



Biotechnology and
Biological Sciences
Research Council

Campus Innovation Awards (CIA)



Case Studies

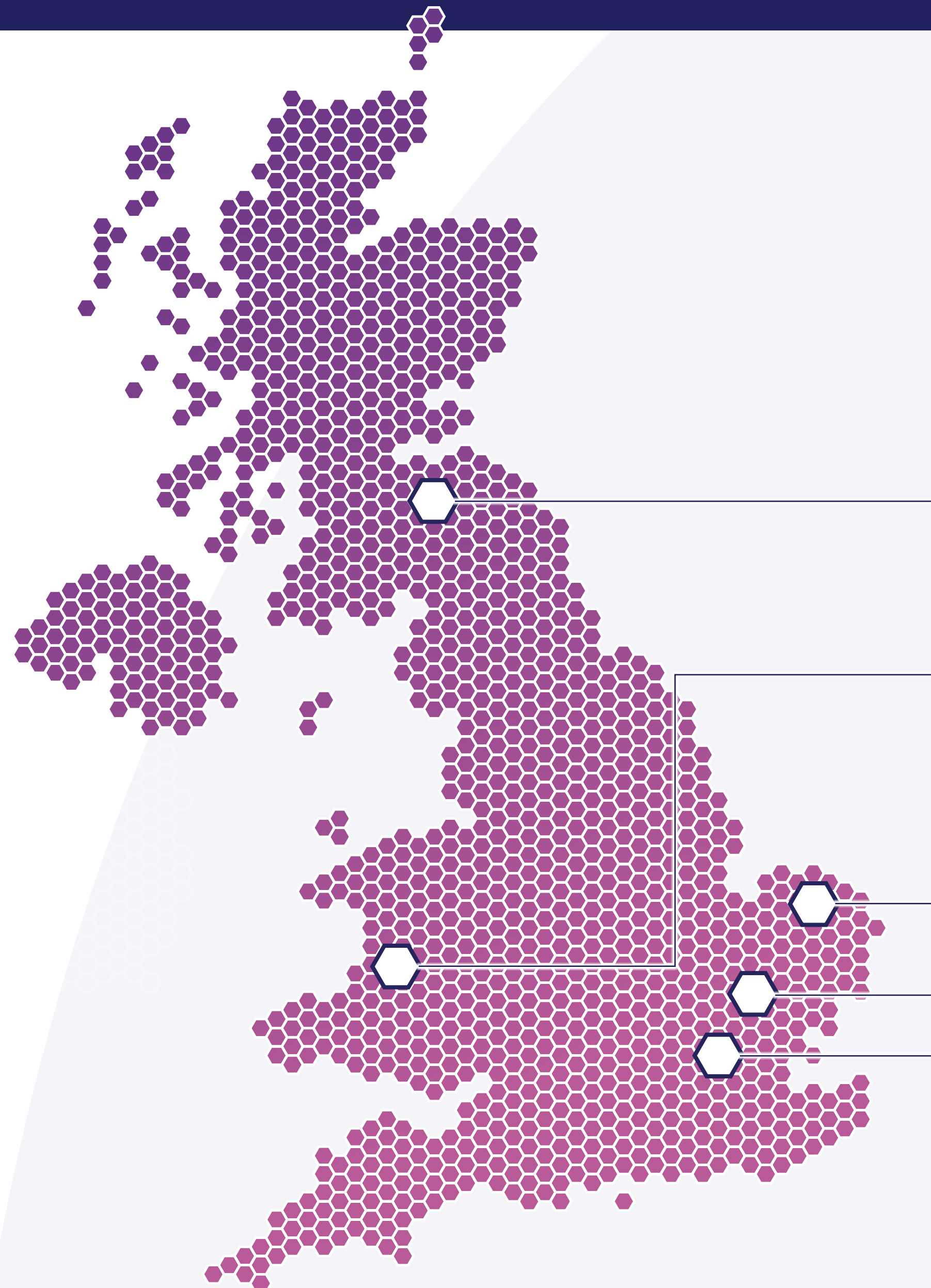
Strategic Awards for Innovation

Research and Innovation Campuses

- BBSRC supports 5 Research and Innovation Campuses around the UK, which form part of a wider UKRI network alongside those supported by STFC.
- BBSRC Campuses are centred on, and draw value from, the world-leading bioscience and national capability of the Strategically Funded Institutes.

They aim to:

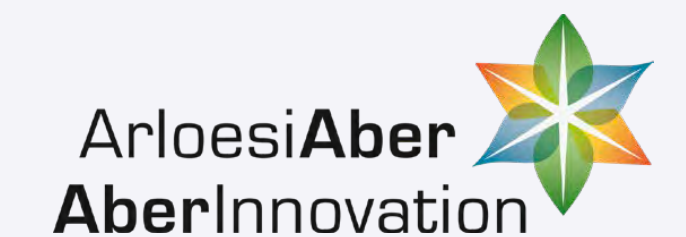
- nucleate regional clusters and work with key stakeholders to deliver benefit for the UK by attracting and nurturing highly innovative businesses, creating high-value jobs, attracting inward investment, enhancing collaboration, and accelerating impact
- add significant value to the local, national and international innovation ecosystem
- create a unique, defined and dynamic research and innovation opportunities nucleated by a critical mass of world-leading science, talented people, national capability, and specialist research-led facilities / infrastructures at each location.



Easter Bush Campus



AberInnovation



Norwich Research Park



Babraham Research Campus



Rothamsted Enterprises



Overview

BBSRC Research and Innovation Campuses facilitate a diverse range of research-intensive businesses to grow and scale throughout the UK.

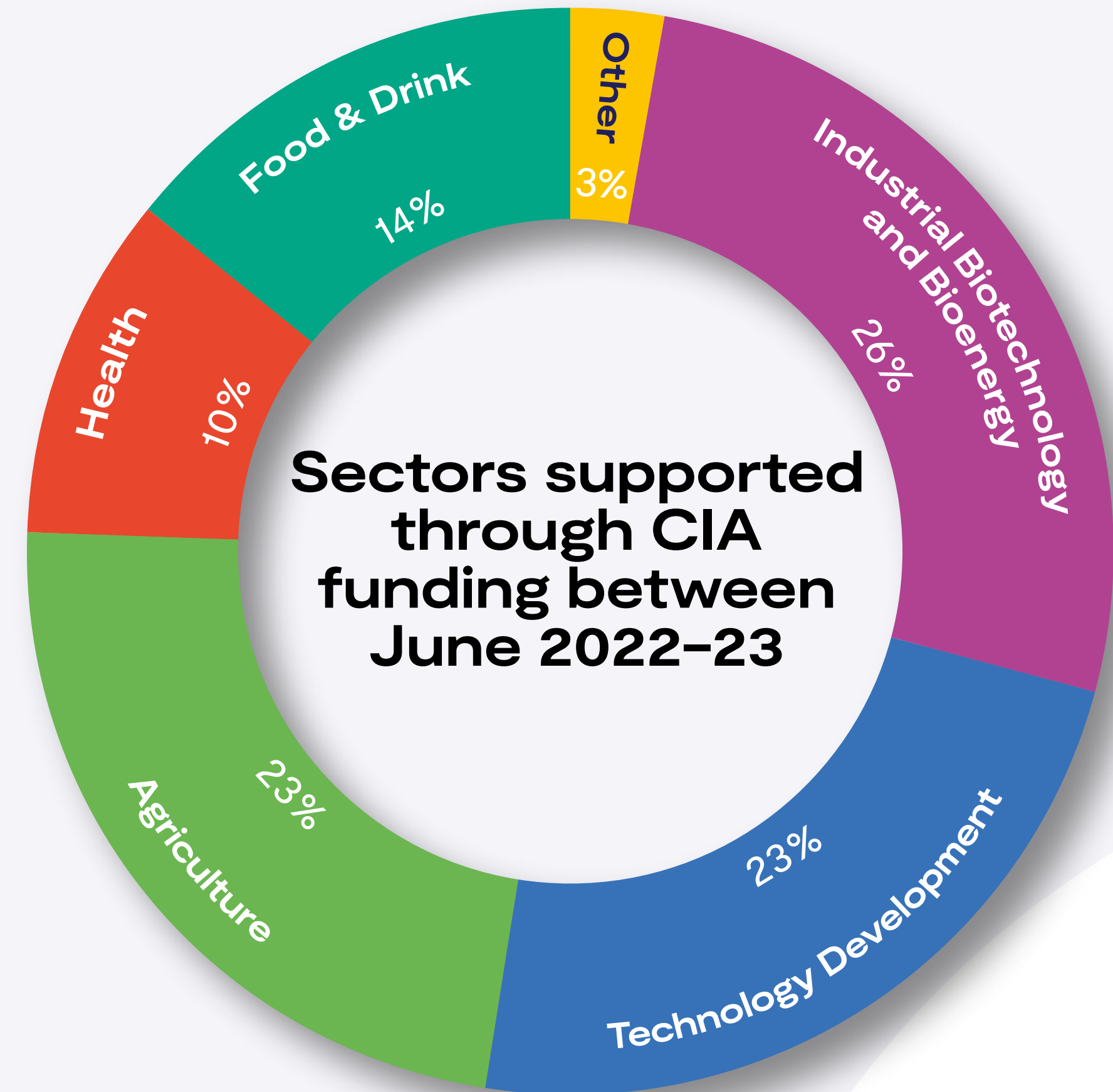
£4.4m has been invested through the Campus Innovation Award (CIA) scheme to further stimulate innovation across the Campuses. Since 2022, the funds have created new connections across communities, generating novel collaborations between the tenant companies, research institutions, and other third sector organisations and charities.

The CIA scheme fosters deeper connectivity within the bioscience research and innovation system, enabling academic enterprise to create impact both locally and nationally. The funding has deepened existing relationships and opened new opportunities for leading-edge research to progress towards innovation.

The funding has strengthened the research and innovation pipelines of start-up companies and SMEs translating bioscience into products, services, and processes, leading to significant commercial impact across a wide range of sectors, from agriculture, to health, and industrial biotechnology and bioenergy.

In its first year, the funding has:

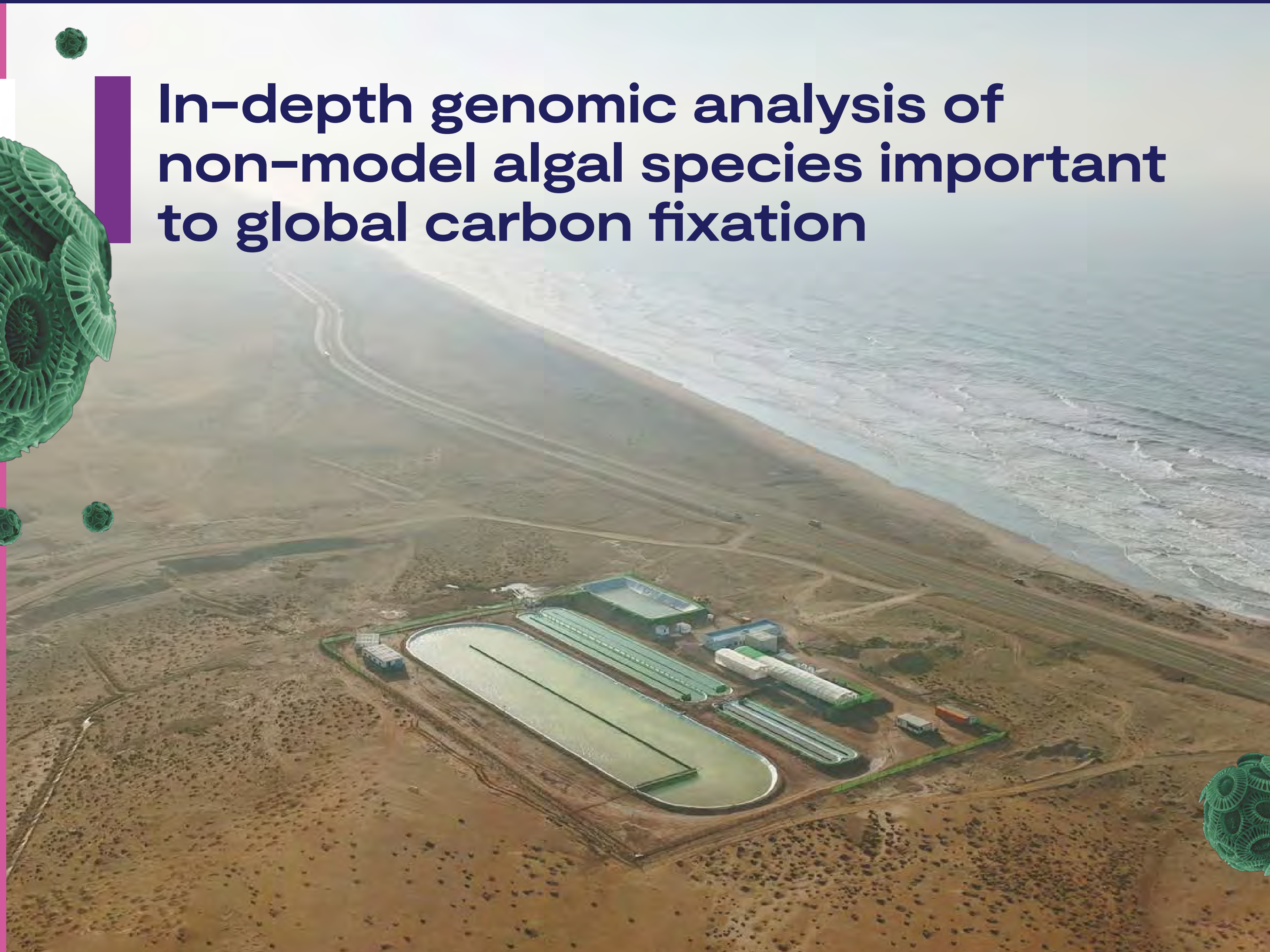
- Supported 50 projects across 43 companies over the five Campuses
- Attracted over £1.1m of co-funding into the projects, through direct and in-kind contributions.
- Facilitated growth of tenant companies at the Research and Innovation Campuses by supporting access to dedicated capability and infrastructure
- Allowed companies to go on and secure additional public and private investment



Brilliant Planet

In-depth genomic analysis of non-model algal species important to global carbon fixation

Marine phytoplankton are a leading contributor to global primary productivity (GPP), the synthesis of organic compounds from atmospheric or aqueous carbon dioxide. Diatoms (a member of the marine phytoplankton family) contribute approximately 40% of this productivity, making them one of the most successful and abundant photosynthetic organisms in the world. Brilliant Planet was founded in 2013 and produce algae which can be converted into stable biomass, which can then be buried where it remains stable for thousands of years, thus removing CO₂ permanently from the atmosphere. Furthermore, this process helps deacidify seawater, strengthening the local coastal ecosystem.



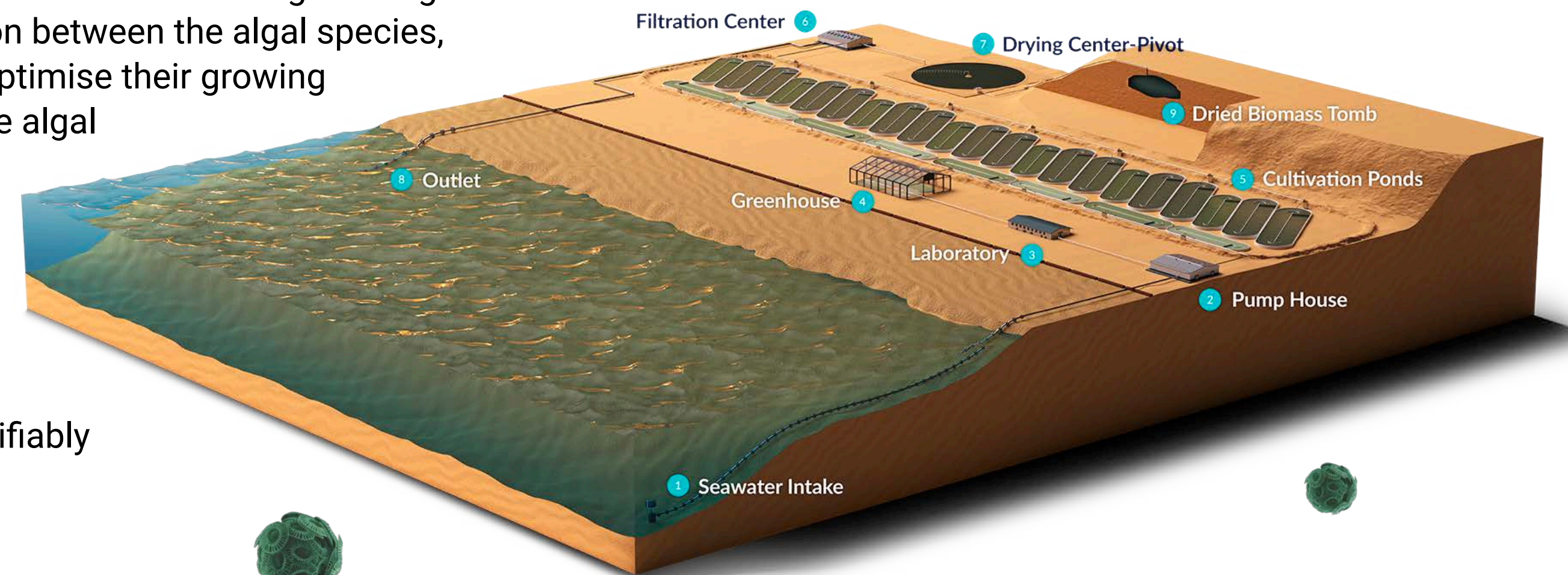


“ The BBSRC Innovation Grant Scheme was launched around the same time as Brilliant Planet joined out tenant business community, and they jumped at the chance of this exciting collaborative opportunity to use the expertise and facilities on the Rothamsted campus. ”

Claire Wolstencroft, CIA Delivery Lead,
Rothamsted Enterprises

Due to a lack in algal sequencing data, there are challenges in understanding the genetic variation between different species. Based on this, Brilliant Planet used CIA funding to collaborate with Rothamsted Research and develop a sequencing project to understand the genomics of five algae species. These algae include four novel, unique, and previously unexplored diatoms and a separate species from the Moroccan coast. Using the data generated, the company can build new reference genomes. This information is necessary to determine the underlying genetic differences between algal strains which are the basis for their commercial carbon sequestration system.

Following on, Brilliant Planet were able to gain insights into the genetic variation between the algal species, which can be used to optimise their growing conditions based on the algal species used and growing environment. This helped further develop their technology as an affordable method of permanently and quantifiably sequestering carbon.





Innovation Funding supported a study and successfully fast-tracked pre-seed investment

■ Cancer is the leading cause of death for dogs over 12 months old, however, current detection and monitoring methods are invasive, time-consuming and expensive. The use of liquid biopsy, a non-invasive laboratory test to detect signs of a tumour, in humans has helped increase the early detection of cancers and inform therapeutic strategies. CanCan Diagnostics is refining this approach with the inclusion of next-generation sequencing to analyse cell-free DNA fragments in dogs. Longer term it is hoped that the technology will be able to predict recurrence and screen dogs before clinical signs of cancer occur.



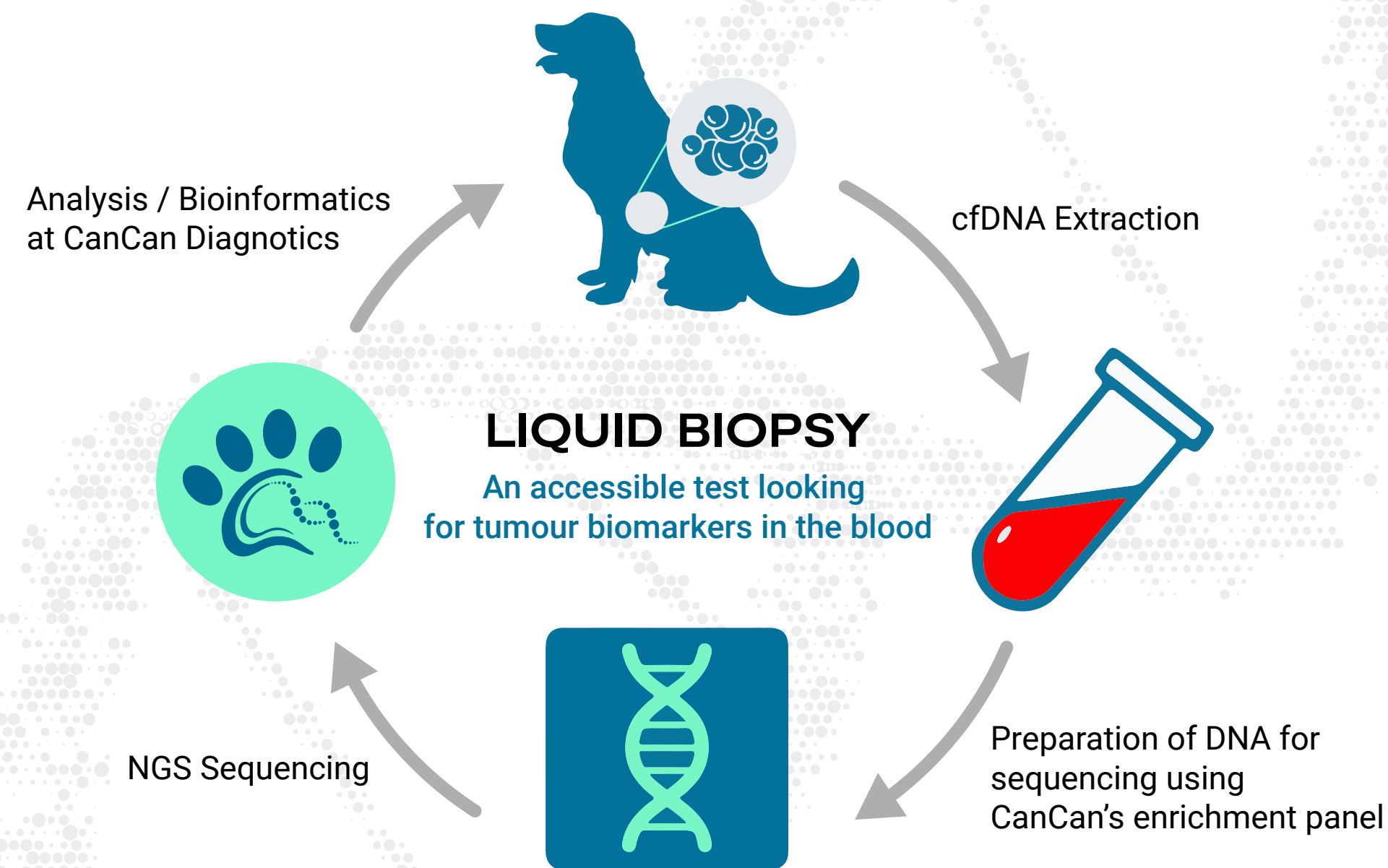
CIA support allowed the company to further validate the technology before it could attract investment. The project facilitated a collaboration between the company and The Royal (Dick) School of Veterinary Studies to streamline sample preparation and provide access to genomic sequencing / analysis techniques to test samples from animals with known and well documented tumour types. This included mast cell tumours, soft tissue sarcomas, melanomas, and anal sac adenocarcinomas. Furthermore, AI-based detection methods further helped to refine diagnostics in a range of cancer types, a methodology which is currently not available on the market for canine cancer detection.

As a result of funding CanCan Diagnostics were able to secure pre-seed funding from Advanced Genomics Limited and a private investor. Furthermore, the company are planning to start selling their flagship product “K9-LiquiDX” liquid biopsy test, which will be the first test of this kind available on UK and European market. The team hopes to take their product to market in 2024 and plans to offer additional tests to enhance diagnosis and personalise treatment for pets with cancer.

“ We believe our approach of using liquid biopsy to detect and monitor cancers in dogs to be the first application of this type of technology to veterinary diagnostics in the UK and Europe. It will help improve the disease monitoring for affected pets and their owners, while also providing vets with a novel, minimally invasive and quick to perform diagnostic test.

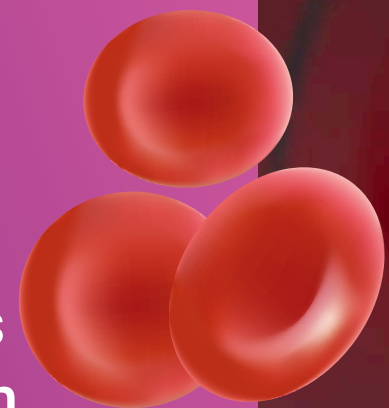
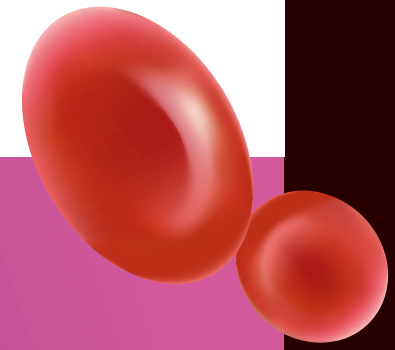
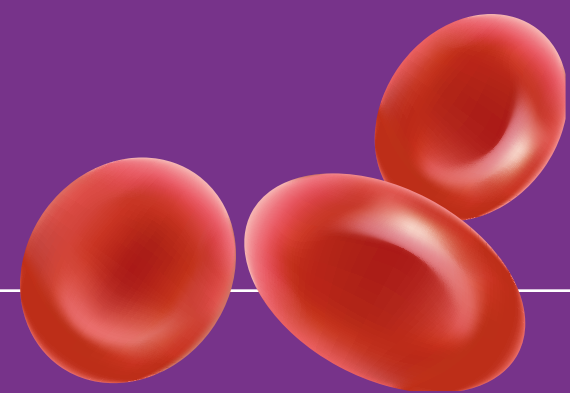
We anticipate that further development could lead to sophisticated diagnosis and personalised treatments, including specific products for particular breeds, in future. ”

Dr Maciej Parys Veterinarian at the Royal (Dick) School of Veterinary Studies and director of CanCan Diagnostics



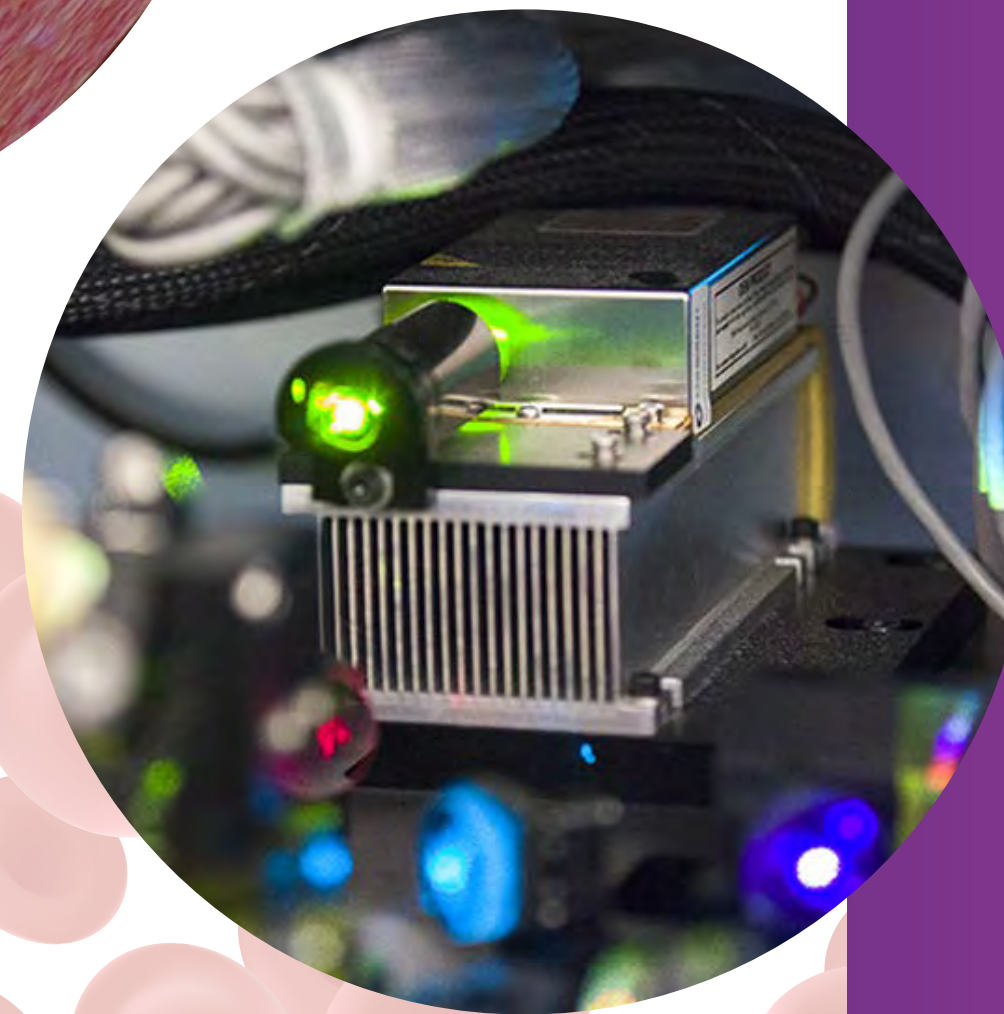
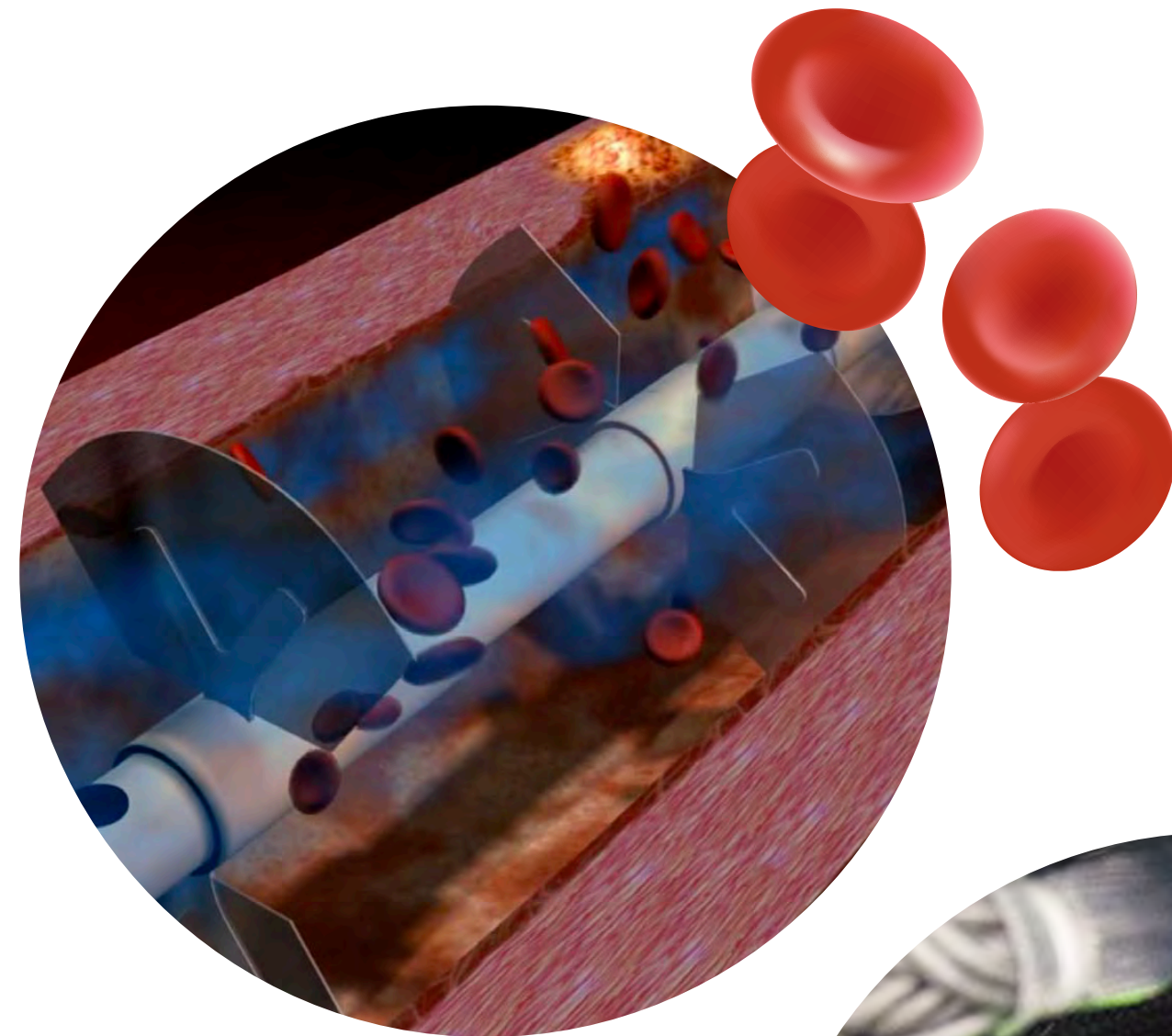
■ Coronary Artery Disease (CAD) is a leading cause of death globally, and current treatment approaches are largely ineffective for many patients. To address this, PlaqueTec is pioneering the development of biomarker-based strategies to transform the prevention, diagnosis, and treatment of CAD using cutting-edge technology and a data analysis platform. The company was formed in 2008 following a collaboration between engineers and molecular biologists, using funding from IPEX Capital to develop its novel “Liquid Biopsy System™.” Subsequent clinical trials have successfully validated the technology, and the current BIOPATTERN clinical trial (ongoing) will contribute to a unique data platform which can be used to inform the development of precision medicine in CAD.

PlaqueTec collaborate with Flow Cytometry Facility to develop a unique phenotyping assay to screen coronary artery blood



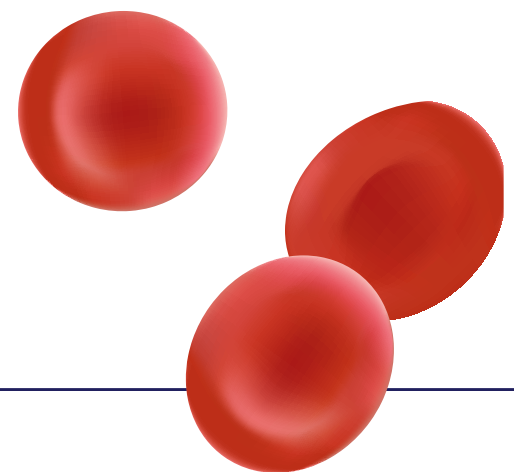
Using CIA funding, PlaqueTec collaborated with the Flow Cytometry Facility located at the Babraham Institute, to establish and validate a cell phenotyping assay suitable for analysis of a sub-set blood samples from patients taking part in the current clinical trial, BIOPATTERN. The project aimed to develop a 35-colour panel for spectral cytometers to detect the different cell subpopulations present in human blood. This panel provides one of the most detailed solutions for identifying major subpopulations across cells of the immune system.

Following on, PlaqueTec were able to develop a bespoke service assay to investigate the cell types present in coronary artery samples. This exploratory analysis could also uncover novel biological insights into the cell types accumulating at the lining of the artery wall in close proximity to coronary disease sites. Data generated through this project will also be integrated with other multi-omic and imaging data and published as part of the BIOPATTERN trial. Furthermore, the collaboration has provided a new capability service within the Flow Cytometry Facility, providing new skills for staff, commercial service offerings, and data for flow cytometry teaching courses.



“ PlaqueTec’s collaboration with the Flow Cytometry Facility has enabled the development of a bespoke cell phenotyping assay. Using this assay, we are performing exploratory cell analysis of coronary blood samples from participants in the BIOPATTERN clinical trial. Being able to characterise cell types from these blood samples has the potential to improve our understanding of the underlying coronary disease biology, and ultimately improve treatments for those suffering with coronary artery disease. ”

Dr Diane Proudfoot, Chief Scientific Officer,
PlaqueTec



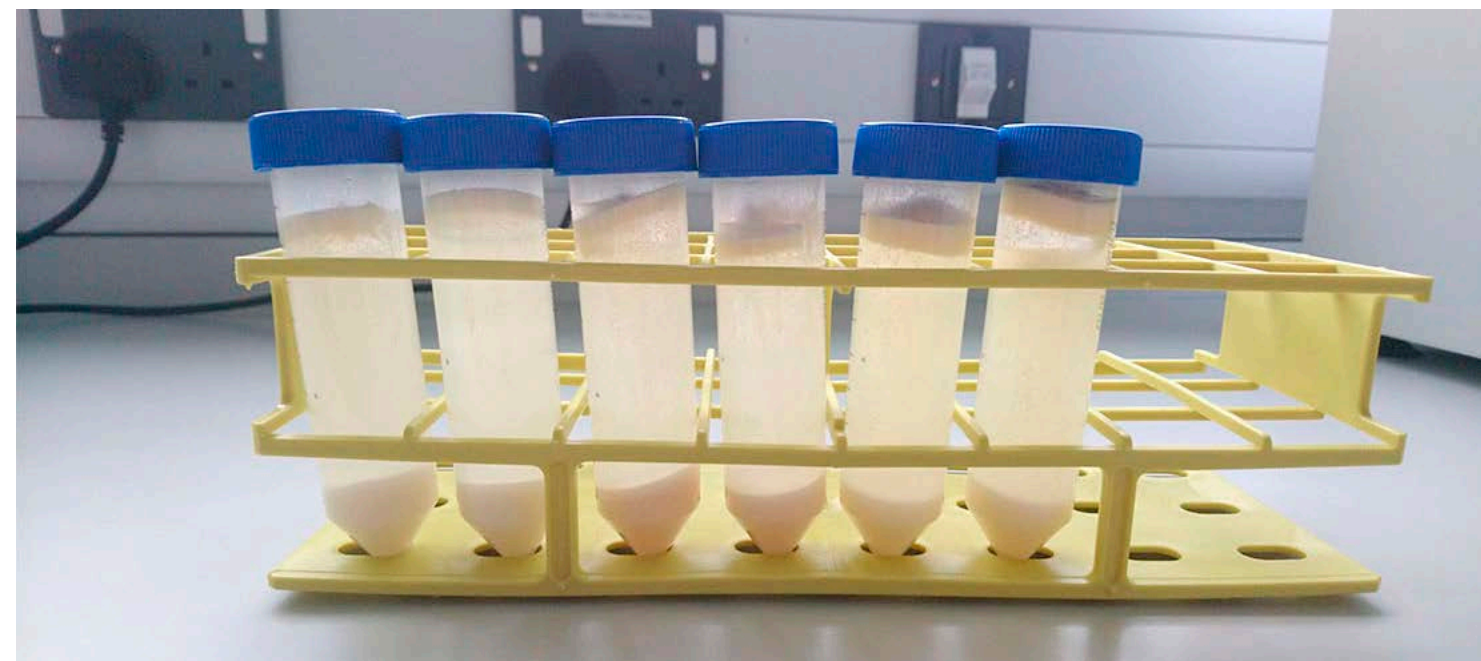


Agri-food innovation, enhancing products: Innovating bacteria control with Brevibacterium-compatible additive

■ Brevibacterium linens (B. linens) has long been recognised as an important dairy microorganism due to its presence on the surface of a variety of smear surface-ripened cheeses. However, milk produced from cows who are fed silage feed, can contain butyric acid bacterium which reduce the effectiveness of B. linens, causing large cracks, unsavoury flavours and defects. Caws Teifi, an artisan cheese company located in Ceredigion, uses B. linens as a wash during the ripening process of their signature cheese, Celtic Promise. The company uses Lysozyme (an inhibitor of spoilage organisms on rind-washed cheeses) to help combat this effect. However, it has the drawbacks of preventing the cheese from being labelled as organic and is also a potential allergen.



Through CIA funding a collaboration was developed between Caws Teifi, Professor Hazel Davey (Aberystwyth University), and the Future Foods and Advanced Analysis labs located at AberInnovation. The project aimed to seek out alternative products to suppress butyric bacteria growth whilst also reducing by-products/waste in their production process. Carrying out this R&D as a part of this CIA funded “Solutions Catalyst Programme” meant that the company could work on their product development with more certainty in getting the process correct and with less risk or cost associated. Through this collaboration, Caws Teifi now have gained substantial research findings which allow them to move to the next stage and accredit the results gained and are confident that their investigative work can not only help them to improve their own product line but also go on to inform better industry regulations in general. Furthermore, the company has been successful in raising private investment, and has established new capability within the company.



“ It was a huge bonus for Caws Teifi to gain access to a local laboratory space and the Advanced Analysis suite at AberInnovation with funding from the Solutions Catalyst programme, supported by the BBSRC, for the company to carry out product process and quality checks. ”

Robert-Jan Savage-Onstwedder, Managing Director, Caws Teifi

“ The support of the CIA funding has been vital to the development of our Solutions Catalyst programme which enables companies to tap into the world leading expertise at Aberystwyth University and the cutting edge AberInnovation facilities and technical expertise. This has reduced the risk to the companies associated with their R&D needs and enabled the companies to form new collaborations that are now moving forward together towards bigger R&D projects that are essential to accelerating their innovative progress. In addition, these collaborations provide the University expertise with perfect opportunities to be involved in research with real everyday impact. ”

Dr Rebecca Charnock, Industrial Research Development Manager & Solutions Catalyst lead, AberInnovation

Norwich Research Park



■ Sugar beet is an important crop for the UK economy and especially so in the East of England. The industry supports 9,000 jobs across the UK and supplies a significant proportion of the country's demand for sugar. However, the industry is under threat from a disease known as Virus Yellows which can cause severe crop damage. Historically, conventional breeding has helped scientists develop new varieties of sugar beet with greater viral tolerance, but this breeding process takes many years. Since the disease threat is critical, the industry needs a quicker and more effective solution.

Explorer Forum facilitates regional research collaboration to fight sugar beet disease



Current measures to counteract Virus Yellows include pesticides to neutralise the aphid carrier that transmits the disease, and their use must be authorised by the Department for Environment, Food & Rural Affairs (DEFRA). It is widely accepted that this is not a sustainable long-term solution, as the chemicals are controversial and may be harmful to the environment, specifically key insects which are beneficial to the food chain.

Supported by the BBSRC Campus Innovation Award, Norwich Research Park runs facilitated 'Explorer Forum' workshops that bring together onsite academic researchers, business, and policy makers to tackle 'grand challenges'. Following a session on 'Applications of Gene Editing', a collaboration was formed between British Sugar, Tropic Biosciences, John Innes Centre and the British Beet Research Organisation (BBRO), to try and identify a more robust and sustainable solution to this problem using gene-editing. The collaboration will explore the application of this technique to develop disease resistant varieties of sugar-beet. The five-year project's full budget is £1m, of which £663,443 is grant funded by the Department for Environment, Food and Rural Affairs' (Defra) Farming Innovation Programme, and the remainder by British Sugar.



*Peach potato aphid
(Myzus persicae)*

Sugar beet crops diseased with Virus Yellows



“ This work is a really great example of the amazing outputs that can be achieved through facilitation and collaboration between business and science that exists at Norwich Research Park. We're looking forward to running more Explorer Forums to build groups who can uncover truly powerful answers to some of the most challenging issues our world faces. ”

Dr Nick Goodwin, Chief Operating Officer, Anglia Innovation Partnership LLP