimates and judgements (continued)

(ii) Research and development

Careful judgement by the Directors is applied when deciding whether the recognition requirements for development costs have been met. This is necessary as the economic success of any product development is uncertain until such time as technical viability has been proven and commercial supply agreements are likely to be achieved. Judgements are based on the information available at each reporting date which includes the progress with testing and certification and progress on, for example, establishment of commercial arrangements with third parties. In addition, all internal activities related to research and development of new products are continuously monitored by the Directors. Further information is included in note 3.

(iii) Intangible fixed assets and goodwill

Estimated impairment of intangible fixed assets and goodwill

The Group tests annually whether intangible fixed assets and goodwill have suffered any impairment, in accordance with the accounting policy stated in note 3. The potential recoverable amounts of intangible fixed assets and goodwill have been determined based on value-in-use calculations. These calculations require the use of estimates both in arriving at the expected future cash flows and the application of a suitable discount rate in order to calculate the present value of these flows. There is a degree of judgement involved in making assessments of attributable values on acquisition and making impairment assessments. More detail is provided in note 3(i).

(iv) Valuation, presentation and classification of warrants and units

The value, presentation and classification of warrants is measured at inception and subsequently at each reporting date to ensure that its assertions remain correct and that the financial statements present a true and fair view. As part of this review the treatment of warrants and units was examined to ensure that disclosures and accounting are appropriate and accurate. In forming an option the Directors reviewed the reporting requirements of IFRS 2, the requirement of IAS-32 and the recent IFRIC discussion "Transactions with a special purpose acquisition company (SPAC): how should founder and public warrants be classified after a SPAC has been acquired' from February 2022.

Having considered these factors, the Directors decided that there were several instances where warrants or units would not meet the 'Fixed-for-Fixed' criteria under IAS 32 and that they should be treated as liabilities. While the warrants issued to Oxford Finance always met this definition, and were treated as liabilities, the warrants and units include in the Longevity transaction require subsequent re-classification.

Warrants and units included as financial liabilities in the financial statements and classified in accordance with these principles are adjusted to their fair values at 31 December 2021 with gains and losses on valuation reported in the income statement. The Directors have valued public warrants by reference to their market value and have used either the Black Scholes valuation technique or a Monte Carlo simulation to value its' remaining warrants.

(v) Inter-company balances

The Company uses judgement when considering the recoverability of its inter-company balances and any impairment associated with them. Though there is no evidence of impairment of the underlying asset, after careful consideration the Company has included an impairment in respect of certain inter-company balances based on the reduced level of activity in certain areas; further detail is included in note 13.

(vi) Deferred tax

The Group reviews its assumptions and estimation techniques in respect of assets and liabilities on an annual basis including assumptions around the liability and associated recoverability of deferred tax assets. Management has always held the view that the Group and assets will be profitable before any sale of the asset is considered and that the Group should not offset such deferred tax liabilities arising on the purchase of these assets against deferred tax assets as a result. After the restructure in 2020 and reduction in capacity of certain parts of the business we have reviewed this position and believe that this assumption is no longer certain and that it would be more appropriate to only recognize these liabilities should our losses to date become unavailable through utilization or change in tax regime. As a result, we have offset our brought forwards deferred tax liabilities on acquisition of subsidiaries against available assets until such time as our losses are no longer available to offset; this resulted in a deferred tax credit recognized in the year to 31 December 2020 of £940,000.

In addition to deferred tax losses on acquisition, the Group consider the likelihood of recovery of deferred assets when assessing their recoverability. In doing so the likelihood of recovery is considered in relation to existing policies in other areas and treatment is aligned with these policies. In line with standard industrial practice, the probability of successfully developing clinical assets into a commercial product remain remote until regulatory approval is achieved. In recognition of this factor, and associated likelihood of recovery, the Group have not recognize deferred tax assets on the carrying value of the unrecognized tax losses which stood at £85.0 million on 31 December 2021. Had the Group included these deferred tax assets then an additional deferred tax asset of £21.0 million would be recognized in the accounts at 31 December 2021. Further information is included in note 9.

(vii) Acquisition of Special Purpose Acquisition Companies (SPACs)

Special Purpose Acquisition Companies are usually quoted or listed entities whose only asset is cash. They are established with the sole purpose of acquiring or being acquired for the cash they hold as an asset and for their market listing but have no other trade or intended trade.

IFRS 3 'Business Combinations' defines a business as 'an integrated set of activities and assets that is capable of being conducted and managed for the purpose of providing goods or services to customers, generating investment income (such as dividends or interest) or generating other income from ordinary activities'. Since SPACs are not established to provide goods and services, nor to generate income from other sources, they cannot be classified as a business.

Where control has not passed to a SPAC though the majority of shares, voting rights or Director's influence, the transaction is treated as an acquisition, representing a continuation of the existing business and has been accounted for as the issue of equity.

3. Significant accounting policies

The accounting policies set out below are applied consistently by Group entities.

The Group financial statements are presented in Sterling and all values are rounded to the nearest thousand pounds except where otherwise indicated.

(a) Basis of consolidation

(i) Subsidiaries

Subsidiaries are entities controlled by the Group. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases.

(ii) Acquisition of Special Purpose Acquisition Companies (SPACs)

Special Purpose Acquisition Companies are usually quoted or listed entities whose only asset is cash. They are established with the sole purpose of acquiring or being acquired for the cash they hold as an asset and for their market listing but have no other trade or intended trade.

IFRS 3 'Business Combinations' defines a business as 'an integrated set of activities and assets that is capable of being conducted and managed for the purpose of providing goods or services to customers, generating investment income (such as dividends or interest) or generating other income from ordinary activities'. Since SPACs are not established to provide goods and services, nor to generate income from other sources, they cannot be classified as a business.

Where control has not passed to a SPAC though the majority of shares, voting rights or Director's influence, the transaction is treated as an acquisition, representing a continuation of the existing business and has been accounted for as the issue of equity.

(iii) Transactions eliminated on consolidation

Intra-group balances and transactions, and any unrealized income and expenses arising from intra-group transactions, are eliminated in preparing the consolidated financial statements. Unrealized gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of the Group's interest in the investee. Unrealized losses are eliminated in the same way as unrealized gains, but only to the extent that there is no evidence of impairment.

(b) Foreign currency transactions

Transactions in foreign currencies are initially recorded in the functional currency by applying the spot rate ruling at the date of the transaction. Monetary assets and liabilities denominated in foreign currencies are retranslated at the functional currency rate of exchange ruling at the reporting date. All differences are recognized in profit or loss.

Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rates as at the dates of the initial transactions. Non-monetary items measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

(c) Segmental reporting

An operating segment is a component of an entity that engages in business activities from which it may earn revenues and incur expenses, whose operating results are regularly reviewed by the Group's chief operating decision maker, being the Chief Executive Officer, to make decisions about resources to be allocated to the segment and assess its performance, and for which discrete financial information is available. As at the reporting date the Group operated as a single segment.

(d) Revenue recognition

Revenue from the sale of goods is measured at the fair value of the consideration and excludes intra-group sales and value added and similar taxes. The primary performance obligation is the transfer of goods to the customer. Revenue from the sale of goods is recognized when control of the goods is transferred to the customer, at an amount that reflects the consideration to which an entity expects to be entitled in exchange for those goods.

The Company has a licensing and development agreement with Merck Sharp & Dohme Corp. (MSD) for the development of novel vaccines. The terms of the agreement contain multiple elements and deliverables, which may include: (i) upfront fees; (ii) milestone payment; (iii) option exercise fees; and (iv) tiered royalties based on net sales of licensed product. Payments to the Group under the agreement include upfront fees, payments for research activities, payments based upon the achievement of certain milestones and royalties on product sales. There are no performance, cancellation, termination, or refund provisions though commercially reasonable efforts are required in the arrangement. The Group follows the provisions of IFRS 15 in accounting for these agreements and recognizes income as a function of both labor and materials costs over the anticipated life of the revenue-generating element.

Payments are attributable to milestones based on successful production of viable candidates, given the significant uncertainty that is attributable to the development of clinical candidates for future milestone payments the Group are only recognizing the initial upfront payment of $2.5 million (£1.93 million) over the period during which we will develop the candidates. There are no regulated milestones for performance of this initial up-front sum so the Group have elected to recognize income as a proportion of total anticipated contract value.

3. Significant accounting policies (continued)

(e) Finance income and finance expense

Finance income comprises interest income on funds invested and changes in the fair value of financial assets at fair value through profit or loss. Interest income is recognized as interest accrues using the effective interest rate method.

Finance expense comprises interest expense on borrowings, changes in the fair value of financial assets at fair value through the Group Statement of Total Comprehensive Income, impairment losses recognized on financial assets and losses on hedging instruments that are recognized in profit or loss. All borrowing costs are recognized using the effective interest method.

(f) Income tax

Income tax expense comprises current and deferred tax. Income tax expense is recognized in the Group Statement of Total Comprehensive Income except to the extent that it relates to items recognized directly in equity or in other comprehensive income.

Current income tax assets and liabilities for the current and prior years are measured at the amount expected to be recovered from, or paid to, the tax authorities. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted by the reporting date.

Deferred income tax is recognized on all temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the financial statements with the following exceptions:

- where the temporary difference arises from the initial recognition of goodwill or of an asset or liability in a transaction that is not a business combination and that at the time of the transaction affects neither accounting nor taxable profit or loss; and
- in respect of taxable temporary differences associated with investments in subsidiaries where the timing of the reversal of the temporary differences can be controlled and it is probable that the temporary differences will not reverse in the foreseeable future.

Deferred income tax assets and liabilities are measured on an undiscounted basis using the tax rates and tax laws that have been enacted or substantively enacted by the year end date and which are expected to apply when the related deferred tax asset is realized, or the deferred tax liability is settled.

Deferred income tax assets are recognized to the extent that it is probable that future taxable profits will be available against which differences can be utilized. An asset is not recognized to the extent that the transfer or economic benefits in the future are uncertain.

(g) Recognition of financial instruments

Financial assets and financial liabilities are recognized when the Company becomes party to the contractual provisions of the instrument. The Group determines the classification of its financial assets and liabilities at initial recognition and re-evaluates this designation at each financial year end.

(h) Property, plant and equipment

Property, plant and equipment are recognized initially at cost. After initial recognition, these assets are carried at cost less any accumulated depreciation and any accumulated impairment losses. Cost comprises the aggregate amount paid and the fair value of any other consideration given to acquire the asset and includes costs directly attributable to making the asset capable of operating as intended.

Initial and subsequent measurement of the right-of-use asset

A right-of-use asset is recognized at commencement of the lease and initially measured at the amount of the lease liability, plus any incremental costs of obtaining the lease and any lease payments made at or before the leased asset is available for use by the Group. They are subsequently measured at cost less accumulated depreciation and any accumulated impairment losses.

Depreciation is computed by allocating the depreciable amount of an asset on a systematic basis over its useful life and is applied separately to each identifiable component.

The following bases and rates are used to depreciate classes of assets, including right-of use assets:

- Plant and machinery – straight line over three to ten years
- Fixtures, fittings and office equipment – straight line over four to five years
- Land and buildings – straight line over the period of the lease or over five to ten years for shorter life components

The carrying values of property, plant and equipment are reviewed for impairment if events or changes in circumstances indicate that the carrying value may not be recoverable and are written down immediately to their recoverable amount. Useful lives and residual values are reviewed annually and where adjustments are required these are made prospectively.

A property, plant and equipment item is derecognized on disposal or when no future economic benefits are expected to arise from the continued use of the asset. Any gain or loss arising on the derecognition of the asset is included in the Income Statement in the year of derecognition.

(i) Intangible assets

Intellectual property and patents

The carrying value of intangible fixed assets is reviewed annually for impairment whenever events or changes in circumstances indicate the carrying value may not be recoverable.

At each reporting date the Group reviews the carrying value of its intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss.

Where the asset does not generate cash flows that are independent from other assets, the Group estimates the recoverable amount of the cash-generating unit to which the asset belongs. A cash-generating unit is the smallest identifiable group of assets that generates cash inflows from other assets or groups of assets.

3. Significant accounting policies (continued)

(i) Intangible assets (continued)

Intellectual property and patents (continued)

Recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset, for which the estimates of future cash flows have not been adjusted.

If the recoverable amount of an asset is estimated to be less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. An impairment loss is recognized as an expense immediately.

Where an impairment loss subsequently reverses, the carrying amount of the assets is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset in prior years. A reversal of an impairment loss is recognized in profit or loss immediately.

Amortization is provided on the fair value of the asset and is calculated on a straight-line basis over its useful life. Amortization is recognized within the Group Statement of Comprehensive Income. Intellectual property and patents acquired as part of a business combination are only amortized once technical viability has been proven and commercial agreements are likely to be achieved.

Patents includes the costs associated with acquiring and registering patents in respect of intellectual property rights. Patents are amortized on a straight-line basis over their useful lives of up to 20 years from the date of filing the patent.

Goodwill

Goodwill on acquisitions, being the excess of the fair value of the cost of acquisition over the Group's interest in the fair value of the identifiable assets and liabilities acquired, is capitalized and tested for impairment on an annual basis.

Any impairment is recognized immediately in profit or loss and is not subsequently reversed. For the purpose of impairment testing, goodwill is allocated to cash-generating units of 4D pharma plc, which represent the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets.

Software

Software is recognized initially at cost. After initial recognition, these assets are carried at cost less any accumulated amortization and any accumulated impairment losses. Cost comprises the aggregate amount paid and the fair value of any other consideration given to acquire the asset and includes costs directly attributable to making the asset capable of operating as intended.

Amortization is computed by allocating the amortization amount of an asset on a systematic basis over its useful life and is applied separately to each identifiable component. Amortization is applied to software over three to five years on a straight-line basis.

The carrying value of software is reviewed for impairment if events or changes in circumstances indicate that the carrying value may not be recoverable and is written down immediately to their recoverable amount. Useful lives and residual values are reviewed annually and where adjustments are required these are made prospectively.

A software item is derecognized on disposal or when no future economic benefits are expected to arise from the continued use of the asset. Any gain or loss arising on the derecognition of the asset is included in the Income Statement in the year of derecognition.

Internally generated intangible assets

Expenditure on research activities is recognized in the Group Statement of Comprehensive Income as incurred. Expenditure arising from the Group's development is recognized in the Statement of Financial Position only if all of the following conditions are met:

- an asset is created that can be identified in the Group Statement of Financial Position;
- it is probable that the asset created will generate future economic benefits;
- the development cost of the asset can be measured reliably;
- the Group has the intention to complete the asset and the ability and intention to use or sell it;
- the product or process is technically and commercially feasible; and
- sufficient resources are available to complete the development and to either sell or use the asset.

Where these criteria have not been achieved, development expenditure is recognized in profit or loss in the year in which it is incurred.

The Group has adopted the industry standard approach to the treatment of development expenditure by capitalizing development costs at the point where regulatory approval is reached and the probability of generating future economic benefits is high.

(j) Impairment of assets

An asset's recoverable amount is the higher of an asset's or cash-generating unit's fair value less costs to sell and its value in use and is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or groups of assets. Where the carrying value of an asset exceeds its recoverable amount, the asset is considered impaired and is written down to its recoverable amount. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In determining fair value less costs of disposal, an appropriate valuation model is used; these calculations are corroborated by valuation multiples, or other available fair value indicators. Impairment losses on continuing operations are recognized in the Group Statement of Comprehensive Income in those expense categories consistent with the function of the impaired asset.

(k) Investments in subsidiaries

Investments in and loans to subsidiaries are stated in the Company's Statement of Financial Position at cost less provision for any impairment.

3. Significant accounting policies (continued)

(l) Impairment of financial assets

An impairment loss is recognized for the expected credit losses on financial assets when there is an increased probability that the counterparty will be unable to settle an instrument's contractual cash flows on the contractual due dates, a reduction in the amounts expected to be recovered, or both.

The probability of default and expected amounts recoverable is assessed using reasonable and supportable past and forward-looking information that is available without undue cost or effort. The expected credit loss is a probability-weighted amount determined from a range of outcomes and takes into account the time value of money.

Impairment of intercompany loans measured at amortized cost

The measurement of impairment losses depends on whether the financial asset is 'performing', 'underperforming' or 'non-performing' based on the Company's assessment of increases in the credit risk of the financial asset since its initial recognition and any events that have occurred before the year end which have a detrimental impact on cash flows.

The financial asset moves from 'performing' to 'underperforming' when the increase in credit risk since initial recognition becomes significant.

In assessing whether credit risk has increased significantly, the Company compares the risk of default at the year end with the risk of a default when the investment was originally recognized using reasonable and supportable past and forward-looking information that is available without undue cost.

The risk of a default occurring takes into consideration default events that are possible within 12 months of the year end (the '12-month expected credit losses') for 'performing' financial assets, and all possible default events over the expected life of those receivables (the 'lifetime expected credit losses') for 'underperforming' financial assets.

Impairment losses, and any subsequent reversals of impairment losses, are adjusted against the carrying amount of the receivable and are recognized in profit or loss.

(m) Inventories

Inventories are stated at the lower of cost and net realizable value. Cost based on latest contractual prices includes all costs incurred in bringing each product to its present location and condition. Net realizable value is based on estimated selling price less any further costs expected to be incurred to disposal. Provision is made for slow-moving or obsolete items.

(n) Trade and other receivables

Trade receivables are initially measured at their transaction price. Group and other receivables are initially measured at fair value plus transaction costs.

Receivables are held to collect the contractual cash flows which are solely payments of principal and interest. Therefore, these receivables are subsequently measured at amortized cost using the effective interest rate method.

(o) Cash, cash equivalents and short-term investments

Cash and cash equivalents comprise cash at hand and deposits with maturities of three months or less. Short-term investments comprise deposits with maturities of more than three months, but no greater than 12 months.

(p) Financial liabilities and equity

Financial liabilities and equity instruments are classified according to the substance of the contractual arrangements entered into. An equity instrument is any contract that evidences a residual interest in the assets of the Company after deducting all of its liabilities.

(q) Trade and other payables

Trade, Group and other payables are initially measured at fair value, net of direct transaction costs, and subsequently measured at amortized cost using the effective interest rate method.

Receivables are held to collect the contractual cash flows which are solely payments of principal and interest. Therefore, these receivables are subsequently measured at amortized cost using the effective interest rate method.

(r) Leases

The Group and Company apply the rules of IFRS 16 according to the criteria detailed below:

(i) Leases – the Group as lessee

On commencement of a contract (or part of a contract) which gives the Group, or Company, the right to use an asset for a period of time in exchange for consideration, the Group recognizes a right-of-use asset and a lease liability unless the lease qualifies as a 'short-term' lease or a 'low-value' lease.

(ii) 'Low-value' leases

When the value of the underlying asset is £10,000 or less, the Group and Company both recognize, and continue to recognize, the lease payments associated with those leases on a straight-line basis over the lease term.

3. Significant accounting policies (continued)

(r) Leases (continued)

(iii) 'Short-term' leases

Where the lease term is 12 months or less and the lease does not contain an option to purchase the leased asset, lease payments are recognized as an expense on a straight-line basis over the lease term.

(v) Leases assessed on a portfolio basis

The Group elected to treat its property leases as a portfolio as all land and buildings have similar lease characteristics. Consequently, IFRS 16 is applied to all land and building leases, not otherwise included in low-value or short-term leases, in aggregate rather than to each individual lease.

(vi) Initial measurement of the lease liability

The lease liability is initially measured at the present value of the lease payments during the lease term discounted using the interest rate implicit in the lease, or the incremental borrowing rate if the interest rate implicit in the lease cannot be readily determined.

The lease term is the non-cancellable period of the lease plus extension periods that the Group is reasonably certain to exercise and termination periods that the Group is reasonably certain not to exercise.

Lease payments include fixed payments, less any lease incentives receivable, variable lease payments dependent on an index or a rate (such as those linked to LIBOR) and any residual value guarantees. Variable lease payments are initially measured using the index or rate when the leased asset is available for use.

Termination penalties are included in the lease payments if the lease term has been adjusted because the Group reasonably expects to exercise an option to terminate the lease.

The exercise price of an option to purchase the leased asset is included in the lease liability when the Group is reasonably certain to exercise that option.

(vii) Subsequent measurement of the lease liability

The lease liability is subsequently increased for a constant periodic rate of interest on the remaining balance of the lease liability and reduced for lease payments.

Interest on the lease liability is recognized in profit or loss, unless interest is directly attributable to qualifying assets. The Group had no such liabilities during the current and previous year.

Variable lease payments not included in the measurement of the lease liability as they are not dependent on an index or rate are recognized in profit or loss in the period in which the event or condition that triggers those payments occurs.

(viii) Re-measurement of the lease liability

The lease liability is adjusted for changes arising from the original terms and conditions of the lease that change the lease term, the Group's assessment of its option to purchase the leased asset, the amount expected to be payable under a residual value guarantee and/or changes in lease payments due to a change in an index or rate. The adjustment to the lease liability is recognized when the change takes effect and is adjusted against the right-of-use asset, unless the carrying amount of the right-of-use asset is reduced to nil, when any further adjustment is recognized in profit or loss.

Adjustments to the lease payments arising from a change in the lease term or the lessee's assessment of its option to purchase the leased asset are discounted using a revised discount rate. The revised discount rate is calculated as the interest rate implicit in the lease for the remainder of the lease term, or if that rate cannot be readily determined, the lessee's incremental borrowing rate at the date of reassessment.

3. Significant accounting policies (continued)

(r) Leases (continued)

(viii) Re-measurement of the lease liability (continued)

Changes to the amounts expected to be payable under a residual value guarantee and changes to lease payments due to a change in an index or rate are recognized when the change takes effect and are discounted at the original discount rate unless the change is due to a change in floating interest rates, when the discount rate is revised to reflect the changes in interest rate.

(ix) Lease modifications

A lease modification is a change that was not part of the original terms and conditions of the lease and is accounted for as a separate lease if it increases the scope of the lease by adding the right to use one or more additional assets with a commensurate adjustment to the payments under the lease.

For a lease modification not accounted for as a separate lease, the lease liability is adjusted for the revised lease payments, discounted using a revised discount rate. The revised discount rate used is the interest rate implicit in the lease for the remainder of the lease term, or if that rate cannot be readily determined, the lessee company's incremental borrowing rate at the date of the modification.

Where the lease modification decreases the scope of the lease, the carrying amount of the right-of-use asset is reduced to reflect the partial or full termination of the lease. Any difference between the adjustment to the lease liability and the adjustment to the right-of-use asset is recognized in profit or loss.

For all other lease modifications, the adjustment to the lease liability is recognized as an adjustment to the right-of-use asset.

(x) Significant judgements and major sources of estimation uncertainty

The Group determined that all leases of assets with a value, when new, of £10,000 will be classified and accounted for as 'low-value' leases.

The Group applies judgement in determining whether individual leases can be accounted for as a portfolio. The judgements include an assessment of whether the leases share similar characteristics and whether the financial statements would be materially different if each lease was accounted for individually.

In determining the lease term, the Group assesses whether it is reasonably certain to exercise, or not to exercise, options to extend or terminate a lease. This assessment is made at the start of the lease and is re-assessed if significant events of changes in circumstances occur that are within the lessee's control.

The Group uses judgement to assess whether the interest rate implicit in the lease is readily determinable.

When the interest rate implicit in the lease is not readily determinable, the Group estimates the incremental borrowing rate based on its external borrowings secured against similar assets, adjusted for the term of the lease.

The Group estimates the amount expected to be paid under a residual value guarantee taking into consideration current market prices for similar assets of a similar age and condition and the remaining term of the lease.

The Group makes estimates of the cost of restoring leased assets to their original condition when required to do so under the terms and conditions of the lease. Those estimates are based on the current condition of the leased assets and past experience of restoration costs.

The Group applied judgement in applying the following transition provisions in IFRS 16:

- Determining whether leases have similar characteristics to apply a single discount rate. Lease portfolios have been grouped between leases of UK and European properties, UK and European machinery, UK and European office equipment and UK and European vehicles. These classes of asset have similar lease terms.

(s) Loans

Loans are interest bearing and are initially recognized at fair value less the directly attributable costs of issue. They are subsequently measured at amortized cost using the effective interest method.

(t) Warrants and units (financial liabilities)

Financial liabilities are initially recognized at their fair value on the date the contract is entered into and transaction costs are expensed. The Company's financial liabilities are subsequently re-measured at their fair value at each Statement of Financial Position date with changes in fair value recognized in the Income Statement.

As the exercise price of certain of the Company's share purchase warrants and units are fixed in US Dollars, and the functional currency of the Company is Pounds Sterling, these warrants and units are considered financial liabilities as a variable amount of cash in the Company's functional currency will be received on exercise. Accordingly, these share purchase warrants and units are classified and accounted for as a financial liability. The fair value of the warrants is determined using a Type 1 valuation, by comparison to their publicly traded market value, where available. For warrants and units which are not publicly traded a Type 2 Black Scholes option pricing model has been used to generate a valuation.

The Company also has certain warrants which are treated as financial liabilities as, though they are exercisable in Pounds Sterling, they contain characteristics which allow for variations in the number of shares that will be issued for a fixed amount of cash. The fair value of these warrants is determined using a Type 3 Monte Carlo valuation technique.

3. Significant accounting policies (continued)

(u) Share-based payments including warrants

Equity settled share-based payment transactions are measured with reference to the fair value at the date of grant, recognized on a straight-line basis over the vesting period, based on the Company's estimate of shares that will eventually vest. Where no vesting period exists, the full fair value is recognized immediately. Fair value is measured using a suitable option pricing model.

At each reporting date before vesting, the cumulative expense is calculated, representing the extent to which the vesting period has expired and management's best estimate of the achievement or otherwise of non-market conditions and the number of equity instruments that will ultimately vest. The movement in cumulative expense since the previous reporting date is recognized in the Group Statement of Comprehensive Income, with a corresponding entry in equity.

Where the terms of an equity settled award are modified or a new award is designated as replacing a cancelled or settled award, the cost based on the original award terms continues to be recognized over the remainder of the original vesting period. In addition, an expense is recognized over the remainder of the new vesting period for the incremental fair value of any modification, based on the difference between the fair value of the original award and the fair value of the modified award, both as measured on the date of modification. No reduction is recognized if this difference is negative.

Where awards are granted to the employees of the subsidiary company, the fair value of the awards at grant date is recorded in the Company's financial statements as an increase in the value of the investment with a corresponding increase in equity via the share-based payment reserve.

(v) Share capital

Proceeds on issue of shares are included in shareholders' equity, net of transaction costs. The carrying amount is not re-measured in subsequent years.

(w) New accounting standards and interpretations

Adoption of IFRS

The Group and Company financial statements have been prepared in accordance with IFRS, IAS and IFRS Interpretations Committee (IFRSIC) effective as at 31 December 2021. The Group and Company have not chosen to adopt any amendments or revised standards early.

Where applicable, the following amendments to accounting standards were adopted by the Group on the effective date during the current year. The Group has applied these standards in the preparation of the financial statements and has not adopted any new or amended standards early.

Amendment to IFRS 16	COVID-19-Related Rent Concessions beyond 30 June 2021	1 April 2021
Amendment to IFRS 4, IFRS 7, IFRS 9, IFRS 16 and IAS 39	Interest Rate Benchmark Reform – Phase 2	1 January 2021

Any significant impact on adoption is included in these notes.

UK IFRS

On 31 January 2020, the UK exited the EU and entered the transitional period during which companies with a financial year beginning on or before 31 December 2020, whose debt or equity securities are traded in a regulated exchange in the UK, continue to apply IFRS adopted by the EU.

On 1 January 2021 the Company adopted UK IFRS for both the current and prior reported results under the revised framework. The Directors did not note any changes requiring disclosure or adjustment.

IFRS issued but not yet effective

At the date of issue of these financial statements, the following accounting standards and interpretations, which have not been applied, were in issue but not yet effective. The Directors do not anticipate adoption of the standards listed below will have a material impact on the financial statements or they consider the implementation too uncertain to speculate on the impact on the accounts at this point in time.

Amendments to IFRS 17 and IFRS 9	Initial Application of IFRS 17 and IFRS 9 – Comparative Information	1 January 2023
Amendments to IFRS 1 and IAS 12	Deferred Tax Related to Assets and Liabilities Arising from a Single Transaction	1 January 2023
Amendments to Practice Statement 2, IAS 1, IFRS 7, IFRS 8, IAS 26 and IAS 34	Disclosure of Accounting Policies	1 January 2023
Amendment to IAS 8	Definition of Accounting Estimates	1 January 2023
Taxonomy Updates to IFRS 3, IFRS 5, IFRS 15, IAS 1, IAS 7, IAS 12, IAS 16, IAS 19, IAS 21 and IAS 33	Various Taxonomy Updates	TBC

4. Revenue

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Revenue	**522**	534

In October 2019, the Group entered into a collaboration agreement with MSD. The collaboration agreement was for the use of the MicroRx® platform to discover and develop LBP candidates as vaccines in up to three indications and the Group is responsible for the discovery and engineering of LBPs. Associated project costs were £1.1 million for the year ended 31 December 2021 (31 December 2020: £1.0 million).

No other revenue was generated during the year.

5. Operating loss

By nature:	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Operating loss is stated after charging /(crediting):		
Research and development expense		
Depreciation on property, plant, and equipment:		
– Owned assets	**629**	731
– Right-of-use assets	**50**	52
Amortization of intangible assets	**66**	139
Staff costs (see note 7)	**4,388**	4,522
Short-term rentals:		
– Land and buildings	**85**	133
Other contractual commitments	**5,673**	9,213
Other research and development costs	**8,927**	7,251
	19,818	22,041
Administrative expenses		
Depreciation on property, plant, and equipment:		
– Owned assets	**117**	126
– Right-of-use assets	**93**	93
Amortization of intangible assets	**21**	64
Profit on disposal of property, plant and equipment	**14**	—
Staff costs (see note 7)	**1,528**	1,353
Short-term rentals:		
– Land and buildings	**19**	—
– Equipment	**2**	2
Auditor's remuneration	**334**	469
Legal and professional	**2,094**	2,013
Consultancy	**242**	269
Insurance	**1,314**	83
Share-based payments	**583**	235
Other contractual commitments	**442**	488
Other administrative costs	**480**	774
	7,283	5,969
Foreign currency gains	**(441)**	(363)
Other income	**(36)**	(45)

5. Operating loss (continued)

By nature:	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Auditor's remuneration:		
RSM UK, UK audit services:		
– Fees payable to Company auditor for the audit of the IFRS parent and the consolidated accounts	**54**	44
– Auditing the financial statements of subsidiaries pursuant to legislation	**11**	11
– Audit related services	**3**	3
RSM US, US affiliated audit services:		
– Fees payable to US Company auditor for the audit of the parent and the consolidated accounts for the current year	**204**	127
– Fees payable to US Company auditor for the audit of the parent and the consolidated accounts for the prior years	**—**	228
– Non-audit services included in the Income Statement for the review of the opening balances	**62**	56
– Non-audit share issue costs, included in the Statement of Financial Position	**—**	112
Total auditor's and affiliated auditor's remuneration	**334**	581

6. Non-recurring costs

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Fair value adjustments on warrants issued February 2020 in connection with the issue of equity	**—**	3,110
Fair value adjustments on completion of the merger with Longevity Acquisition Corporation are made up as follows:		
– Shares	**34,153**	—
– Public warrants	**5,589**	—
– Private warrants	**1,236**	—
– Representative units	**2,339**	—
– Backstop warrants	**9,353**	—
Less: cash received (after deduction of liabilities)	**(8,419)**	—
Fair value adjustment on warrants issued with loans	**130**	—
Total non-recurring costs	**44,381**	3,110

Non-recurring costs relate to fair value adjustment in respect of warrants and other financial instruments on initial inception; further details can be found in notes 8 and 21.

7. Staff costs

	Year to 31 December 2021			Year to 31 December 2020		
Group	Research and development £000	Administrative £000	Total £000	Research and development £000	Administrative £000	Total £000
Wages and salaries	**3,467**	**938**	**4,405**	3,657	1,101	4,758
Social security costs	**602**	**243**	**845**	619	148	767
Pension contributions	**66**	**17**	**83**	84	31	115
	4,135	**1,198**	**5,333**	4,360	1,280	5,640
Share-based compensation	**253**	**330**	**583**	162	73	235
	4,388	**1,528**	**5,916**	4,522	1,353	5,875
Directors' remuneration (including benefits in kind) included in the aggregate remuneration above comprised:						
Emoluments for qualifying services	**—**	**622**	**622**	—	387	387

7. Staff costs (continued)

Company	Year to 31 December 2021 Research and development £000	Administrative £000	Total £000	Year to 31 December 2020 Research and development £000	Administrative £000	Total £000
Wages and salaries	**1,196**	**325**	**1,521**	1,120	646	1,766
Social security costs	**205**	**34**	**239**	192	75	267
Pension contributions	**14**	**13**	**27**	22	29	51
	1,415	**372**	**1,787**	1,334	750	2,084
Share-based compensation	**52**	**104**	**156**	54	73	127
	1,467	**476**	**1,943**	1,388	823	2,211
Directors' remuneration (including benefits in kind) included in the aggregate remuneration above comprised:						
Emoluments for qualifying services	**—**	**622**	**622**	—	387	387

Directors' emoluments (excluding social security costs but including benefits in kind) disclosed above include £185,042 (31 December 2020: £101,963) paid to the highest paid Director.

The Directors were not granted any share options in the year ended 31 December 2021 or 31 December 2020 and none of the Directors held any share options at 31 December 2021 nor at 31 December 2020.

An analysis of the highest paid Director's remuneration is included in the Directors' remuneration report: Report.

The average number of employees during the year (including Directors) was as follows:

	Year to 31 December 2021 Group Number	Year to 31 December 2021 Company Number	Year to 31 December 2020 Group Number	Year to 31 December 2020 Company Number
Directors	**7**	**7**	6	6
Scientific and administrative staff	**88**	**8**	109	16
	95	**15**	115	22

8. Finance income and finance expense

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Finance income		
Bank interest receivable	**1**	5
Finance expense		
Lease liability interest on:		
– Plant and equipment	**—**	—
– Land and buildings	**(161)**	(82)
Other interest payable	**(449)**	(91)
	(610)	(173)
Fair value adjustment on warrants and units	**13,627**	—

Bank interest receivable includes £Nil (31 December 2020: £Nil) which is receivable after the year end.

9. Taxation

The tax credit is made up as follows:

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Current income tax		
Corporation tax income for the year	**(3,496)**	(3,475)
Corporation tax expense for the year	**14**	2
Adjustment in respect of prior years	**(21)**	42
Total income tax credit recognized in the year	**(3,503)**	(3,431)
Current deferred tax		
Previously recognized deferred tax gains offset against losses	**—**	(940)
Current year charge	**(2)**	(12)
Total deferred tax	**(2)**	(952)
Total income tax credit recognized in the year	**(3,505)**	(4,383)

The income tax credit can be reconciled to the accounting loss as follows:

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Loss before taxation	**(57,465)**	(30,346)
Tax at the average standard rate of 19.12% (31 December 2020: 19.58%)	**(10,986)**	(5,942)
Effects of:		
Expenses not deductible for tax purposes	**5,234**	656
Adjustments from foreign currency translations on subsidiaries	**(24)**	(7)
Enhanced research and development expenditure	**(2,604)**	(2,464)
Property, plant, equipment and software temporary differences	**39**	97
Deferred tax not provided on losses	**3,953**	3,397
Utilized losses from prior years	**—**	(28)
Adjustment in respect of prior years	**(20)**	42
Offset of deferred tax liabilities against deferred tax assets in the year	**—**	(940)
Reversal of temporary differences	**(2)**	(12)
Effects of variation on tax reclaims over the standard rate	**905**	818
Tax income tax credit recognized in the year	**(3,505)**	(4,383)

The enacted UK corporation tax rate of 25.00% forms the basis for the UK element of the deferred tax calculation noted below, the equivalent rates used for Ireland and Spain were 12.50% and 25.00% respectively and for the USA the federal tax rate used was 21.00% and the average state tax rate used was 8.84%.

At 31 December 2021, the Group had tax losses available for carry forward of approximately £85.0 million (31 December 2020: £66.6 million). The Group has not recognized deferred tax assets relating to such earned forward losses of approximately £21.0 million (31 December 2020: £12.6 million).

At 31 December 2021, the Company had tax losses available for carry forward of approximately £38.8 million (31 December 2020: £28.0 million). The Company has not recognized deferred tax assets relating to such earned forward losses of approximately £10.6 million (31 December 2020: £5.3 million).

Group management considers that there is insufficient evidence of future taxable income, taxable temporary differences and feasible tax-planning strategies to utilize all of the cumulative losses and therefore it is not considered certain that the deferred tax assets will be realized in full. If future income differs from current projections, this could significantly impact the tax charge or benefit in future years.

10. Loss per share

(a) Basic and diluted

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Loss for the year attributable to equity shareholders	**(53,960)**	(25,963)
Weighted average number of shares		
Ordinary shares in issue	**169,520,003**	113,851,960
Basic loss per share (pence)	**(31.83)p**	(22.80)p

The basic and diluted loss per share are the same as the effect of share options and warrants is anti-dilutive.

(b) Adjusted

Adjusted loss per share is calculated after adjusting for the effect of non-recurring income and expenses arising from fair value adjustments on the issue of warrants and merger with Longevity Acquisition Corporation.

Reconciliation of adjusted loss after tax:

	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Reported loss after tax	**(53,960)**	(25,963)
Non-recurring costs	**44,381**	3,110
Adjusted loss after tax	**(9,579)**	(22,853)
Adjusted basic loss per share (pence)	**(5.65)p**	(20.07)p

11. Property, plant and equipment

Group	Plant and machinery £000	Fixtures, fittings and office equipment £000	Land and buildings £000	Total £000
Cost				
At 31 December 2019	5,987	215	2,207	8,409
Additions	163	—	—	163
Exchange rate adjustment	238	—	63	301
At 31 December 2020	6,388	215	2,270	8,873
Additions	180	—	23	203
Disposals	(304)	(3)	—	(307)
Exchange rate adjustment	(274)	—	(71)	(345)
At 31 December 2021	**5,990**	**212**	**2,222**	**8,424**
Depreciation				
At 31 December 2019	2,529	163	557	3,249
Provided during the year	682	32	289	1,003
Exchange rate adjustment	103	—	24	127
At 31 December 2020	3,314	195	870	4,379
Provided during the year	580	19	290	889
Released on disposal	(264)	(3)	—	(267)
Exchange rate adjustment	(111)	(1)	(27)	(139)
At 31 December 2021	**3,519**	**210**	**1,133**	**4,862**
Net book value:				
At 31 December 2021	**2,471**	**2**	**1,089**	**3,562**
At 31 December 2020	3,074	20	1,400	4,494
At 31 December 2019	3,458	52	1,650	5,160

Included in the totals above are the following assets held under leases; these agreements are secured against the assets to which they relate:

	Finance lease assets		Right-of-use assets	
Group assets under lease agreements	Plant and machinery £000	Total owned assets £000	Land and buildings £000	Total £000
Cost				
At 31 December 2019	44	44	1,106	1,150
Exchange rate adjustment	2	2	19	21
At 31 December 2020	46	46	1,125	1,171
Release of security on completion of lease	(43)	(43)	—	(43)
Exchange rate adjustment	(3)	(3)	(22)	(25)
At 31 December 2021	—	—	**1,103**	**1,103**
Depreciation				
At 31 December 2019	24	24	142	166
Provided during the year	5	5	145	150
Exchange rate adjustment	2	2	3	5
At 31 December 2020	31	31	290	321
Provided during the year	4	4	143	147
Release of security on completion of lease	(33)	(33)	—	(33)
Exchange rate adjustment	(2)	(2)	(7)	(9)
At 31 December 2021	—	—	**426**	**426**
Net book value:				
At 31 December 2021	—	—	**677**	**677**
At 31 December 2020	15	15	835	850
At 31 December 2019	20	20	964	984

11. Property, plant and equipment (continued)

Company	Plant and machinery £000	Fixtures, fittings and office equipment £000	Land and buildings £000	Total £000
Cost				
At 31 December 2019	218	184	1,062	1,464
Additions	4	—	—	4
At 31 December 2020	222	184	1,062	1,468
Additions	29	—	—	29
At 31 December 2021	**251**	**184**	**1,062**	**1,497**
Depreciation				
At 31 December 2019	113	137	239	489
Provided during the year	39	28	154	221
At 31 December 2020	152	165	393	710
Provided during the year	36	18	155	209
At 31 December 2021	**188**	**183**	**548**	**919**
Net book value:				
At 31 December 2021	**63**	**1**	**514**	**578**
At 31 December 2020	70	19	669	758
At 31 December 2019	105	47	823	975

Included in the totals above are the following assets held under leases; these agreements are secured against the assets to which they relate:

	Right-of-use assets	
Company assets under lease agreements	Land and buildings £000	Total £000
Cost		
At 31 December 2019, 31 December 2020 and 31 December 2021	**755**	**755**
Depreciation		
At 31 December 2019	92	92
Provided during the year	94	94
At 31 December 2020	186	186
Provided during the year	94	94
At 31 December 2021	**280**	**280**
Net book value:		
At 31 December 2021	**475**	**475**
At 31 December 2020	569	569
At 31 December 2019	663	663

12. Intangible assets

Group	Software £000	Patents £000	Intellectual property £000	Goodwill £000	Total £000
Cost					
At 31 December 2019	278	1,081	4,507	9,187	15,053
Additions	15	—	—	—	15
Exchange rate adjustment	—	—	—	225	225
At 31 December 2020	293	1,081	4,507	9,412	15,293
Disposals	(1)	—	—	—	(1)
Exchange rate adjustment	—	—	—	(252)	(252)
At 31 December 2021	**292**	**1,081**	**4,507**	**9,160**	**15,040**
Amortization					
At 31 December 2019	177	888	—	—	1,065
Provided during the year	71	132	—	—	203
At 31 December 2020	248	1,020	—	—	1,268
Provided during the year	26	61	—	—	87
Disposals	(1)	—	—	—	(1)
At 31 December 2021	**273**	**1,081**	—	—	**1,354**
Net book value:					
At 31 December 2021	**19**	—	**4,507**	**9,160**	**13,686**
At 31 December 2020	45	61	4,507	9,412	14,025
At 31 December 2019	101	193	4,507	9,187	13,988

Company	Software £000	Patents £000	Total £000
Cost			
At 31 December 2019	239	1,076	1,315
Additions	9	—	9
At 31 December 2020 and 31 December 2021	**248**	**1,076**	**1,324**
Amortization			
At 31 December 2019	147	795	942
Provided during the year	65	198	263
At 31 December 2020	212	993	1,205
Provided during the year	22	82	104
At 31 December 2021	**234**	**1,075**	**1,309**
Net book value			
At 31 December 2021	**14**	**1**	**15**
At 31 December 2020	36	83	119
At 31 December 2019	92	281	373

Goodwill amounting to £9.390 million, intellectual property amounting to £4.507 million and patent rights amounting to £1.081 million relate to a single cash-generating unit (CGU), contained in the original acquisitions of 4D Pharma Research Limited, 4D Pharma León, S.L.U. and 4D Pharma Cork Limited (formerly Tucana Health Limited) before foreign currency adjustments. These entities together provide the necessary facilities and resources to enable the Group to successfully research, manufacture, gain approval for and commercialize Live Biotherapeutic Products.

Goodwill, which has arisen on the business combinations, represents staff and accumulated know-how after fair value has been attributed to all other assets and liabilities acquired. Intellectual property of £1.923 million recognized on the business combinations represents bacteria identified by the Group's know-how and processes and at different stages of research and development, from early identification to patented strains of bacteria. Intellectual property of £2.584 million represents the methods and know-how in relation to the MicroDx platform acquired as part of 4D Pharma Cork Limited (formerly Tucana Health Limited).

12. Intangible assets (continued)

During the year goodwill, intellectual property, patents and associated property, plant and equipment were tested for impairment in accordance with IAS 36 'Impairment of Assets'. The recoverable amount of the CGU exceeds the carrying amount of goodwill, intellectual property, patents and associated property, plant and equipment. The recoverable amount of the CGU has been measured using a value-in-use calculation and, as such, no impairment was deemed necessary. The key assumptions used, which are based on both management's past experience as well as externally provided reports, for the value-in-use calculations are those relating to the risk-adjusted net present value of candidates that have been identified as potential future products as of 31 December 2021 and for which estimated potential peak sales and future cash flows have been estimated. In addition, an external valuation of intellectual property contained via the acquisition of 4D Pharma Cork Limited (formerly Tucana Health Limited) has been used. Valuation of an early-stage drug discovery pharmaceutical company is a notoriously difficult task and an analysis of financial history gives little indication of future performance. Despite this, for products currently in development, sales potentials can be estimated and management has used its own experience as well as consulting with external experts to establish best estimates of sales pricing and revenue forecasting and these can provide the starting point for valuing these products and ensuring that their value has not been impaired.

The recoverable amount of goodwill, intellectual property, patents and associated property, plant and equipment exceeds the carrying amount by 4,189%. The key assumption considered most sensitive for the value-in-use calculation is that regarding the discount rate applied to the net present value calculations. Management has performed sensitivity analysis on this key assumption and increased this from 10% to 20%. Due to the headroom which exists between the recoverable amount and the carrying value there is no reasonable possible change in this assumption that would cause the CGU's carrying value to exceed its recoverable amount.

13. Investment and loans to subsidiaries

Non-current assets

Company	Investment in subsidiaries £000
At 31 December 2019	**11,703**
Share-based payments with subsidiaries failing to meet vesting criteria	(98)
Share-based payments issued to employees in subsidiaries	108
At 31 December 2020	**11,713**
Fair value of shares issued to 4D Pharma (BVI) Limited in relation to the merger with Longevity Acquisition Corporation	34,153
Distribution to 4D pharma plc from 4D Pharma (BVI) Limited	(8,419)
Impairment of investment 4D Pharma (BVI) Limited	(25,734)
Share-based payments with subsidiaries failing to meet vesting criteria	(52)
Change in fair value of exercised share options for employees in subsidiaries	(91)
Share-based payments issued to employees in subsidiaries	427
At 31 December 2021	**11,997**
By subsidiary	
4D Pharma Research Limited	2,494
4D Pharma Cork Limited	3,813
4D Pharma León S.L.U.	5,465
4D Pharma Delaware Inc.	225
At 31 December 2021	**11,997**

13. Investment and loans to subsidiaries (continued)

Non-current assets (continued)

Company	Loans to subsidiary undertakings £000
At 31 December 2019	59,643
Additions in the year	14,257
Impairment provision	(1,230)
At 31 December 2020	72,670
Additions in the year	12,822
At 31 December 2021	**85,492**
By subsidiary	
4D Pharma Research Limited	79,196
4D Pharma Cork Limited	3,022
4D Pharma León S.L.U.	3,255
4D Pharma Delaware Inc.	19
At 31 December 2021	**85,492**

On 22 March 2021 the Group completed its merger with Longevity Acquisition Corporation. To complete the transaction the Company provided 4D Pharma (BVI) limited with 31,048,192 shares with a value of £1.10 per share to settle connected liabilities in relation to the transaction and recognized an investment of £34.2 million. On the same day Longevity Acquisition Corporation transferred its remaining asset, in the form of a cash balance of $14.9 million (less liabilities), to the Company. This provided the Company with net cash of £8.4 with 4D Pharma (BVI) Limited recognizing a loan asset and the Company recognizing a loan liability for this amount. 4D Pharma (BVI) Limited then issued a distribution of all profits (after interest) to the Company for £8.4 million, clearing the loan balances in both companies to £Nil and reducing the investment costs in 4D Pharma (BVI) Limited by the aforementioned amount. With 4D Pharma (BVI) Limited then having no other assets, the remaining investment balance recognized in the Company was impaired, reducing the balance to £Nil.

IFRS 9 requires intercompany loans be recognized based on the recoverability of the discounted value of future cash flows with effective interest taken to the Income Statement and that any impairment be recognized. The Company and Group have reviewed the position on loans and have agreed that they are non-current in nature and that, while no evidence of impairment exists to the underlying assets, the reduced level of activity in Cork from 2020 onwards, brought about after streamlining of staff and overheads was undertaken to reduce costs during COVID-19, increases the inherent probability that sufficient future discounted cash flows will be available to repay the loan; a total provision of £1,407,641 (31 December 2020: £1,407,641) has been included in earlier years in recognition of the increased risk involved.

Details of the share-based payments issued to employees in subsidiaries are included in note 21.

Subsidiary undertakings

Subsidiary undertakings	Country of incorporation	Registered office	Principal activity	Holding at 31 December 2021
4D Pharma Research Limited	Scotland	Life Sciences Innovation Building, Cornhill Road, Aberdeen AB25 2ZS	Research and development	**100%**
4D Pharma Cork Limited	Ireland	C/O Quintas, Herron House, Blackpool Park, Cork T23 R50R	Research and development	**100%**
4D Pharma S.L.U.	Spain	Parque Tecnológico de León, Parcela, M–10.4, 24009, Armunia, León, Spain	Production of Live Biotherapeutics	**100%**
4D Pharma Delaware Inc.	USA	1209 Orange Street, Wilmington, New Castle, Delaware, 19801	Provision of services	**100%**
4D Pharma (BVI) Limited (formerly Dolphin Merger Sub Limited)	British Virgin Isles	Palm Grove House, P.O. Box 438, Road Town, VG1110, Tortola	Acquisition company	**100%**

The shares in all the companies listed above are held by 4D pharma plc.

The following companies were dormant throughout 2020 and 2021 and have been dissolved on a voluntary basis following the year end:

Subsidiary undertakings	Company number
The Microbiota Company Limited	09132301
Microbiomics Limited	08871792

14. Inventories

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Consumables and materials	272	—	291	—

The Directors consider that the carrying amount of inventories is the lower of cost and market value.

During the year £1.18 million (31 December 2020: £0.74 million) of inventories were expensed to the Income Statement.

15. Trade and other receivables

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Prepayments	2,167	891	1,752	439
Prepaid share issue costs	—	—	1,471	1,471
	2,167	891	3,223	1,910

Prepaid share issue costs relate to expenses incurred in advance of the Longevity merger transaction.

The Directors consider that the carrying amount of trade and other receivables approximates to their fair value.

16. Taxation receivables

Non-current receivables	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Corporation tax	199	—	177	—

Non-current assets include research and development tax claims in overseas subsidiaries that are repayable in more than one year.

Current receivables	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Corporation tax	6,825	1,945	3,512	1,326
VAT	732	231	924	225
	7,557	2,176	4,436	1,551

The Directors consider that the carrying amount of taxation receivables approximates to their fair value.

17. Cash, cash equivalents and deposits

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Cash and cash equivalents	**15,497**	**14,363**	8,775	6,213

The Company and the Group did not hold any cash on deposit at 31 December 2021 nor at 31 December 2020.

The Directors consider that the carrying value of cash and cash equivalents approximates their fair value. For details on the Group's credit risk management refer to note 27.

18. Trade and other payables

Current	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Trade payables	**1,221**	**612**	3,300	2,583
Other payables	**17**	**12**	22	17
Taxation and social security	**304**	**118**	223	82
Accruals	**2,580**	**564**	1,604	893
Deferred income	**688**	**—**	1,230	—
	4,810	**1,306**	6,379	3,575

Trade and other payables principally comprise amounts outstanding for trade purchases and ongoing costs. Trade payables are non-interest bearing and are typically settled on 30 to 45-day terms.

The Directors consider that the carrying value of trade payables, other payables and accruals approximates to their fair value.

The Group has financial risk management policies in place to ensure that any trade payables are settled within the credit time frame and no significant interest has been charged by any suppliers as a result of late payment of invoices during the reporting year presented herein.

19. Lease liabilities

Lease liabilities, excluding short-term and low-value leases, included in the Statement of Financial Position were as follows:

Lease liabilities	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Current liabilities	**80**	**44**	73	37
Non-current liabilities	**889**	**671**	986	716
	969	**715**	1,059	753

19. Lease liabilities (continued)

Maturity analysis of lease liabilities

The maturity of the gross contractual undiscounted cash flows due on the Group's lease liabilities (excluding short-term and low-value leases) is set out below based on the period between 31 December 2021 and the contractual maturity date.

Analyzed as follows:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Land and buildings				
Due within six months	**115**	**78**	115	78
Due between six months and one year	**115**	**78**	115	78
Due between one and two years	**251**	**176**	229	155
Due between two and five years	**719**	**501**	738	510
Due in more than five years	**338**	**338**	569	505
	1,538	**1,171**	1,766	1,326
Plant and equipment				
Due within six months	—	—	5	—
Due between six months and one year	—	—	—	—
Due between one and two years	—	—	—	—
Due between two and five years	—	—	—	—
Due in more than five years	—	—	—	—
	—	—	5	—
Total				
Due within six months	**115**	**78**	120	78
Due between six months and one year	**115**	**78**	115	78
Due between one and two years	**251**	**176**	229	155
Due between two and five years	**719**	**501**	738	510
Due in more than five years	**338**	**338**	569	505
	1,538	**1,171**	1,771	1,326

19. Lease liabilities (continued)

Maturity analysis of lease liabilities (continued)

The maturity of the net contractual discounted cash flows due on the Group's lease liabilities (excluding short-term and low-value leases) is set out below based on the period between 31 December 2021 and the contractual maturity date.

Analyzed as follows:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Land and buildings				
Due within six months	**38**	**21**	14	16
Due between six months and one year	**42**	**23**	55	21
Due between one and two years	**84**	**44**	76	38
Due between two and five years	**479**	**301**	413	248
Due in more than five years	**326**	**326**	497	430
	969	**715**	1,055	753
Plant and equipment				
Due within six months	—	—	4	—
Due between six months and one year	—	—	—	—
Due between one and two years	—	—	—	—
Due between two and five years	—	—	—	—
Due in more than five years	—	—	—	—
	—	—	4	—
Total				
Due within six months	**38**	**21**	18	16
Due between six months and one year	**42**	**23**	55	21
Due between one and two years	**84**	**44**	76	38
Due between two and five years	**479**	**301**	413	248
Due in more than five years	**326**	**326**	497	430
	969	**715**	1,059	753

Lease terms

The Group leases properties used for its operations in the UK and in Europe. Remaining lease terms are four to five years, with remaining lease terms on the same leases at 31 December 2020 being for five to six years. Rentals are fixed with index linked increases at certain dates after inception of the lease. All property leases are subject to repair and maintenance terms and include provision for repair work on *termination of the lease, estimations for the value of which have been included above.*

Terms on specific property leases also include:

- UK property leases include a rent review by valuation in 2023.
- European property leases included a break clause in 2021, which was not exercised.

The Group also leases photocopiers which are low value and leased over a period of no more than three years at inception.

Repayment and interest rates on lease agreements are fixed at the contract date.

The Group incremental borrowing rate for leases at 31 December 2021 was 16.79% (31 December 2020: 16.59%) over a weighted average remaining period of 61 months (31 December 2020: 72 months).

The Company incremental borrowing rate for leases at 31 December 2021 was 16.81% (31 December 2020: 16.81%) over a weighted average remaining period of 65 months (31 December 2020: 77 months).

All lease agreements are secured by the Company against the assets to which they relate.

Disclosure of the carrying amounts of right-of-use assets by class and additions to right-of-use assets has been provided in note 11 'Property, plant and equipment'.

19. Lease liabilities (continued)

Effect of leases on financial performance

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Depreciation charge for the year included in land and buildings: for right-of-use assets:				
– Research and development costs	**50**	**—**	52	—
– Administrative expenses	**93**	**94**	93	93
Total depreciation charge on leased assets	**143**	**94**	145	93
Lease expense in the year included in 'research and development' for:				
– Short-term leases, excluding leases with a term of one month or less	**85**	**—**	133	—
– Leases of low-value assets, excluding short-term leases disclosed above	**—**	**—**	—	—
Lease expense in the year included in 'administrative expenses' for:				
– Short-term leases, excluding leases with a term of one month or less	**19**	**—**	—	—
– Leases of low-value assets, excluding short-term leases disclosed above	**2**	**2**	2	2
Interest expense for the year on lease liabilities recognized in 'finance costs'	**161**	**117**	173	123
Foreign currency adjustments to lease liabilities	**(18)**	**—**	18	—
Total effect of leases on financial performance	**392**	**213**	471	218

Effect of leases on cash flows

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Total cash outflow for leases in the year	**337**	**157**	361	157

Minimum lease commitments

The total minimum lease commitments for short-term and low-value leases at 31 December 2021 and 31 December 2020 were as follows:

	Short-term and low-value leases		Short-term and low-value leases	
	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Land and buildings				
Not later than one year	**98**	**—**	81	—
After one year but not more than five years	**—**	**—**	—	—
	98	**—**	81	—

There were no minimum lease commitments for plant and machinery during the year to 31 December 2021 and 31 December 2020.

20. Loans

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Current liabilities	—	—	—	—
Non-current liabilities	**8,961**	**8,961**	—	—
Net loan balance	**8,961**	**8,961**	—	—

The loans are made up as follows:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Term loan	**9,241**	**9,241**	—	—
Capitalized debt issue costs	**(280)**	**(280)**	—	—
Net loan balance	**8,961**	**8,961**	—	—

On 29 July 2021 the Group entered a loan agreement with Oxford Finance S.A.R.L. for up to $30 million maturing on 1 July 2026 and secured against substantially all of the assets of the Group and drawing down the first tranche for $12.5 million or £8.990 million at that date.

Interest is charged on the loan at 8.15% plus the greater of the 30-day US Dollar LIBOR rate and 0.1% throughout the term of the loan. Interest-only monthly payments will be made until either 1 September 2023 or 1 September 2024 dependent on certain milestones. In addition, a 6.0% or 6.5% final payment fee will be charged, the latter being dependent on the extension of the interest only period, though this fee may be discounted to between 3% and 1% if the loan is repaid before the maturity date depending on certain criteria.

In addition to the interest and final payment fee, warrants were issued for 212,568 shares at an exercise price of $1.18. Further warrants become available on drawdown of loan tranches at a rate of 2% of the loan value with an exercise price based on the lower of the preceding day's share price and the 10-day average share price prior to the further loan. All warrants have a five-year exercise period from the date of issuance.

The loan includes a restrictive covenant that requires the Group to maintain a cash balance of at least $7.5 million if the Group does not meet the conditions of the equity event. The equity event requires the issue of equity securities and other receipt of income from other partnering transactions, in certain combinations, of at least $45 million before 1 April 2022.

The loan includes various customary covenants limiting the Group's ability to perform certain functions that may affect recoverability of the loan, as well as providing penalties and repayment provisions in the event of a default. A copy of the loan agreement and further details can be found as an exhibit to our F-1 filings with the SEC, a link to which is provided on our website.

21. Financial instruments

Warrants and units included in liabilities	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Current liabilities	—	—	—	—
Non-current liabilities	**4,992**	**4,992**	—	—
	4,992	**4,992**	—	—

The warrants and units are made up as follows:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Opening balance	—	—	—	—
Additions:				
– Arising on merger with Longevity Acquisition Corporation	**18,517**	**18,517**	—	—
– Arising on drawdown of loans	**130**	**130**	—	—
Change in fair value during the period	**(13,655)**	**(13,655)**	—	—
Closing balance	**4,992**	**4,992**	—	—

Warrants and units

The Group and Company have the following warrant and unit option schemes:

a) Recognized on acquisition of Longevity Acquisition Corporation

On 22 March 2021 the Company and Group completed their merger with Longevity Acquisition Corporation and assumed the existing warrants and recognized the backstop warrants issued in the funding of the transaction. The transaction was subject to an exchange ratio of 7.5315 4D pharma plc shares for each Longevity Acquisition Corporation share with the warrants and units detailed as follows:

i. Public warrants

Public warrants are traded on Nasdaq as LBPSW. At acquisition there were 4,000,000 public warrants which convert to half of a Longevity share (pre-acquisition) or 15,063,000 4D pharma plc ordinary shares at the exchange ratio. The public warrants are exercisable until the fifth anniversary of the transaction and have an exercise price of $11.50 per public warrant; they also include a redemption price of $18.00 and a cashless redemption feature. As the exercise price is expressed in USD but the Company's functional currency is GBP they have been treated as financial liabilities in the financial statements under IAS 32 with periodic gains and losses on fair value adjustment included in the Income Statement. As publicly traded financial instruments the fair value has been assessed using a Type 1 valuation method which uses their publicly traded value.

ii. Private warrants

At acquisition there were 320,000 private warrants which converted to half of a Longevity share (pre-acquisition) or 1,205,040 4D pharma plc ordinary shares at the exchange ratio. The private warrants are exercisable until the fifth anniversary of the transaction and have an exercise price of $11.50 per private warrant; in addition there is no redemption clause, provided certain conditions are maintained or convert to public warrants with the same characteristics as private warrants if the conditions are not met, and cashless redemption features are also present. As the exercise price is expressed in USD but the Company's functional currency is GBP they have been treated as financial liabilities in the financial statements under IAS 32 with periodic gains and losses on fair value adjustment included in the Income Statement. As publicly traded prices are not available the fair value has been assessed using a Type 2, Black Scholes valuation model linked to the terms, conditions and observable market data at issue.

21. Financial instruments (continued)

Warrants and units (continued)

a) Recognized on acquisition of Longevity Acquisition Corporation (continued)

iii. Representative units

At acquisition there were 240,000 representative units. Pre-acquisition each unit converted 1.1 Longevity shares and one public warrant or 1,988,316 4D pharma plc ordinary shares and 903,780 4D pharma shares in public warrants at the exchange ratio. The representative units are exercisable until 28 August 2023 and have an exercise price of $11.50 per unit and underlying redemption clauses associated with the public warrants if exercised. As the exercise price is expressed in USD but the Company's functional currency is GBP they have been treated as financial liabilities in the financial statements under IAS 32 with periodic gains and losses on fair value adjustment included in the Income Statement. As publicly traded prices are not available the fair value has been assessed using a Type 2, Black Scholes valuation model linked to the terms, conditions and observable market data at issue.

iv. Backstop warrants

Backstop warrants were issued to guarantors who provided financial support for the merger with Longevity Acquisition Corporation and came into effect on completion of the transaction. At acquisition 7,530,000 backstop warrants were issued for one 4D pharma plc ordinary share per warrant. The backstop warrants are exercisable for 60 days following the exercise period of the assumed warrants detailed in (i) and (ii) above. They have an exercise at par value but are indexed to the exercise of the assumed warrants, such that they only vest in proportion to the percentage of these assumed warrants. They include a cashless redemption feature and as the exercise price is indexed to these factors they have been treated as financial liabilities in the financial statements under IAS 32 with periodic gains and losses on fair value adjustment included in the Income Statement. As publicly traded prices are not available and multiple elements factor into the fair value it has been assessed using a Type 3, Monte Carlo valuation model linked to the terms, conditions and observable market data at issue.

b) Loan warrants

On 29 July 2021 the Company issued 212,568 warrants to Oxford Finance S.A.R.L. on the drawdown of the first $12.5 million of a loan facility for up to $30 million. Further warrants become available on drawdown of loan tranches at a rate of 2% of the loan value with an exercise price based on the lower of the preceding day's share price and the 10-day average share price prior to the further loan. Each warrant entitles the holder to subscribe for one ordinary share at a price of $1.18 at any time up to the fifth anniversary of the issue. As the exercise price is expressed in USD but the Company's functional currency is GBP they have been treated as financial liabilities in the financial statements under IAS 32 with periodic gains and losses on fair value adjustment included in the Income Statement. Since they are not publicly traded the fair value was assessed using a Type 2, Black Scholes valuation model linked to the terms, conditions and observable market data at issue.

c) 18 February 2020 warrants

On 18 February 2020 the Company issued 22,000,000 warrants to subscribers taking part in the issue of ordinary shares on the basis of one warrant for every two ordinary shares purchased. Each warrant entitles the holder to subscribe for one ordinary share at a price of 100 pence at any time up to the fifth anniversary of admission. As they are not publicly traded the fair value was assessed using a Type 2, Black Scholes valuation model linked to the terms, conditions and observable market data at issue and included in equity in the share-based payment reserve.

Group and Company

Year ended 31 December 2021

			Number					
Warrants and units	Exercise period	Exercise price per share Pence	At 31 December 2020	Granted	Exercised	Non-vesting or lapsed	**At 31 December 2021**	Exercisable
Included in liabilities								
Public warrants	2021–2026	110.27–152.69	—	15,063,000	—	—	**15,063,000**	15,063,000
Private warrants	2021–2026	110.27–152.69	—	1,205,040	—	—	**1,205,040**	1,205,040
Representative units	2021–2023	103.38–105.97	—	2,892,096	—	—	**2,892,096**	2,892,096
Backstop warrants	2021–2026	0.25	—	7,530,000	—	—	**7,530,000**	—
Loan warrants	2021–2026	84.80–87.36	—	212,568	—	—	**212,568**	212,568
Included in equity								
18 February 2020	2020–2025	100.00	21,924,307	—	(31,859)	—	**21,892,448**	21,892,448
			21,924,307	26,902,704	(31,859)	—	**48,795,152**	41,265,152
Weighted average exercise price of options (pence)			100.00	91.51	100.00	—	**95.32**	112.67

21. Financial instruments (continued)

Group and Company (continued)

Year ended 31 December 2020

			Number					
Warrants and units	Exercise period	Exercise price per share Pence	At 31 December 2019	Granted	Exercised	Non-vesting or lapsed	At 31 December 2020	Exercisable
Included in equity								
18 February 2020	2020–2025	100.00	—	22,000,000	(75,693)	—	21,924,307	21,924,307
			—	22,000,000	(75,693)	—	21,924,307	21,924,307
Weighted average exercise price of options (pence)			—	100.00	100.00	—	100.00	100.00

31,859 warrants were exercised during the year (31 December 2020: 75,693) and 41,265,152 warrants were exercisable at the year end (31 December 2020: 21,924,307).

The following table lists the assumptions used in calculating the fair value of warrants and units:

	Date of issue	Expected volatility percentage range	Risk-free interest rate percentage range	Dividend yield %	Expected life of options years	Weighted average exercise price	Weighted average share price at date of grant	Number of options originally granted
Included in liabilities								
Public warrants	22 March 2021	n/a	n/a	0.0	4.22-5.00	131.48p	137.00p	15,063,000
Private warrants	22 March 2021	90.2–94.8	0.86–1.15	0.0	4.22-5.00	131.48p	137.00p	1,205,040
Representative units	22 March 2021	96.0–106.1	0.43–0.78	0.0	1.66-2.44	104.68p	137.00p	2,892,096
Backstop warrants	22 March 2021	70.0–85.0	0.87–1.14	0.0	4.22-5.00	0.25p	137.00p	7,530,000
Loan warrants	29 July 2021	90.3–94.8	0.74–1.15	0.0	4.58-5.00	86.08p	88.00p	212,568
Included in equity								
18 February 2020	18 February 2020	59.3	0.46	0.0	5.00	100.00p	46.00p	22,000,000

The expected life of the warrants and units is based on historical data and is not necessarily indicative of exercise patterns that may occur. The expected volatility reflects the assumption that the historical volatility is indicative of future trends, which may also not necessarily be the actual outcome.

No dividends were assumed to be paid in the foreseeable future.

The models assume, within the calculation of the charge, delivery of options that are dependent on a judgmental comparison to the total shareholder return against a specified comparator group of companies upon passing of the vesting period.

No other features of warrants and units granted were incorporated into the measurement of fair value.

Share option schemes

The Group operates the following unapproved share option schemes:

a) 2015 Long Term Incentive Plan (LTIP)

Share options were granted to staff members under the '2015 Long Term Incentive Plan' on 10 November 2015, 11 May 2016, 24 May 2017, 26 October 2018 and 5 July 2019. Share options are awarded to management and key staff as a mechanism for attracting and retaining key employees. These options vest over a period of up to three years from the date of grant and are exercisable until the 10th anniversary of the award. Exercise of the award is subject to the employee remaining a full-time member of staff at the point of exercise and the vesting conditions being met. Vesting conditions are based on a mixture of the Company's TSR performance, relative to an appropriate comparator group, and certain individual performance criteria. The fair value is assessed using a Type 2, Black Scholes valuation model, linked to the terms, conditions and observable market data at issue and included in equity in the share-based payment reserve, and vesting conditions are based on a mixture of the Company's TSR performance, relative to an appropriate comparator group, and certain individual performance criteria.

b) 2021 Long Term Incentive Plan (LTIP)

Share options were granted to staff members under the '2021 Long Term Incentive Plan' on 17 December 2021. Share options are awarded to management and staff as a mechanism for attracting and retaining key employees. These options vest subject to members of staff remaining employees on each vesting date and on exercise, with one-quarter of the options awarded vesting on the anniversary of the vesting start date with the remaining vesting dates and number of remaining options occurring evenly over the remainder of a four-year period from vesting start date. The fair value is assessed using a Type 2, Black Scholes valuation model, linked to the terms, conditions and observable market data at issue and included in equity in the share-based payment reserve.

21. Financial Instruments (continued)

Share option schemes (continued)

Group and Company

Year ended 31 December 2021

			Number					
Date of grant	Exercise period	Exercise price per share Pence	At 31 December 2020	Granted	Exercised	Non-vesting or lapsed	At 31 December 2021	Exercisable
Issued under the 2015 LTIP								
11 May 2016	2019–2026	0.25	9,686	—	(9,686)	—	—	—
24 May 2017	2020–2027	0.25	36,930	—	(36,930)	—	—	—
26 October 2018	2021–2028	0.25	57,962	—	(21,353)	—	**36,610**	36,610
5 July 2019	2022–2029	0.25	446,004	—	—	(176,706)	**269,298**	—
Issued under the 2021 LTIP								
17 December 2021	2021–2031	52.35	—	7,520,152	—	—	**7,520,152**	530,289
			550,582	7,520,152	(67,969)	(176,706)	**7,826,060**	566,899
Weighted average exercise price of options (pence)			0.25	52.35	0.25	0.25	**50.31**	48.99

Year ended 31 December 2020

			Number					
Date of grant	Exercise period	Exercise price per share Pence	At 31 December 2019	Granted	Exercised	Non-vesting or lapsed	At 31 December 2020	Exercisable
Issued under the 2015 LTIP								
11 May 2016	2019–2026	0.25	9,686	—	—	—	9,686	9,686
24 May 2017	2020–2027	0.25	110,817	—	—	(73,887)	36,930	36,930
26 October 2018	2021–2028	0.25	400,391	30,961	—	(373,390)	57,962	
5 July 2019	2022–2029	0.25	538,596	—	—	(92,592)	446,004	21,353
			1,059,490	30,961	—	(539,869)	550,582	67,969
Weighted average exercise price of options (pence)			0.25	0.25	—	0.25	0.25	0.25

67,969 share options had been exercised at the year end (31 December 2020: nil) and 566,289 (31 December 2020: 67,969) share options were exercisable at the year end.

The following table lists the assumptions used in calculating the fair value of options:

Date of grant	Expected volatility %	Risk-free interest rate %	Dividend yield %	Expected life of options years	Weighted average exercise price	Weighted average share price at date of grant	Number of options originally granted
Issued under the 2015 LTIP							
11 May 2016	52.50	1.40	0.00	3.00	0.25p	771p	60,147
24 May 2017	52.50	0.41	0.00	3.00	0.25p	321p	240,406
26 October 2018	50.96	0.72	0.00	3.00	0.25p	141p	746,779
5 July 2019	69.62	0.57	0.00	3.00	0.25p	93p	538,596
Issued under the 2021 LTIP							
17 December 2021	86.64	1.22	0.00	5.84	52.3p	52.3p	7,520,152

The expected life of the options is based on historical data and is not necessarily indicative of exercise patterns that may occur. The expected volatility reflects the assumption that the historical volatility is indicative of future trends, which may also not necessarily be the actual outcome.

No dividends were assumed to be paid in the foreseeable future.

The models assume, within the calculation of the charge, delivery of options that are dependent on a judgemental comparison to the total shareholder return against a specified comparator group of companies upon passing of the vesting period.

No other features of options granted were incorporated into the measurement of fair value.

22. Deferred tax

	Group £000
At 31 December 2019	964
Offset against taxable losses	(940)
Unwound in the year	(12)
Exchange rate movement	1
At 31 December 2020	13
Unwound in the year	(2)
Exchange rate movement	(1)
At 31 December 2021	**10**

Group management considers that there is insufficient evidence of future taxable income, taxable temporary differences and feasible tax-planning strategies to utilize all of the cumulative losses and therefore it is not considered certain that the deferred tax assets will be realized in full. If future income differs from current projections, this could significantly impact the tax charge or benefit in future years.

Though the Group's management does not believe that the recognition of a deferred tax asset is appropriate due to the significant uncertainty, the position related to the deferred tax liabilities of the Group is reviewed annually. Following the 31 December 2021 review, management concluded that there are sufficient losses such that that the estimated liability arising on the acquisition of goodwill on subsidiaries remains eligible to be offset. In the year to 31 December 2020 management formed the conclusion that the deferred tax liability arising on acquisition of subsidiaries could be offset against losses, reducing the balance by £940,000 to £Nil.

All deferred tax liabilities relate to the tax arising on fair value adjustment on the acquisition of subsidiaries and their assets and as such there is no provision for deferred tax in the Company.

23. Share capital

Group and Company	Ordinary shares Number	Share capital £000	Share premium £000	Total £000
Allotted, called up and fully paid ordinary shares of 0.25p				
Ordinary shares at 1 January 2020	65,493,842	164	108,296	108,460
Placing and subscription on 18 February 2020	44,000,000	110	21,890	22,000
Expenses of placing and subscription on 18 February 2020	—	—	(1,065)	(1,065)
Placing and subscription on 13 July 2020	21,898,400	55	7,610	7,665
Expenses of placing and subscription on 13 July 2020	—	—	(529)	(529)
Warrants exercised (issued 18 February 2020)	75,693	—	76	76
Ordinary shares at 31 December 2020	131,467,935	329	136,278	136,607
Issued in connection with Longevity merger on 22 March 2021	31,048,192	78	34,075	34,153
Expenses of merger	—	—	(2,805)	(2,805)
Placing and issue on 22 March 2021	16,367,332	41	17,963	18,004
Expenses of placing	—	—	(1,412)	(1,412)
Directors' subscription on 16 April 2021	1,317,680	3	1,446	1,449
Warrants exercised	31,859	—	64	64
Share options exercised	67,969	—	94	94
Ordinary shares at 31 December 2021	**180,300,967**	**451**	**185,703**	**186,154**

The balances classified as share capital and share premium include the total net proceeds (nominal value and share premium respectively) on issue of the Company's equity share capital. The entire share capital consists of 0.25 pence ordinary shares.

Each ordinary 0.25 pence share is entitled:

- to one vote in any circumstances;
- pari passu to dividend payments or any other distribution; and
- pari passu to participate in a distribution arising from a winding up of the Company.

23. Share capital (continued)

Significant transactions

On 18 February 2020 the Company raised £22.0 million in gross proceeds (£20.9 million net) from a placing of 16,820,080 new ordinary shares and a subscription of 27,179,920 new ordinary shares at an issue price of 50 pence per share. In addition, one warrant was allotted for every two ordinary shares subscribed in the fundraising. As a result, a total of 22,000,000 warrants were allotted. Each warrant entitles the holder to subscribe for one ordinary share at an exercise price of 100 pence at any time up to the fifth anniversary of admission.

On 13 July 2020 the Company raised £7.7 million in gross proceeds (£7.1 million net) from a placing of 16,807,616 new ordinary shares and a subscription of 5,090,784 new ordinary shares at an issue price of 35 pence per share.

On 22 March 2021 the Company completed the merger with Longevity Acquisition Corporation, listed on Nasdaq and gained access to its cash balance of $14.9 million which equated to $11.6 million or £8.4 million after the settling liabilities. Since Longevity is a cash shell with no future trade or income it did not qualify as a business and is not subject to the treatment for business combination under IFRS 3; as such the transaction has been treated as the issue of 31,048,192 shares at a price of £1.10 per share, further details of which are included in notes 6 and 13.

On 22 March 2021 the Company raised £18.0 million in gross proceeds (£16.6 million net) from a placing of 16,367,332 new ordinary shares at an issue price of £1.10 per share.

On 16 April 2021 the Company raised £1.4 million in proceeds through the sale of 1,317,680 new ordinary shares to Directors, who were unable to invest in the placing, at a price of £1.10 per share.

24. Share-based payment reserve

	Group			Company		
	Share-based compensation £000	Warrants £000	Total £000	Share-based compensation £000	Warrants £000	Total £000
At 31 December 2019	367	—	367	367	—	367
Lapsed options	(204)	—	(204)	(106)	—	(106)
Lapsed options relating to investment in subsidiaries	—	—	—	(98)	—	(98)
Issued	235	3,110	3,345	127	3,110	3,237
Issued to investment in subsidiaries	—	—	—	108	—	108
Exercised	—	(11)	(11)	—	(11)	(11)
At 31 December 2020	398	3,099	3,497	398	3,099	3,497
Warrants issued or assumed in connection with the merger with Longevity Acquisition Corporation	18,517	—	18,517	—	—	—
Warrants re-classified as liabilities	(18,517)	—	(18,517)	—	—	—
Lapsed options	(135)	—	(135)	(83)	—	(83)
Lapsed options relating to investment in subsidiaries	—	—	—	(52)	—	(52)
Issued	583	—	583	156	—	156
Issued to investment in subsidiaries	—	—	—	427	—	427
Exercised	(224)	(4)	(228)	(68)	(4)	(72)
Exercises relating to investment in subsidiaries	—	—	—	(156)	—	(156)
At 31 December 2021	**622**	**3,095**	**3,717**	**622**	**3,095**	**3,717**

Details of employee share options and warrants included in the share-based payment reserve are included in note 24.

25. Capital and reserves

The components of equity are as follows:

Called-up share capital

The share capital account includes the par value for all shares issued and outstanding.

Share premium account

The share premium account is used to record amounts received in excess of the nominal value of shares on issue of new shares less the costs of new share issues.

Merger reserve

The merger reserve comprises the premium arising on shares issued as consideration for the acquisition of subsidiary undertakings where merger relief under section 612 of the Companies Act 2006 applies.

Retained earnings

Retained earnings includes the accumulated profits and losses arising from the Group Statement of Comprehensive Income and certain items from other comprehensive income attributable to equity shareholders net of distributions to shareholders.

25. Capital and reserves (continued)

Other reserve

The other reserve represents the balance arising on the acquisition of the former non-controlling interest in 4D Pharma Research Limited.

Share-based payment reserve

The share-based payment reserve accumulates the corresponding credit entry in respect of share-based compensation charges. Movements in the reserve are disclosed in the Statements of Changes in Equity.

Translation reserve

The translation reserve is composed of the exchange rate movements in non-cash assets in for foreign subsidiaries which arise on the translation of foreign subsidiaries. Movements in the reserve are disclosed in the Statements of Changes in Equity.

26. Commitments

The Group had the following non-cancellable commitments at the date of the Statement of Financial Position:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Short-term and low-value leases (see note 19)	**98**	**—**	81	—
Research and development	**5,031**	**5,031**	5,570	5,570
Administrative expenses	**10**	**10**	184	184
	5,139	**5,041**	5,835	5,754

The maturity analysis of non-cancellable commitments is as follows:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Short- term and low-value leases (see note 19):				
– Not later than one year	**98**	**—**	81	—
– After one year but not more than five years	**—**	**—**	—	—
– Due in more than five years	**—**	**—**	—	—
	98	**—**	81	—
Research and development:				
– Not later than one year	**1,888**	**1,888**	3,112	3,112
– After one year but not more than five years	**3,143**	**3,143**	2,458	2,458
– Due in more than five years	**—**	**—**	—	—
	5,031	**5,031**	5,570	5,570
Administrative expenses:				
– Not later than one year	**9**	**9**	184	184
– After one year but not more than five years	**1**	**1**	—	—
– Due in more than five years	**—**	**—**	—	—
	10	**10**	184	184
Total:				
– Not later than one year	**1,995**	**1,897**	3,377	3,296
– After one year but not more than five years	**3,144**	**3,144**	2,458	2,458
– Due in more than five years	**—**	**—**	—	—
	5,139	**5,041**	5,835	5,754

27. Financial risk management

Overview

This note presents information about the Group's exposure to various kinds of financial risks, the Group's objectives, policies and processes for measuring and managing risk, and the Group's management of capital.

The Board of Directors has overall responsibility for the establishment and oversight of the Group's risk management framework. The Executive Directors report regularly to the Board on Group risk management.

It is, and has been throughout the year, the Group's policy that no speculative trading in financial instruments is undertaken.

Capital risk management

The Company reviews its forecast capital requirements on a rolling basis to ensure that entities in the Group will be able to continue as a going concern while maximizing the return to stakeholders.

The capital structure of the Group consists of equity attributable to equity holders of the parent, comprising issued share capital (note 23), reserves and retained earnings as disclosed in note 25 and in the Group Statement of Changes in Equity. Total equity was £23.2 million at 31 December 2021 (31 December 2020: £28.0 million).

The Company was not subject to externally imposed capital requirements at 31 December 2021. On 29 July 2021 the Company established a loan facility with Oxford Finance S.A.R.L.; included in the agreement is a cash covenant which requires a cash balance of no less than $7.5 million to be maintained if the Company has not generated at least $45 million through the issue of certain combinations of equity and partnering transactions before 1 April 2022 (see note 20 for details).

Liquidity risk

The Group's approach to managing liquidity is to ensure that, as far as possible, it will always have sufficient liquidity to meet its liabilities when due, under both normal and stressed conditions, without incurring unacceptable losses or risking damage to the Group's reputation.

The Group manages all of its external bank relationships centrally in accordance with defined treasury policies. The policies include the minimum acceptable credit rating of relationship banks and financial transaction authority limits. Any material change to the Group's principal banking facility requires Board approval.

Financial liabilities arising from the issue of warrants and units have been excluded from the details below as they will not result in a cash settlement by the Group.

At the reporting date the Group was cash positive after adding a loan facility.

	31 December 2021			
Categorization of financial instruments	Fixed rate £000	Floating rate £000	Non-interest bearing £000	Total £000
Group				
Cash, cash equivalents and short-term deposits	—	15,497	—	15,497
Trade and other payables	—	—	(4,810)	(4,810)
Lease liabilities	(969)	—	—	(969)
Loans	—	(9,241)	—	(9,241)
	(969)	6,256	(4,810)	477
Company				
Cash, cash equivalents and short-term deposits	—	14,363	—	14,363
Loans to subsidiaries	—	—	85,492	85,492
Trade and other payables	—	—	(1,306)	(1,306)
Lease liabilities	(715)	—	—	(715)
Loans	—	(9,241)	—	(9,241)
	(715)	5,122	84,186	88,593

27. Financial risk management (continued)

Liquidity risk (continued)

Categorization of financial instruments	31 December 2020 Fixed rate £000	Floating rate £000	Non-interest bearing £000	Total £000
Group				
Cash, cash equivalents and short-term deposits	—	8,775	—	8,775
Trade and other payables	—	—	(6,379)	(6,379)
Lease liabilities	(1,059)	—	—	(1,059)
	(1,059)	8,775	(6,379)	1,337
Company				
Cash, cash equivalents and short-term deposits	—	6,213	—	6,213
Loans to subsidiaries	—	—	72,670	72,670
Trade and other payables	—	—	(3,575)	(3,575)
Lease liabilities	(753)	—	—	(753)
	(753)	6,213	69,095	74,555

All categories of financial assets and liabilities are measured at amortized cost with the exception of the **warrants and units** which are measured at fair value through the Statement of Total Comprehensive Income.

The values disclosed in the above table are carrying values. The Directors consider that the carrying amount of financial assets and liabilities approximates to their fair value.

Interest rate risk

The Group has added a loan facility during the year which includes interest at a rate of 8.15% plus the lower of the 30-day US Dollar LIBOR rate and 0.1% for the term of the loan. Each incremental increase of 0.1% in LIBOR over the base of 0.1% is anticipated to add around £0.0093 million to payments in the 2022 and approximately £0.0289 million over the total remaining life of the loan based on the shorter loan period.

Maturity profile

The Directors consider that the carrying amount of the financial liabilities approximates to their fair value.

With the exception of loans to subsidiaries, which have a maturity of more than five years, all financial assets are expected to mature within the next 12 months an aged analysis of financial assets has not been presented.

Maturity of liabilities and cash outflows

	2021				2020			
Group	Less than one year £000	Between one and two years £000	Between two and five years £000	More than five years £000	Less than one year £000	Between one and two years £000	Between two and five years £000	More than five years £000
Trade and other payables	**4,810**	**—**	**—**	**—**	6,379	—	—	—
Lease liabilities	**80**	**84**	**479**	**326**	73	76	413	497
Loans	**—**	**1,320**	**7,921**	**—**	—	—	—	—
	4,890	**1,404**	**8,400**	**326**	6,452	76	413	497

	2021				2020			
Company	Less than one year £000	Between one and two years £000	Between two and five years £000	More than five years £000	Less than one year £000	Between one and two years £000	Between two and five years £000	More than five years £000
Trade and other payables	**1,306**	**—**	**—**	**—**	3,575	—	—	—
Lease liabilities	**44**	**44**	**301**	**326**	37	38	248	430
Loans	**—**	**1,320**	**7,921**	**—**	—	—	—	—
	1,350	**1,364**	**8,222**	**326**	3,612	38	248	430

27. Financial risk management (continued)

Foreign currency risk

The Group's principal functional currency is Sterling. However, the Group has two subsidiaries whose functional currency is Euros and one subsidiary whose functional currency is US Dollars. In addition, the Group as a whole undertakes certain transactions denominated in foreign currencies.

The Group is exposed to currency risk on sales and purchases that are denominated in a currency other than the respective functional currency of the Company. These are primarily US Dollars (USD) and Euros (EUR). Transactions outside of these currencies are limited.

The Group may use forward exchange contracts as an economic hedge against currency risk, where cash flow can be judged with reasonable certainty. Foreign exchange swaps and options may be used to hedge foreign currency receipts in the event that the timing of the receipt is less certain. There were no open forward contracts as at 31 December 2021 or at 31 December 2020 and the Group did not enter into any such contracts during these years.

The split of Group assets between Sterling and other currencies at the year end is analyzed as follows:

	2021				2020			
Group	GBP £000	USD £000	EUR £000	Total £000	GBP £000	USD £000	EUR £000	Total £000
Cash, cash equivalents and deposits	**2,010**	**11,258**	**2,229**	**15,497**	4,199	3,484	1,092	8,775
Trade and other payables	**(3,878)**	**(309)**	**(623)**	**(4,810)**	(3,526)	(2,036)	(817)	(6,379)
Lease liabilities	**(715)**	**—**	**(254)**	**(969)**	(754)	—	(305)	(1,059)
Loans	**—**	**(9,241)**	**—**	**(9,241)**	—	—	—	—
	(2,583)	**1,708**	**1,352**	**477**	(81)	1,448	(30)	1,337

Sensitivity analysis to movement in exchange rates

To understand the sensitivity to exchange rate fluctuations the Group has considered the effect on the net balances based on a 1-point and 5-point variation and has concluded that the impact is immaterial; the details are as follows:

	2021				2020			
Group	GBP £000	USD £000	EUR £000	Total £000	GBP £000	USD £000	EUR £000	Total £000
Exchange rate at 31 December	**1**	**1.35269**	**1.18977**		1	1.36638	1.12022	
5-point decrease	**(2,583)**	**1,647**	**1,297**	**361**	(81)	1,397	(29)	1,287
1-point decrease	**(2,583)**	**1,695**	**1,341**	**453**	(81)	1,437	(30)	1,326
At 31 December	**(2,583)**	**1,708**	**1,352**	**477**	(81)	1,448	(30)	1,337
1-point increase	**(2,583)**	**1,721**	**1,363**	**501**	(81)	1,459	(30)	1,348
5-point increase	**(2,583)**	**1,774**	**1,411**	**602**	(81)	1,503	(31)	1,391

28. Related party transactions

Key management compensation	Year to 31 December 2021 £000	Year to 31 December 2020 £000
Executive Directors:		
Salaries and short-term benefits	**344**	204
Employer's National Insurance and social security costs	**44**	25
	388	229
Fees for services provided as Non-Executive Directors:		
Salaries and short-term benefits	**278**	183
Employer's National Insurance and social security costs	**—**	1
	278	184
Other key management:		
Salaries and short-term benefits	**849**	961
Employer's National Insurance and social security costs	**261**	143
Employer's pension contributions	**16**	24
Share-based payment charge	**404**	235
	1,530	1,363

Group

Transactions with Directors, substantial shareholders and related entities

Interest in shares and warrants

During the year the Company undertook two capital raises through the issue of shares and warrants. Details of the Directors' participation in these raises and other share acquisitions is as follows:

Executive Directors	Duncan Peyton CEO			Dr. Alex Stevenson CSO		
Shares and warrants	Number of shares	Number of warrants	£	Number of shares	Number of warrants	£
At 1 January 2020	6,455,075	—	—	6,413,136	—	—
Subscription on 18 February 2020 at £0.50 per share	1,333,332	666,666	666,666	1,333,332	666,666	666,666
Subscription on 13 July 2020 at £0.35 per share	571,428	—	200,000	571,428	—	200,000
Total at 31 December 2020	8,359,835	666,666	866,666	8,317,896	666,666	866,666
Backstop shares issued in connection with the acquisition of Longevity on 22 March 2021*	496,096	—	—	381,728	—	—
Subscription on 6 April 2021 at $1.10 per share	658,840	—	724,724	658,840	—	724,724
Total at 31 December 2021	**9,514,771**	**666,666**	**1,591,390**	**9,358,464**	**666,666**	**1,591,390**
Percentage of enlarged share capital at 31 December 2021	6.36%			6.33%		

Non-Executive Directors	Prof. Axel Glasmacher NED		
Shares and warrants	Number of shares	Number of warrants	£
At 1 January 2020	—	—	—
Subscription on 13 July 2020 at £0.35 per share	30,000	—	10,500
Total at 31 December 2020 and 31 December 2021	**30,000**	**—**	**10,500**
Percentage of enlarged share capital at 31 December 2021	0.02%		

* Excludes backstop warrants.

No warrants had been exercised by the existing Directors at 31 December 2021 nor at 31 December 2020.

Further details of shares issued and proceeds from their issue can be found in note 23.

28. Related party transactions (continued)

Group (continued)

Merger with Longevity Acquisition Corporation

On 22 March 2021 the Company completed its merger with Longevity Acquisition Corporation ('Longevity'), a Special Purpose Acquisition Company, and listed on Nasdaq.

To secure the merger a backstop agreement was put in place involving certain of the Directors and significant shareholders (the 'Backstop Investors'). The details of the agreement were as follows:

Backstop arrangements and related party transactions

The Longevity shareholders had the right to redeem their shareholding in Longevity, even if the requisite majority of Longevity shareholders approved the merge with $14.6 million held in a trust account by Longevity to fund redemptions. Any redemptions by Longevity shareholders would have reduced the capital available to the enlarged group so Backstop agreements were executed by Longevity, the Company and Whale Management Corporation (the 'SPAC Sponsor') with certain investors, including Duncan Peyton and Dr. Alex Stevenson (together, the 'Backstop Investors').

The Backstop Investors committed to subscribing for Longevity shares prior to completion to ensure that Longevity held at least $14.6 million in cash in the event of redemptions by Longevity shareholders. To secure the backstop arrangements, Longevity agreed to allot 700,000 Longevity shares to the Backstop Investors, Whale agreed to transfer 200,000 Longevity shares to the Backstop Investors, and the Company agreed to allot up to 7,530,000 4D ordinary shares to the Backstop Investors if and to the extent outstanding warrants issued by Longevity were exercised.

The Backstop Investors also agreed to loan Longevity $1.86 million, the proceeds of which were used to repay Whale for loans previously made by Whale to Longevity to fund its launch costs. At completion, the enlarged group repaid this sum to the Backstop Investors.

Related party transactions

The participation by Duncan Peyton (in the amount of $1,075,862) and Dr. Alex Stevenson (in the amount of $827,856) in the backstop arrangements constitutes a related party transaction for the purposes of the AIM Rules. In addition, Steve Oliveira and connected parties, a substantial shareholder of the Company (as defined by the AIM Rules), participated in the backstop arrangements in the amount of $5 million (in aggregate). The participation by Steve Oliveira and connected parties in the backstop arrangements also constitutes a related party transaction for the purposes of the AIM Rules.

The 4D independent Directors, having consulted with the Company's nominated advisor, Singer Capital Markets, consider that the terms of the related party transactions are fair and reasonable insofar as shareholders are concerned. In providing their advice to the 4D independent Directors, N+1 Singer has taken into account the commercial assessments of the 4D independent Directors.

Lock-up agreements

Duncan Peyton and Dr. Alex Stevenson, being the Chief Executive Officer and Chief Scientific Officer respectively, entered into lock-up agreements at completion. Under the terms of the lock-up agreement, each of Mr. Peyton and Dr. Stevenson agreed that, subject to certain limited exceptions, they will not sell any consideration shares due to them under the terms of the merger for a period of 12 months.

Transactions with key personnel and related entities

Biomar Microbial Technologies, an entity in which Antonio Fernandez is a director, charged rent and building service costs to the Group of £95,421 (31 December 2020: £132,979) and the Group charged Biomar £27,666 for services (31 December 2020: £31,595). At the year end £10,782 was due from Biomar Microbial Technologies (31 December 2020: £2,880).

The Cancer Drug Development Forum (CDDF), an entity in which Prof. Axel Glasmacher is a director, charged membership fees to the Group of £6,025 (31 December 2020: £Nil). At the year end £Nil was due from CDDF (31 December 2020: £Nil).

Transactions with substantial shareholders

Following the announcement of the merger, Steve Oliveira purchased shares in Longevity Acquisition Corporation. At 31 December 2020 his holding equated to 212,349 shares which constituted 8.12% of the outstanding share capital. Steve Oliveira and associated companies held 13,863,075 ordinary shares in 4D pharma plc at 31 December 2021 (31 December 2020: 14,442,698 ordinary shares) which constituted 7.69% (31 December 2020: 10.99%) of the outstanding share capital.

There were no further transactions with Directors, substantial shareholders and related entities with the Group during the current or previous year.

Company

Transactions between 100% owned Group companies have not been disclosed as these have all been eliminated in the preparation of the Group financial statements.

Transactions with Directors and related entities

All transactions with Directors and related entities are the same as listed above for the Group.

Transactions with key personnel and related entities

There were no transactions between the Company and key personnel and their related entities during the current and previous year.

29. Reconciliation of net cash flows to movement in net debt

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Net cash at the beginning of the year	**(7,716)**	**(5,460)**	(2,725)	(2,135)
Cash flows	**1,702**	**355**	(5,312)	(3,442)
Non-cash items*	**(47)**	**(29)**	18	—
Interest and other finance costs	**494**	**447**	303	117
Decrease/(Increase) in net debt in the year	**2,149**	**773**	(4,991)	(3,325)
Net cash at 31 December	**(5,567)**	**(4,687)**	(7,716)	(5,460)

* Non-cash items relate to the fair value movement of debt recognized in the year which do not give rise to a cash inflow or outflow.

Net debt is defined as follows:

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Current assets				
Cash and cash equivalents	**15,497**	**14,363**	8,775	6,213
Current liabilities				
Lease liabilities	**(80)**	**(44)**	(73)	(37)
Non-current liabilities				
Lease liabilities	**(889)**	**(671)**	(986)	(716)
Loans	**(8,961)**	**(8,961)**	—	—
Net cash	**5,567**	**4,687**	7,716	5,460

Analysis of net debt

Group	31 December 2020 £000	Cash flows £000	Non-cash items £000	Interest and other finance costs £000	31 December 2021 £000
Cash and cash equivalents	8,775	6,721	—	1	**15,497**
	8,775	6,721	—	1	**15,497**
Liabilities arising from financing activities					
Lease liabilities	(1,059)	233	18	(161)	**(969)**
Loans	—	(8,656)	29	(334)	**(8,961)**
	(1,059)	(8,423)	47	(495)	**(9,930)**
Net cash	7,716	(1,702)	47	(494)	**5,567**

Group	31 December 2019 £000	Cash flows £000	Non-cash items £000	Interest and other finance costs £000	31 December 2020 £000
Short-term investments and cash on deposit	—	(5)	—	5	—
Cash and cash equivalents	3,836	4,939	—	—	8,775
	3,836	4,934	—	5	8,775
Liabilities arising from financing activities					
Lease liabilities	(1,111)	378	(18)	(308)	(1,059)
	(1,111)	378	(18)	(308)	(1,059)
Net cash	2,725	5,312	(18)	(303)	7,716

29. Reconciliation of net cash flows to movement in net debt (continued)

Analysis of net debt (continued)

Company	31 December 2020 £000	Cash flows £000	Non-cash items £000	Interest and other finance costs £000	**31 December 2021 £000**
Cash and cash equivalents	6,213	8,150	—	—	**14,363**
	6,213	8,150	—	—	**14,363**
Liabilities arising from financing activities					
Lease liabilities	(753)	155	—	(117)	**(715)**
Loans	—	(8,660)	29	(330)	**(8,961)**
	(753)	(8,505)	29	(447)	**(9,676)**
Net cash	5,460	(355)	29	(447)	**(4,687)**

Company	31 December 2019 £000	Cash flows £000	Non-cash items £000	Interest and other finance costs £000	31 December 2020 £000
Short-term investments and cash on deposit	—	(7)	—	7	—
Cash and cash equivalents	2,921	3,292	—	—	6,213
	2,921	3,285	—	7	6,213
Liabilities arising from financing activities					
Lease liabilities	(786)	157	—	(124)	(753)
	(786)	157	—	(124)	(753)
Net cash	2,135	3,442	—	(117)	5,460

30. Reconciliation of fair value adjustment on equity, warrants and units

	31 December 2021 Group £000	31 December 2021 Company £000	31 December 2020 Group £000	31 December 2020 Company £000
Fair value on issue of shares, warrants and units	**44,381**	**44,381**	3,110	3,110
Prepaid deal costs	**1,471**	**1,471**	—	—
Fair value adjustment on share option exercise	**94**	**94**	—	—
Fair value adjustment on share option exercises in subsidiaries	**—**	**(138)**	—	—
Fair value adjustment on exercise of warrants	**4**	**4**	—	—
Change in fair value during the period	**(13,627)**	**(13,627)**	—	—
Cash flow adjustment	**32,323**	**32,185**	3,110	3,110

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