Category

Best Startup

Product/Solution Name

Carcino3D™

Date of Approval

N/A

Indications

Biotechnology/small molecule

Therapeutic Categories

Oncology/ toxicity

Attached Files:

- Carcinotech commercial deck non confidential.pptx

Background information and need for solution/product

Carcinotech is MedTech company with expertise in manufacturing 3D-printed living mini-tumours using patient-derived biopsies, primary cells, immune cells, and cancer stem cells. Carcinotech's advanced technology provides a platform for rapid, ethical, and accurate drug discovery, screening, and pre-clinical testing. We work with global partners, leading pharma companies, surgeons, pathologists, and clinicians to accelerate drug discovery and bring more effective cancer treatments to market. Our vision is to be at the forefront of cancer drug testing and provide personalised medicine testing to each individual suffering from cancer to better their chance of treatment and survival.

Carcino3D™ technology is developed from patient biopsies, whole blood, and immune cells with a heterogeneous population of cells isolated directly from the biopsy and detailed characterised patient profile with sequencing and mutation data available. These printed patient tumours are available in 96 or 384 well formats with tumour-specific ECM and can also include tumour infiltrating lymphocytes (T cells, B cells, NK cells and more) and tumour-associated macrophages. As per request, we can also develop vascularised and irradiated tumours for combination therapies.

Carcinotech offers assay-ready 3D-printed tumours for drug discovery, screening, and pre-clinical testing. Our innovative Carcino3D™ technology is validated to ensure consistency, uses advanced robotic manufacturing to ensure high-throughput and robust results, and is quality controlled to produce highly predictive assay-ready printed tumours. They are very close to clinical biopsy samples as we get patient-specific and isolated cells from biopsies, allowing us to develop tumours representing cancer heterogeneity. These printed tumours can be manufactured to order and delivered assay-ready to your labs. Our team of 3D oncology experts also offer assay services for each drug compound utilising our advanced Carcino3D™ technology, allowing for flexibility, with high-quality data delivered to ensure the client’s success.

Carcino3D™ printed tumours self-form and are ready to test within 7-14 days of printing. These can be manufactured to order, cryopreserved, and delivered assay-ready to our clients' labs. Our team of 3D oncology experts can customise these according to clients' drug testing needs e.g., specific patient populations, mutation types, drug targets and treatments. Our technology can be used for various assays, or we can offer assays for clients to test drug compounds in-house. (See assay graphic)

Carcino3D™ printed tumours are currently available across five cancers primarily.
However, we can work with cancers of choice developing printed tumours for clients' specific needs working with solid tumours and rare cancers:
• Lung cancer- non-small cell and small cell subtypes are available
• Brain cancer- Glioblastoma printed tumours with rare mutations available
• Breast cancer- Triple-negative, HER2+ and Luminal A subtypes available
• Colorectal cancer- Adenocarcinoma with MSI status available for each patient
• Ovarian cancer- High-grade serous, endometrioid and clear cell carcinoma available
• Custom cancers- we can work with cancers of your choice and develop printed tumours from other solid tumours and rare cancers

Carcino3D™ printed tumours are available in 3 different formats. Drug testing can be carried out in-house or our 3D-printed tumours can be cryopreserved and shipped to clients. Carcino3D™ technology can also be used for personalised medicine testing. Our technology allows surgeons and oncologists to test treatment options and drug responses and create treatment plans for each patient.

The WHO estimates the total number of cancer cases will reach 22 million by 2030. That means millions of people will lose out on innovative cures because of inaccurate, expensive, and outdated techniques used in the manufacturing of drugs. In 2019 the FDA had a staggering fail rate of 97% in clinical trials for oncology. Carcino3D™ was developed to directly address this problem so more accurate and effective cancer drugs can get to market faster making innovative treatments available to all. Traditional drug testing methods are falling short of bringing new therapies to market quickly, safely, and effectively.

Carcinotech's current target markets cover 5 main target segments (by therapy): hit-to-lead, lead optimisation, pre-clinical, personalised medicine, and licensing for drug discovery. Each segment is divided both by cancer type and region addressing our 7 current cancers of interest (Breast, Lung, Glioblastoma, Ovarian, Colorectal, Rare, and Paediatric) across UK, EU, USA and Asia markets.

The global oncology market's CAGR is projected at 8.2% from 2021-2030. We have further analysed this breaking down growth for our customer segments across each cancer we offer services for to be CAGR 12.4% 2022-2030, representing a value of $55bn of the global oncology drug development market.

Carcinotech is unique in its offering. While there are thousands of businesses working hard in the industry to advance their technology to offer better solutions to cancer research, drug development and manufacturing. Carcinotech is the only business in our field to be using 3D-printed living tumours. Most of our competitors are working with 2D models that are not representative of real living tumours within a patient. Therefore, our technology allows for more robust data in drug screening/testing as our 3D-printed tumours are far closer to the patient's biopsy. Our analysis of our competitors highlights our unique selling points and the value our offering holds in the marketplace as a truly unique and advanced service. We compare ourselves against competitors in the market against several metrics,

including the use of 3D-bioprinting in their process, rapid and consistent results, cryo-preservable plates, tumour-microenvironment replicated, personalised medicine testing, customisable, Accuracy and biological relevance, a sample size of >100 from biopsy. None of our competitors can match or top us on all of these metrics.

Carcinotech sells directly to our clients following a B2B model. We work with global partners, leading pharma companies, surgeons, pathologists, and clinicians to accelerate drug discovery and bring more effective cancer treatments to market. We have an extensive network of contacts across all fields in the industry and promote our technology through these lines of communication. We promote ourselves online through our website and social media as well as attending regular tradeshows and conferences to engage in the wider community in the oncology and clinical research fields.

The business has 3 main revenue streams comprising sales from drug testing, licensing, and precision medicine services. Customers are acquired through an extensive network of industry contacts built up by our CEO and Management with the help of our board of directors and investors. We actively undertake lead generation efforts by researching our customer segments and reaching out to potential clients.

Carcinotech's vision is to be at the forefront of cancer drug testing and provide personalised medicine testing to each individual suffering from cancer to better their chance of treatment and survival.

Carcinotech wants to democratize cancer treatment, bringing better treatments to market quicker. Ishani set out to address the major challenges facing the cancer industry including replicating tumour microenvironments and immune systems of the patients. Carcinotech’s immuno-oncology-focused printed tumours developed from the patient's immune cells is our solution to this challenge. Traditional organoid models can take up to 90 days to be assay-ready, are less reproducible, and are incompatible with high-throughput systems. Carcinotech’s 3D-printed tumours solve this problem with rapid, consistent tumours in high-throughput formats.

At Carcinotech our technology helps reduce and remove the requirement of animal testing for drug development. We develop humanised models, tackling head-on one of the biggest issues facing the pharmaceutical industry – the use of animal testing.

At Carcinotech, our technology follows precision medicine, a healthcare approach that utilizes molecular information, phenotypic, and health data from patients to generate care insights to prevent and treat human disease resulting in improved health outcomes. In the oncology space, precision medicine uses specific information about a person’s tumour to help make a diagnosis, plan treatment, find out how well treatments are working, or make a prognosis. With the help of our technology, surgeons and oncologists can seek the opportunity of evaluating treatment options, observe drug responses, and create treatment plans for each patient. Personalised treatment improves quality of life and the chance of survival of those suffering from cancer. As the number of people suffering from cancer increases year on year the need for new more effective treatments has never been more vital.

Attached Files:

- Workflow final edit4x.png
- Carcinotech LSX Congress Digital Poster.pdf
- Carcinotech LtdOverview Brochure.pdf
- Main Comp.mp4

History of the development of the solution/product

Current cancer drug development pipelines are costly and unpredictable with a 97% FDA approval failure rate in oncology clinical trials. Carcinotech's advanced offering provides a platform for rapid, ethical, and accurate drug screening, pre-clinical and personalised medicine testing. We work with global partners, leading pharma companies, surgeons, pathologists, and clinicians to accelerate drug discovery and bring more effective cancer treatments to market.

Traditional drug testing methods are costly, unpredictable, and unrepresentative of the human body. Carcino3D™ is a humanised model reducing the need for animal testing while being more biologically relevant. We have developed patient-specific printed tumours for Brain, Lung, Breast, Colorectal and Ovarian cancers with characterized patient populations and mutational status. As well as the 6 cancers, our flexible technology allows us to develop models for any solid tumours. We continuously develop new products for different cancers including rare cancers.

Carcinotech's immune-oncology-focused printed tumours developed from the patient's immune cells is our solution to this challenge. We print each tumour using our custom ECM matching the original tumour environment. Our models encapsulate the heterogeneity of each patient's tumour including their immune cells.

So far Carcino3D™ has been developed for 6 cancer types and has been used in a number of pilot projects with big pharma and cancer institutes.

Carcino3D™ development began when founder & CEO, Ishani Malhotra, began her research at The University of Edinburgh. From here Ishani obtained grant funding from Scottish Enterprise and won several business competitions to kickstart the company's entrepreneurial journey and the development of this technology. With proof of concept and validation data funded through grants, an investment round of seed funding was raised to commercialise Carcino3D™.

The key milestones laid out post-investment included delivering on existing projects and targeting international markets including the US and Europe. The company also aims to target hospitals so that we can move towards our vision of personalised medicine testing for cancer patients.

Our experienced team of scientists research each cancer of interest, focusing on the most relevant aspects of that cancer type, in particular key cell types and Tumour Micro-Environment (TME) components. This determines the most important cell types that can be assessed, quantified, and targeted using our 3D printed tumours. The TME research determines key proteins that we incorporate as part of the Extra-Cellular Matrix (ECM), to ensure we fully replicate the TME as it is in the patient. The research ensures that we produce our 3D printed tumours with a custom panel of key cells and ECM, customised to the cancer of interest.

Next, the bioprinting process is optimised to produce the most consistent and accurate methodology which is tailored to each cancer type. Our offering for each cancer, then undergoes rigorous QC testing to ensure that key cell types and components are maintained and remain viable for drug testing. Each new cancer type is then tested against the Standard of Care treatments which the patients would undergo. We assess this to ensure that our 3D printed tumours accurately respond to treatment in the same way a patient tumour would. This ensures that we are fully confident that our 3D printed tumours can provide robust, reliable, and consistent data to our clients.

Each cancer is unique, and we ensure that our offerings reflect that fact. That means extensive research by our experienced scientific team, to determine what factors we need to include and then ensure that these are retained in our 3D printed tumours. We ensure that we assess and overcome challenges that occur when ensuring that we can fully represent the tumour and the TME for each cancer, in a consistent and high-throughput format.

We also face the challenge of bringing a new and advanced offering to the market. The relies on us producing robust data and increasing our presence to overcome this. We are seeing success in this aspect, and we continue to work hard to increase the awareness of our offering.

Carcinotech has established significant international partnerships to advance Carcinotech's vision of providing personalised drug testing platforms to help each individual suffering from cancer. To progress the company's vision and goal of providing this technology on a global scale key and strategic collaborations have been a central focus for the company. Carcinotech has worked with organisations across industry and academia including Cellink, a global leader in 3D bioprinting, and Cancer Research UK to advance the validation of the company's technology.

Why this solution/product is innovative, the broad implications for future research, and/or how it will improve the human condition

Innovation is at the very core of what we do at Carcinotech. Carcinotech's technology holds the potential to revolutionise cancer research, offering surgeons and oncologists the opportunity to test treatment options, drug responses and create treatment plans for each patient. Contributing to the rapidly developing sector of personalised medicine we hope that in the future our models will allow every individual the opportunity to receive personal cancer care improving treatments and increasing the chance of survival.

Carcinotech sets out to address major challenges facing the cancer industry including replicating tumour microenvironments and immune systems of the patients. Carcinotech's immuno-oncology-focused printed tumours developed from the patient's immune cells is our solution to this challenge. Traditional organoid models can take up to 90 days to be assay-ready, are less reproducible, and are incompatible with high-throughput systems. Carcinotech's 3D-printed tumours solve this problem with rapid, consistent tumours in high-throughput formats. We print each tumour using our custom ECM matching the original tumour environment. Our models encapsulate the heterogeneity of each patient's tumour including their immune cells.

Carcino3D™ has been developed as patient-specific printed tumours for Brain, Lung, Breast, Colorectal and Ovarian cancers with characterized patient populations and mutational status. As well as the five cancers, our flexible technology allows us to develop models for any solid tumours. We continuously develop new products for different cancers including rare cancers.

The implications of this technology are wide-reaching both for research and for the improvement of the human condition across the world.

Current cancer drug development pipelines are costly and unpredictable with 97% FDA approval failure rate in oncology clinical trials. Carcinotech's advanced offering provides a platform for rapid, ethical, and accurate drug screening, pre-clinical and personalised medicine testing. We work with

global partners, leading pharma companies, surgeons, pathologists, clinicians to accelerate drug discovery and bring more effective cancer treatments to market.

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Carcino3D™ printed tumours self-form and are ready to test within 7-14 days of printing. These can be manufactured to order, cryopreserved, and delivered to clients. Our team can also customise assays depending on clients' drug testing needs e.g. specific patient populations, mutation types, drug targets or treatments. This technology can be used for a variety of assays including biological, drug interaction, phenotypic and genomic assays.

Carcino3D™ advanced technology provides a platform for rapid, ethical, and accurate drug discovery, screening, and pre-clinical testing. Rapid testing (results within 21 days of printing), ethical (remove the need for animal testing in drug testing), accurate (humanised models' representative of the tumour micro-environment and 3D tumour structure in the human body, patient-tumour heterogeneity).

Attached Files:

- drug development pipeline4x.png

Please provide appropriate references (ie Pubmed links)

Carcinotech is backed by an experienced and respected board of advisors and scientific advisory board. Each of whom endorses the work being done within the company and the innovation of our technology.

Albert Nicholl, Chairman.
Highly accomplished business leader with a deep knowledge of delivering and advising on global

operations across the healthcare sector. Strategically focused, his strengths lie in delivering significant quantifiable and often transformational improvements, restructuring operations, and developing / engaging high-calibre personnel to ensure continuous growth, competitive superiority and profit maximisation. Experienced in the Medtech industry at Director of Global Orthopaedics at Stryker, and as Managing Director of Orthofix. Mentor and adviser for early-stage, entrepreneurial MedTech and life sciences companies.

Ian Waddell, Investment Director.
A proven leader, with over 35 years' experience in project, line and matrix management in the pharmaceutical industry. Broad experience in all stages of modern drug discovery having managed and motivated large discovery-based groups in both cardiovascular and oncology disease areas in Astrazeneca. Previously enjoyed a unique opportunity to experience drug discovery in an academic setting with fantastic access to clinical support where he led the team which signed licensing deals with 6th Element Capital, AstraZeneca, GSK, IDEAYA and HitGen.

Alec Mackie, Non-executive Director.
Alec is Managing Director of Barwell Plc and has extensive experience investing in start-ups and emerging technology companies with high growth potential. Alec has come on board as a financial advisor and mentor, advising on financial strategy and forecasts. Alec became involved with Carcinotech Limited when the company raised its first funding round and he initially acted as mentor/financial adviser on behalf of the Gabriel Investment Syndicate, of which he is a member.

Scientific Advisory Board:

Dr. Nikki March.
Skilled molecular and cell biologist with over 21 years of experience in the oncology area and broad experience in all aspects of molecular signalling, signal transduction pathways, and drug discovery. Her experience lies in target validations, identifying potential oncology targets, aiding in molecular and cellular biology approaches in oncology drug discovery. She is currently the Senior Director of Scientific Affairs at Cumulus Oncology.

Dr. Ashok Srivastava.
Chief Medical Officer Trans Atlantic Therapeutics Oncology, He was Chief Medical Officer of CareBeyond - A Radiation Therapy Cancer Center, New Jersey, USA. He has more than 15 years of experience in drug development, medical affairs and commercialization of cancer drugs including radiopharmaceutical and supportive care, Phase I-4, and marketing commercialization of Haematology, Oncology and radio pharmaceutical drugs in USA, EU and Japan. He is leader in Cancer Drug Development Worldwide large and complex Phase 3 Clinical Trials in many countries. He received his clinical, medical training & worked at renowned medical centers and pharmaceutical institutions worldwide; Walter Reed Army Institute of Research and Medical Center, Dachi, Sumitomo, Pharmacia, Pfizer, Eisai Oncology, and Spectrum Pharmaceuticals.

Dr. Andrew Biankin.
Professor Andrew Biankin is the Regius Chair of Surgery at the University of Glasgow, a Cancer Research UK Clinician Scientist, a Welcome Trust Senior Investigator, a Fellow of the Royal Society of Edinburgh and the Academy of Medical Sciences. He is the Director of the Wolfson Wohl Cancer Research Centre which is focused on precision oncology and established the Glasgow Precision

Oncology Laboratory, which he directs. He plays leadership roles in national and international consortia in cancer genomics and therapeutic development including the Chair of Precision-Panc and Executive Director of the International Cancer Genome Consortium. He has authored over 200 articles in major journals including seminal works on cancer, genomics and precision medicine.

Dr. Chee Gee See.
Has over 30 years frontline R&D experience covering every aspect from post-doctoral researcher in the Human Genome Mapping Project, pioneering innovative genomic technologies for pharmaceutical R&D, clinical scientist and translational medicine leader in big pharma, to championing oncology precision medicine clinical drug development.

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