

19 January 2022

Pharmaceuticals, Biotechnology & Life Sciences

52-WEEK HIGH	8.00p
52-WEEK LOW	1.81p
PRICE	2.50p
MARKET CAP MLN	£24.0

Share Price



Major Shareholders

Kingsley Capital Partners	17.2%
Imperial Brands Ventures	9.0%
GHS Capital	6.8%
Primary Index	AIM
Next Key Announcement	April 2022

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Oxford Cannabinoid Technologies - initiation report

Pharmaceuticals derived from cannabinoids

Oxford Cannabinoid Technologies (OCT) is a UK-based pharmaceutical company specialising in drug development from cannabinoids (compounds derived from cannabis). The company aims to become a leader in developing licensed prescription medicines that target the endocannabinoid system with a primary focus on the pain relief market. This market is estimated to be worth over £40 billion by 2027, which is the timeline of our forecast to commercialisation of the first drug to be produced by OCT. We provide an overview of the market and of our timeline expectations on p6 and p7.

The company has four drug development programmes, targeting multiple indications in neuropathic pain, visceral pain, forms of neuralgia, and other pain conditions. The company is developing three types of compounds: phytocannabinoids or pCBs, which are the same compounds found in plant extracts; cannabinoid derivatives, including the library of compounds acquired under licence from Canopy Growth Corporation during 2021; and cannabinoid mimetics — new chemical entities (NCEs) that target cannabinoid receptors.

During 2022 we anticipate the start of clinical trials of OCT's inhaled phytocannabinoids programme, initially targeting trigeminal neuralgia (TN). In early 2023, we expect clinical trials to begin of OCT461201, an NCE acquired under a licensing deal in 2019. OCT461201 will initially target irritable bowel syndrome and neuropathic pain. Initiation of these clinical trials will represent significant development milestones for OCT in moving from compound screening and pre-clinical studies into clinical development programmes.

In this report we examine the four programmes, target markets, and development pathways.

Investment conclusion

Oxford Cannabinoid Technologies attained its listing on the London Stock Exchange in May 2021, raising £14.8mln in net proceeds from the initial public offering (IPO). Half-year results (ended November 2021) show the company's net cash balance at £12mln. We believe that OCT is sufficiently capitalised to execute on the next stages of its development programmes, and we present our forecasts for cash utilisation on p9.

OCT's development portfolio addresses a multi-billion dollar global market for pain relief, targeting segments that are poorly served by existing medicines. Each of the four development programmes has the potential to deliver a drug product that could eventually be valued at over £1bn. These developments would benefit from strong intellectual property protection, as licensed pharmaceutical products, and we outline the benefits of this business model on p3.

The company has a robust pipeline strategy, supported by partnerships with world leading specialists in drug programme realisation. The company has multiple options for monetising its intellectual property as the pipeline matures.

During 2022, we believe that there are significant potential triggers for a share price re-rating, with programme milestones including commencement of clinical trials. We argue that the current market capitalisation of £24mln leaves substantial upside potential for shareholders.

Investment summary

Oxford Cannabinoid Technologies (OCT) is a biopharmaceutical company developing new medicines derived from cannabinoids. The company is focussed on pain management drugs, with addressable markets totalling over £40bn.

OCT is 100% focussed on pharmaceutical licensed medicines. This is distinct from the wider medical cannabis market which also encompasses use of cannabis plant extracts as unlicensed medicines. OCT is concerned only with licensed pharmaceutical drug products to be progressed through clinical trials. We outline the distinction between pharmaceutical and medical cannabis on p3.

The company is working on four drug development programmes, focusing on multiple target indications. The following table summarises.

Four drug development programmes

	Programme 1	Programme 2
Compound	OCT461201	Unnamed phytocannabinoids (pCBs)
Indications	Neuropathic pain and visceral pain conditions. Potential use in neurodegenerative and inflammatory diseases.	Trigeminal Neuralgia, a condition which produces “excruciating, stabbing, electric shock like pain”.
Details	A non-psychotropic CB2 agonist being developed as pill or capsule. Pre-clinical development programme with Evotec SE. Phase 1 clinical trials expected to begin Q3 2022	Inhaler administration aims to limit metabolism and reduce onset time. Commercial agreement with Oz-UK LTD for inhaler formulation using pCBs from Purisys LLC. Phase 1 clinical trials expected to begin Q1 2023
	Programme 3	Programme 4
Compound	Cannabinoid library targeting a first undisclosed cannabinoid receptor	Cannabinoid library targeting a second undisclosed cannabinoid receptor
Indications	Wide range of pain indications potentially targeted.	Range of pain indications as well as indications in other therapeutic areas including oncology, neurology, and immunology
Details	Library of cannabinoids and derivatives licensed from Canopy Growth. Aim to bring a compound to pre-clinical stage by Q2 2023.	Using a subset of the cannabinoid library (programme 3). Aim to develop a compound to lead candidate stage by Q2 2023.

Source: Proactive Research

Pain relief therapies represent a multi-billion dollar market, which is in many respects poorly served by existing medicines. Current treatments consist primarily of opioids, anti-inflammatory drugs and drugs being used off-label. Problems with dependency and side effects from opioids in particular have become a major public health concern in recent years, and there is a clear need for efficacious drugs that are safer, less addictive alternatives.

Studies have shown that pain can potentially be managed by modulation of the endocannabinoid system, a complex physiological system of neurotransmitters, receptors and enzymes in the human body which are sensitive to cannabinoids.

Some examples of academic work on the endocannabinoid system are reviewed in the following literature references:

[The Endogenous Cannabinoid System: A Budding Source of Targets for Treating Inflammatory and Neuropathic Pain](#); (DOI: 10.1038/npp.2017.204)

Development programmes targeting pain and other indications. Clinical trials expected to begin in 2022 and 2023

Potential safe and effective alternatives to opioids

CB2 Cannabinoid Receptors as a Therapeutic target; (DOI: 10.1124/mol.114.094649)

OCT has built a world leading research capability for screening and testing cannabinoids to devise formulations that can provide effective pain relief targeted at specific conditions.



From an investor’s perspective, we argue that OCT offers:

- A pure pharmaceutical play within the cannabinoid medicines space
- Four programmes addressing target markets totalling over £40bn
- A solid balance sheet position to finance the next stage of the drug programmes

Cannabis in medical applications

The use of cannabis in medical applications is well established across many jurisdictions globally; however, many of these applications are based on ‘medical cannabis’ as opposed to licensed pharmaceutical drug products from cannabis. The unlicensed medical cannabis market includes the use of cannabis or extracts as a complimentary medicine for patients with conditions that are difficult to relieve using conventional medicine. These treatments are available under compassionate access or special access programmes in jurisdiction such as Australia, Germany, and many US states, and on a more restrictive basis in the UK.

OCT by contrast is focussed entirely on discovery and development of licensed pharmaceutical drug products — medicines that will be approved under US Food and Drug Administration (FDA) or European Medicines Agency (EMA) testing regimes. The following table summarises the difference between medical cannabis and pharmaceuticals.

Pharmaceutical Cannabis versus Medical Cannabis	
Medical cannabis	Pharmaceutical drug
	
<ul style="list-style-type: none"> • Limited to natural flower and extracts – no improvement to cannabinoid structure • Not approved as licensed medicines (FDA/EMA) • No market exclusivity • Available in specific jurisdictions under special access programmes and similar • Sometimes available only as out-of-pocket expense to the patient 	<ul style="list-style-type: none"> • Includes phytocannabinoids, structurally modified cannabinoids, and new chemical entities • Requires approval from medicines regulatory agencies (e.g. FDA/EMA) • Undergoes full clinical trial process • Regulatory and patent market exclusivity available • Not limited to markets with special access programmes • Can be prescribed by physicians and reimbursed by insurers

Source: Proactive Research

There are many players in the medical cannabis space, but far fewer in the business of developing pharmaceuticals from cannabis.

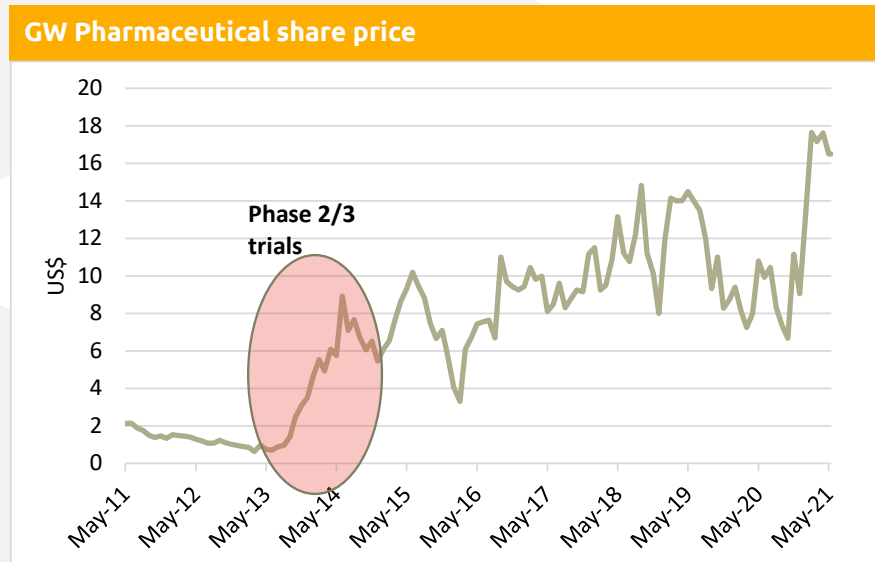
One important precedent in the pharmaceutical drug space is GW Pharmaceutical, which is a UK-based drug company that became a pioneer in gaining market approval for a cannabis based medicine, for its drugs Savitex (for multiple sclerosis) and Epidiolex (for Dravet’s syndrome epilepsy). GW

A pure focus on FDA/EMA licensed pharmaceuticals

A significant precedent in the sector - GW Pharmaceuticals

Pharmaceutical delivered very strong performance for shareholders from its market listing through to its eventual acquisition by Jazz Pharmaceuticals.

The following chart shows the share price performance of GW Pharma.



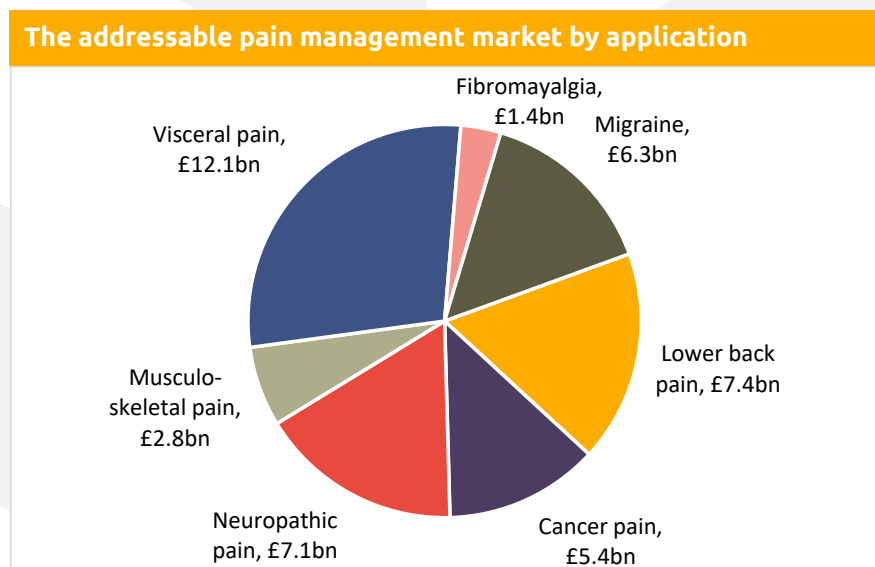
Source: NASDAQ data

The GW share price delivered 1170% upside for shareholders during the period between June 2013, and June 2014, the period during which data was published from the Phase 2/3 clinical trial programmes. We note that share price catalysts can vary between different developmental drug companies. In the case of OCT, share price action could begin earlier than Phase 2 trials, especially now that precedents exist in the industry. The important thing for investors to note is that once the stock market begins to price in a potential successful drug programme, the share price movement can be very rapid.

Addressable markets

OCT is developing a range of drugs addressing pain relief. The target segments add up to £42bn of the addressable market by 2027.

The following chart shows the segments which make up this market:



Source: Oxford Cannabinoid Technologies, 2027 market outlook from market sources

Clinical trial phases can trigger significant share price upside

Target markets add up to £42bn

We can split the addressable market into three subsegments:

Serviceable Obtainable Market (SOM): This is the market share that OCT can realistically expect to capture using candidate drugs that have already been identified, for conditions that can already be specified. This is the most immediate market for OCT.

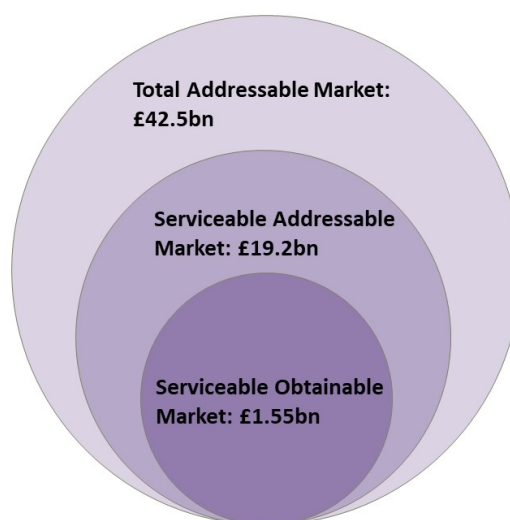
Serviceable Addressable Market (SAM): This is the whole of the market (not just a share) that can be served using candidate drugs that have already been identified, for conditions that can already be specified.

Total Addressable Market (TAM): This is the market segment that could be addressed by drugs that are likely to arise from the discovery/development pipeline including new drug candidates that have yet to be defined.

The following chart shows the TAM for Oxford Cannabinoid Technologies, including the sub-segments.

Explaining the three tiers of addressable markets

Addressable and serviceable markets



Source: Oxford Cannabinoid Technologies, 2027 market outlook from market sources

The company has a robust pipeline strategy for creating new drugs to target indications that are underserved by existing pain relief treatments:

- **Inputs:** The company uses unmodified phytocannabinoids (pCBs), modified cannabinoid derivatives, and cannabinoid mimetics to diversify its range of available inputs and reduce risk to the programmes. The company further in-licenses drug compounds falling into these categories (e.g., the Canopy library of cannabinoid derivatives and the cannabinoid mimetic, OCT461201)
- **Screening:** Compounds are screened for their properties and interactions with the endocannabinoid system in order to identify potential drug candidates. OCT has world-leading academic and commercial partners engaged in the screening process
- **Development:** The company undertakes pre-clinical testing and randomised controlled trials (RCTs), using drug candidates derived from the screening process as well as in-licensing, e.g. OCT461201
- **Monetisation:** Monetisation could be achieved by taking a candidate drug all the way through clinical trials to drug approval, or by other value-creation routes such as the sale or licensing of intellectual property to third parties

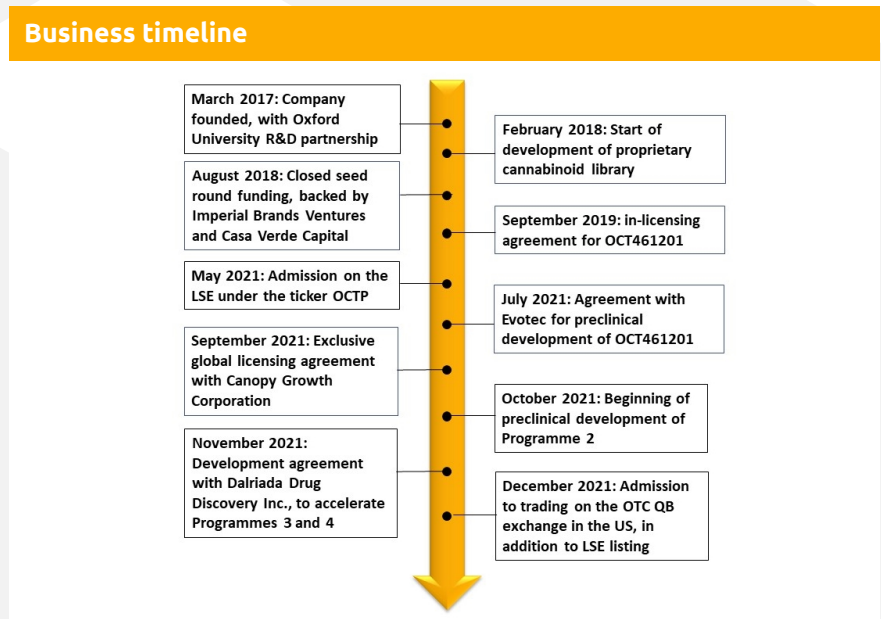
We believe that the pipeline strategy provides OCT with multiple routes for creating value for shareholders.

Robust pipeline strategy provides a roadmap for realising commercial drugs

Strategy and business development

The founding of OCT in 2017 coincided with an exclusive research collaboration agreement with Oxford University. The company raised £4.75m in a Series A fund-raising backed by the FTSE 100 company Imperial Brands, and the specialist investment fund Casa Verde. The company listed on the London Stock Exchange in 2021, raising an additional £16.5m (gross).

The following diagram illustrates the timeline of the main corporate developments of Oxford Cannabinoid Technologies.



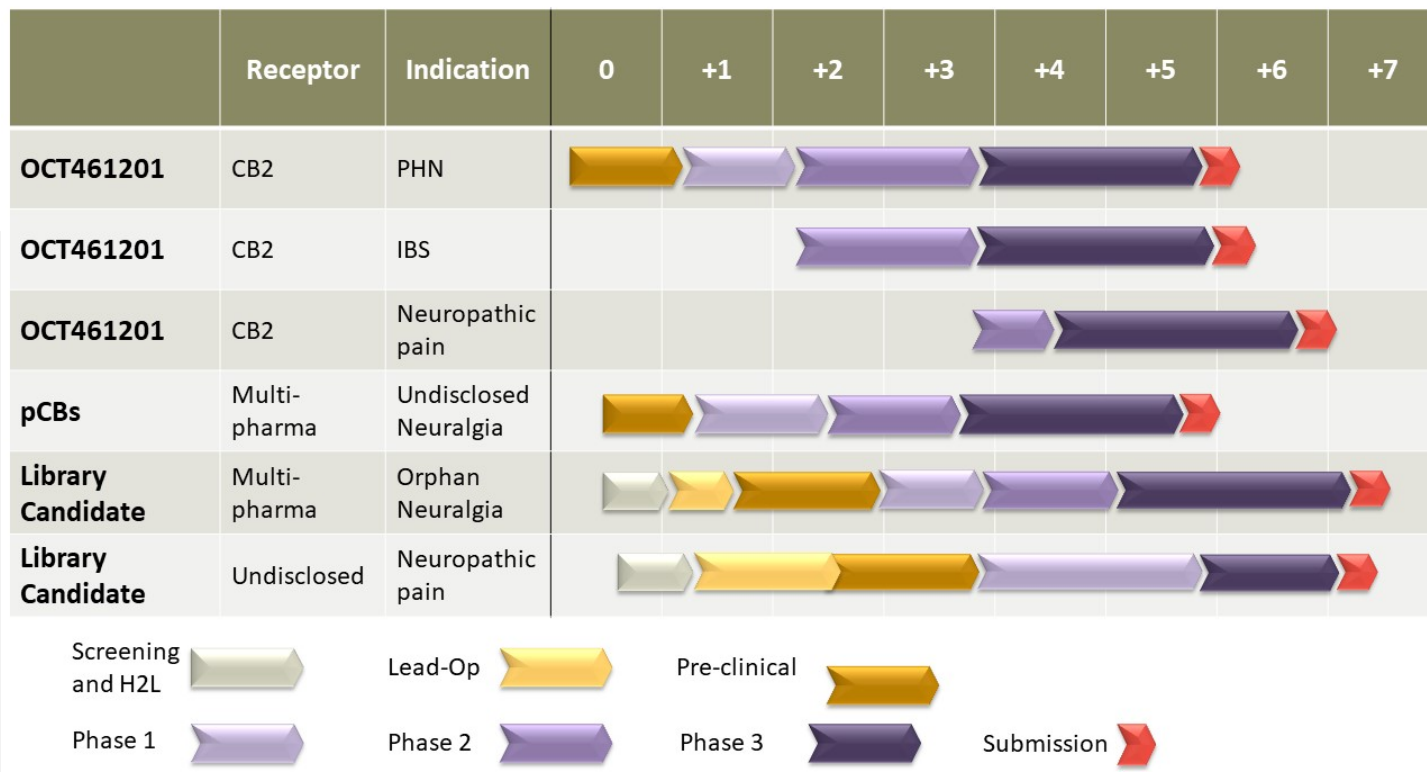
Source: Proactive Research

Objective for drug candidates to enter clinical trials in 2022 and 2023

Two candidate drugs could enter clinical trials during 2022 and early 2023, which would represent significant milestones for the company and potential catalysts for the share price. The following diagram summarises the pathway for the four drug programmes and identifies the potential for multiple indications under each programme.

Timeline of drug programmes

Years from admission



Source: Proactive Research

Partnerships with world leading specialists in pharmaceutical development and cannabis

In order to realise the fastest and most effective development pathways for these drugs, OCT has entered into a number of strategic partnerships with other organisations. Examples include:

- Evotec SE is a drug discovery and development company that has been working with OCT since July 2021 on the development of OCT461201. The development is being conducted under Evotec’s INDiGO programme for accelerated progression of candidate drugs into clinical trials.
- Purisys LLC is a pharmaceutical ingredient supplier providing pharmaceutical grade pCBs manufactured under GMP (good manufacturing practice) for Programme 2.
- Canopy Growth Corporation, based in Canada, is one of the world’s leading producers of cannabis products. In September 2021 OCT entered into an exclusive licensing agreement with Canopy for a cannabinoid derivative library including 335 synthesised derivatives along with research data and 14 patent families. This agreement forms the basis for Programme 3.

We believe that the pipeline offers multiple potential pathways for creating new pharmaceutical drugs to address unmet needs in pain management.

Management

The company’s strategy is directed by a management team with extensive experience in pharmaceutical science and commercial management. The following summaries outline the executive team:

Neil Mahapatra, co-founder and executive chairman

Mahapatra has nearly two decades of experience in business and the investment industry. He began his career in finance at Morgan Stanley and then at J. Rothschild Capital Management. In 2013, He founded private investment firm Kingsley Capital Partners (KCP) LLP, where he is managing partner. Through

KCP, Mahapatra sponsored and launched the "End our Pain" campaign, which was instrumental in effecting the UK government reforms to medical cannabis legislation in 2018.

He holds a BA in Biological Sciences from the University of Oxford, and an MBA from the Harvard Business School, where he was a Fulbright Scholar. Before starting his undergraduate degree at the University of Oxford, he spent a year performing genetic research at Cold Spring Harbor Laboratory, New York, where he was chosen by Professor James Watson, Nobel Laureate for elucidating the structure of DNA.

Dr John Lucas, chief executive officer

Dr John Lucas has over 20 years of experience in the pharmaceutical industry. He joined OCT in 2018 and became chief executive officer in January 2021. He began his career in biopharma at Genset S.A. (Paris) and Genset Corporation (San Diego, California) where he served as vice president, Worldwide Intellectual Property. He has held a number of senior executive positions within the pharmaceutical and biotech industries.

Lucas holds a law degree (JD) from George Washington University and a PhD in molecular genetics from The Ohio State University. He also holds a Master's in microbiology and a Bachelor of Education from Ohio University. In addition to his graduate studies, other experience includes a post-doctoral fellowship in cancer research at the National Cancer Institute, National Institutes of Health in Bethesda, Maryland.

Clarissa Sowemimo-Coker, chief operating officer and general counsel

Clarissa Sowemimo-Coker has extensive experience as a solicitor and commercial consultant to companies in the retail, telecoms, and pharmaceutical sectors. Following an early career with Penningtons Manches Cooper LLP in London, she held posts as senior in-house counsel in companies including Hutchison 3G UK Limited (Three) and Virgin Media Limited, a subsidiary of Liberty Global PLC. She joined the group's executive team in December 2018 as general counsel and company secretary, and in February 2021 she became chief operating officer.

Sowemimo-Coker is a qualified solicitor in England and Wales and is a student member of ICSA, The Chartered Governance Institute where she is studying for an advanced certificate in corporate governance. Sowemimo-Coker holds a BA in philosophy and literature from Warwick University and PGDL and LPC from BPP Law School in London.

Karen Lowe, finance director

Karen Lowe started her career in accountancy, qualifying as a chartered accountant with KPMG before moving into industry. Lowe has over 25 years' experience, having worked internationally at firms including Johnson & Johnson and DHL International GmbH. She sits on the board of a housing development company, and also on the audit committee of a north-west housing association.

Lowe holds a BA in European Finance and Accounting from Leeds Beckett University, and a similar German qualification from the Hochschule Bremen in north Germany.

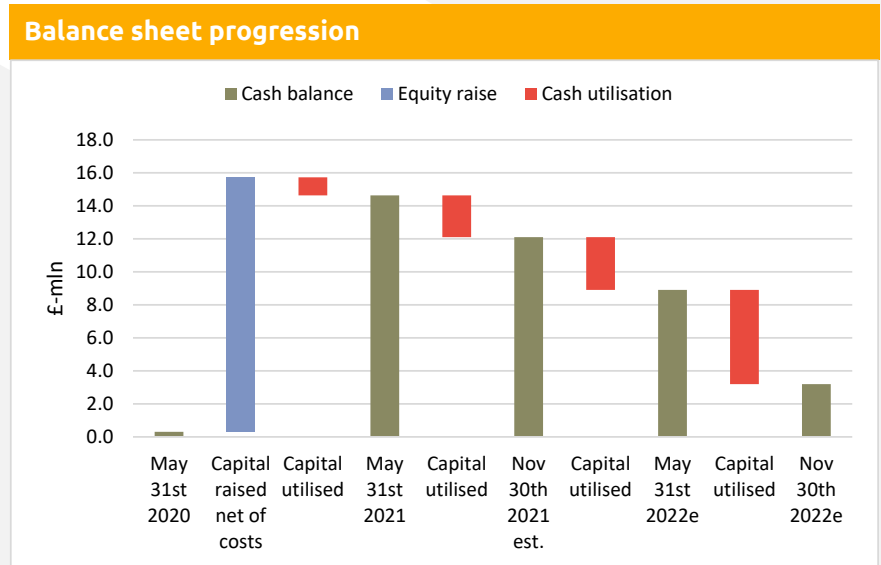
Capital utilisation accelerates. Sufficient cash in place for 2022

Financial position

OCT raised £6.85m of in total financing prior to its listing. The company was admitted to the London Stock Exchange in May 2021, raising IPO proceeds of £14.8m (net).

The company used £1.9m of cash in operations during the financial year ended May 2021. We are forecasting an increase in the cash utilisation rate during calendar year 2022 as the company moves forward with its drug development programmes.

The following chart shows our forecast for cash resources within the company for the half-year financial periods through to November 2022.



Source: Proactive Research

We believe that OCT’s cash resources are sufficient to fund the next phases of the development programmes, extending through the second quarter (Q2) of 2023, including the commencement clinical trials on its two lead programmes.

Conclusion:

We argue that Oxford Cannabinoid Technologies offers investors exposure to the substantial potential market for pharmaceutical pain relief treatments derived from cannabis. The company has built a strong position leading up to commercialisation of its first drug in 2027, with a robust pipeline strategy and a valuable base of commercial partnerships with industry leading specialist players. The company addresses a market worth more than £40bn that is underserved by existing drugs.

We believe that development milestones during 2022 and early 2023 could provide significant catalysts for the share price, including initiation of clinical trials as well as potential progress milestones on the discovery and pre-clinical development programmes.

Unique differentiators and a credible pathway to monetisation

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