

BIA consultation submission: Labour Economy, Business and Trade Commission

July 2020



Summary of this submission

- The UK has a thriving life sciences sector, which provides jobs and contributes to the economy, and delivers health and social benefits, such as new medicines for patients and technologies to support clean growth
- In response to COVID-19, there has been unprecedented action and collaboration between businesses, research institutions, charities and government to develop effective diagnostics, vaccines and therapies, and prepare for their large-scale manufacture. Post-pandemic, there is great opportunity to build on this to drive the economic and social recovery
- For more than five years, there has been cross-party support for policies to substantially increase public and private R&D investment, which we hope the new Labour Party leadership will maintain
- A strong and vibrant UK life sciences sector is essential to national security against future public health threats as well as the delivery of innovative new medicines for the NHS, creating rewarding and well-paid jobs across the UK and driving a new era of clean economic growth
- Labour's industrial strategy for life sciences should focus on investing in jobs and skills, ensuring the ecosystem works together, creating the right environment for private investment, and support for investment in medicines manufacturing capacity
- The BIA sees this submission as the beginning of the conversation and would welcome more in-depth discussions with members of the commission and the Labour Party leadership

Overview of the UK's life sciences sector and its contribution to Labour's priorities

The UK life sciences sector shares the ambition of the Labour Party to see more investment, more research, and more high-skilled jobs in the British economy. The sector consists of almost 5,900 companies, 80% of which are SMEs¹, it consistently invests more in R&D than any other sector (£4.5bn in 2018), and supports almost half a million jobs, with the average GVA per employee over twice the UK average at £104,000.² Two-thirds of these jobs are outside London and the South East.³ Private investment in the UK's life sciences start-ups and scale-ups has increased 400% since 2012, signalling a bright and innovative future.⁴

The sector is not only a strong contributor to the UK economy but also improves the health of the nation and enables clean growth. From improving patients' lives through new treatments and early diagnosis, to the development of environmentally sustainable technologies, such as biodegradable bioplastics and the cleaning of polluted waters, our deep understanding of biology is helping the UK address humankind's greatest challenges, both at home and around the world. We have provided case studies in appendix one to illustrate the value being created by UK life science companies.

¹ <https://www.gov.uk/government/publications/bioscience-and-health-technology-database-annual-report-2017>

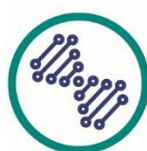
² https://www.abpi.org.uk/media/1371/the_economic_contribution_of_the_uk_life_sciences_industry.pdf

³ <https://www.gov.uk/government/publications/bioscience-and-health-technology-database-annual-report-2017>

⁴ <https://www.bioindustry.org/resource-listing/global-and-growing---uk-biotech-financing-in-2019.html>

These benefits are the result of a continuous and supportive industrial strategy delivered by successive governments, through the creation of R&D tax credits by the Labour Government in 2000, the Biomedical Catalyst by the Coalition Government in 2012, and the new R&D Roadmap published in July 2020.⁵ The UK is not alone in recognising life sciences as an industry of the future; both the United States and China, among many others, are committing considerable public investment to support their life sciences sectors. The next Labour Government will have the opportunity to continue this success and work with life sciences businesses to establish resilience to future pandemics and other threats to public health, generate further jobs, deliver new medicines and promote environmentally sustainable long-term economic growth to address the climate emergency.

How can life sciences improve health?



Earlier identification of disease risk and diagnosis, through genetic screening



Disease prevention through more effective and better targeted vaccines



Faster drug development and more accurate drug delivery



New treatments for previously untreatable conditions

How can life sciences improve the world we live in?



Lower environmental pollution with bio-degradable plastics and plastic-digesting bacteria



Reduced reliance on fossil fuels through biologically-produced chemicals and fuels



More efficient food production with engineered crops and improved fertilisers



Novel high-performance materials for fashion, sports and construction industries

The UK life sciences sector's contribution to the global pandemic response

Through the BIA and individually, UK life science companies have worked in concert with the Government to establish national testing facilities, scale-up vaccine manufacturing capacity, test existing medicines for their effectiveness against COVID-19 and begin work on developing new therapies based on cutting-edge science. Examples of this include:

- BIA members and universities provided Thermo Fisher PCR machines to the Lighthouse Laboratories established in Milton Keynes, Alderley Park and Glasgow
- BIA member and small biotech Vaccitech and the University of Oxford have partnered with AstraZeneca and other global vaccine manufacturers to ensure rapid distribution of their COVID-19

⁵ <https://www.gov.uk/government/publications/uk-research-and-development-roadmap>

vaccine around the world if clinical trials prove its effectiveness, and have waived their rights to any royalties during the pandemic.⁶

- Imperial College London has established a social enterprise and will waive royalties and charge only modest cost-plus prices when supplying the UK and developing world with its vaccine if it proves effective in clinical trials.⁷
- The BIA Antibody Taskforce, led by Alchemab, Kymab, and Abcam, has brought together companies, academics and the public sector across the UK in a pre-competitive consortium to rapidly develop and produce therapeutic antibodies against COVID-19.⁸

This response, characterised by innovation and collaboration, has shown the value of a vibrant life sciences ecosystem based in the UK. It has allowed the UK to not only look after its own citizens but also be a good global citizen itself, including establishing agreements and supply chains to provide global access to vaccines and therapies, as Vaccitech, AstraZeneca and Oxford University have jointly done.

There is clear need and public support for strengthening the UK life sciences sector as a matter of national security and great opportunity for this to be done collaboratively with government and industry working together. This will help create new rewarding and well-paid jobs across the UK, not only in R&D but also in manufacturing, which are accessible through apprenticeships and other vocational training routes. A Labour industrial strategy for life sciences can ensure the UK is protected from future public health emergencies and contribute to the economic and social recovery.

The issues that a Labour industrial strategy for life sciences should address

The Labour Party has pursued a vision of creating “an innovation nation”, including an ambition for 3% of GDP spent on research by 2030 and for the UK to have the highest proportion of high skilled jobs in the developed world. These are very welcome ambitions and shared by our industry. We hope the new Labour administration continues to hold this vision.

For the reasons set out above, an industrial strategy for the life sciences sector should be central to Labour’s wider approach to the economy, business and trade. The life sciences sector is well positioned to help deliver Labour’s goals. The rest of this submission shares our thoughts on what Labour’s strategy for life sciences could involve and how we can work together to achieve it.

Investing in jobs and skills

Like many high-tech industries, the life sciences sector faces skills shortages as too few students study STEM subjects. These shortages risk R&D moving overseas. Labour’s focus on investing in skills is welcome and will need an urgent focus on the skills the life sciences sector needs – not just to ensure these high skills, high-wage jobs stay in the UK, but to ensure the best possible care for patients in the NHS. A multi-disciplinary workforce is needed for the UK to remain at the leading edge of scientific and medical progress. Individuals will need knowledge and skills in the traditional sciences, social science and data sciences, as R&D and new treatments and technologies span these disciplines.

The UK also needs people who will translate public investment in R&D and skills into successful businesses paying tax and manufacturing new products in the UK. This is why the BIA is working with the largest

⁶ <https://www.vaccitech.co.uk/vaccitech-and-oxford-university-announce-landmark-partnership-with-astrazeneca-for-the-development-and-large-scale-distribution-of-the-covid-19-vaccine-candidate/>

⁷ <https://www.imperial.ac.uk/news/198053/imperial-social-enterprise-accelerate-low-cost-covid-19/>

⁸ <https://www.biacovid19.org/developing-solutions.html>

publicly funded research institute in Europe, the Francis Crick Institute, to deliver training to young entrepreneurs and researchers to help them start and grow their own innovative businesses. In addition, in collaboration with the Cell and Gene Therapy Catapult, the BIA is helping to deliver an apprenticeships programme to ensure the UK has the capacity to manufacture the next generation of medicines. The programme is in its first year but, to date, 32 apprentices have already been enrolled in 11 companies and this will rise to upwards of 65-70 apprentices in 26 companies by September 2019. Labour's support to expand programmes like these is needed to ensure the life sciences sector continues to provide well-paying jobs across the country.

Ensuring the ecosystem works together

The UK is renowned worldwide for its excellent science base – it is home to some of the most prestigious universities in the world and responsible for more than 15% of the world's most highly cited scientific articles. Public funding of R&D within universities and public research institutes provides a vital bedrock on which spin-outs, start-ups, SMEs and larger companies can build. The public's early investment in the science base is followed by a much greater investment downstream by the private sector to drive products through the costly R&D and regulatory processes, and ultimately delivering to patients and end-users.

But the public and private R&D sectors interaction goes far beyond this. As COVID-19 has shown, collaborative R&D is highly effective as delivering innovation. Each party brings unique capabilities and resources to address the challenge. Any Labour industrial strategy must focus on ensuring these unique strengths are brought together.

Regulators, guided by government, are also an essential part of the ecosystem and drivers of innovation in their own right. Key to growing and capitalising on the UK's life sciences sector and attracting foreign R&D investment is ensuring that the UK retains the Medicines and Healthcare products Regulatory Agency's (MHRA) international standing and its regulatory science expertise in the eyes of global companies and investors. The UK is respected around the world for its robust and science-led regulatory regime for the R&D of innovative medicines and other life science-related products. The MHRA forms an integral part of the UK life sciences ecosystem and should be embedded in the science base, fostering innovation and attracting global companies to conduct clinical trials in the UK.

The MHRA is valued by industry and recognised for its expertise and competence in the European regulatory system, as well as relevant in global R&D. The UK's future participation in the European Regulatory Network and the European Medicines Agency is highly unlikely due to Brexit, meaning investment will be needed to maintain the MHRA's expert staff and enable the agency to perform its mission to protect public health and patient safety. Moreover, a high degree of cooperation and alignment with the European regulatory system must be a priority to protect patient safety and ensure NHS patients do not have to wait longer for access to innovative medicines than they do presently.

Creating the right environment for private investment

Key to growing the UK's life sciences sector, with the jobs and social benefits that brings, is ensuring that the UK has the right environment for business investment.

The R&D Tax Credit schemes are enormously valuable to life sciences SMEs. They provide a minimal-bureaucracy system that rewards and amplifies companies' own investment in R&D, stimulating further investment. R&D tax credits are particularly critical for young companies yet to generate revenue. Loss of this support would be extremely detrimental to the UK's SMEs, their R&D investment and the jobs that they provide. The Patent Box is another valuable fiscal driver of R&D investment and commercialisation. It

incentivises companies to maintain their operations in the UK, ensuring public and private R&D investment translates into long-term jobs and tax revenues.

An SME developing a new medicine or technology requires an investment of many hundreds of millions of pounds to bring their product to market. Securing this private investment is a challenge and a lack of scale-up capital has historically been – and continues to be – a drag on the growth of British high-tech businesses. As the 2017 Patient Capital Review demonstrated, this problem is particularly acute in life sciences and there is a reliance on overseas private capital; the City of London is too risk-averse and does not invest enough in early-stage innovative businesses. Addressing this through regulatory reform and co-investment funds could change this behaviour and unlock fresh private capital to support innovation and job creation. We propose the government and private sector invest on equal terms, meaning the tax payer would also see a return on co-investment programmes.

Support for investment in medicines manufacturing capacity

Anchoring medicines manufacturing in the UK is critical to our resilience against future public health threats and ensuring the UK's investment in research and innovation leads to high-quality jobs in downstream industries. Due to their large costs, regulatory hurdles and long timelines, medicines manufacturing investments are long-term commitments by life sciences companies so the benefit of policies that anchor them will be felt for many years.

The UK should focus on securing the next wave of medicines manufacturing, both the traditional pharma capacity and particularly that associated with the next generation of medicines such as the emerging cell and gene therapies. In the current environment with global reticence arising from Brexit, more needs to be done to attract these investments.

A government fund that could deploy grants to incentivise investments in the UK would help increase our international competitiveness as a location for manufacturing. These would contribute to a small proportion (say 10%) of the overall capital investment but would greatly influence the global decision makers within the life sciences sector when scouting for manufacturing sites. It should also be made available to UK life science companies, to stop the loss of these valuable employers to overseas life science hubs.

This top-level submission is the start of a conversation with the Labour Policy Commission. We would welcome further discussions to provide more detail.

Dr Martin Turner

Head of Policy and Public Affairs, BIA

mturner@bioindustry.org

About the BIA

The BIA is the trade association for innovative life sciences in the UK. Our goal is to secure the UK's position as a global hub and as the best location for innovative research and commercialisation, enabling our world-leading research base to deliver healthcare solutions that can truly make a difference to people's lives.

Our members include:

- Start-ups, biotechnology and innovative life science companies
- Pharmaceutical and technological companies
- Universities, research centres, tech transfer offices, incubators and accelerators
- A wide range of life science service providers: investors; lawyers; IP consultants; and investor relations agencies

We promote an ecosystem that enables innovative life science companies to start and grow successfully and sustainably.

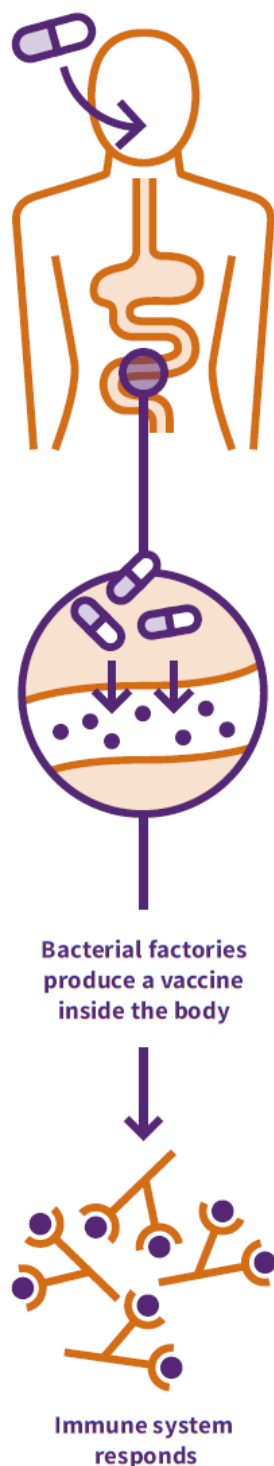
Prokarium

London

Innovation support:

Innovate UK

Sub-sector: Health



Prokarium is an engineering (synthetic) biology company that develops a new, more convenient way to produce and administer vaccines.

The company's oral vaccine delivery platform, Vaxonella®, uses a modified, harmless version of *Salmonella* bacteria to deliver vaccines via the lining of the gastrointestinal tract. This approach may generate medicines that are cheaper to make and easier to store and distribute than existing injectable vaccines. It may also expand the range of diseases that can be targeted.

Prokarium has received funding from Innovate UK in various stages of the company's growth, which have been instrumental to the development of the company. A government grant enabled the company to spin-out from Cobra Biologics, a contract manufacturing organisation. Prokarium subsequently secured private investment and Innovate UK grants, which allowed the company to fund collaborations with UK universities and other companies to develop vaccines for various infectious diseases.

A grant of £374,000 from the Newton Fund has helped fund the development and manufacture of a novel vaccine for enteric fever (typhoid and paratyphoid), which will enter a Phase 1 clinical trial later in 2019. Prokarium is also working on a £1 million Innovate UK-funded project to complete the pre-clinical evaluation of its plague vaccine.

The development of these technologies enabled Prokarium to conclude a \$10 million (~£8 million) fundraising round at the start of 2018. The data package generated from the Innovate UK-funded grants was critical in securing this investment.

A significant portion of Prokarium's grant funding has been spent at UK-based contract research organisations, contract manufacturing organisations, reagent suppliers and other service providers. In addition to the grants, Prokarium has received significant fiscal support in the form of R&D tax credits.

From grant funding of £3.2 million, Prokarium has raised a total of around £13 million from overseas angel and institutional investors – generating £4 for every £1 of public funding and accelerating the development of vaccines for unmet medical needs worldwide.

CHAIN Biotechnology Nottingham

Innovation support:
ISCF Wave 1
Sub-sector: Health

CHAIN Biotechnology is a privately-held microbiome therapeutics company based at Medicity in Nottingham.

CHAIN develops a disruptive technology for the production and delivery of therapeutic molecules to relevant targets in the human gut. Its lead product produces a potent anti-inflammatory targeting ulcerative colitis.

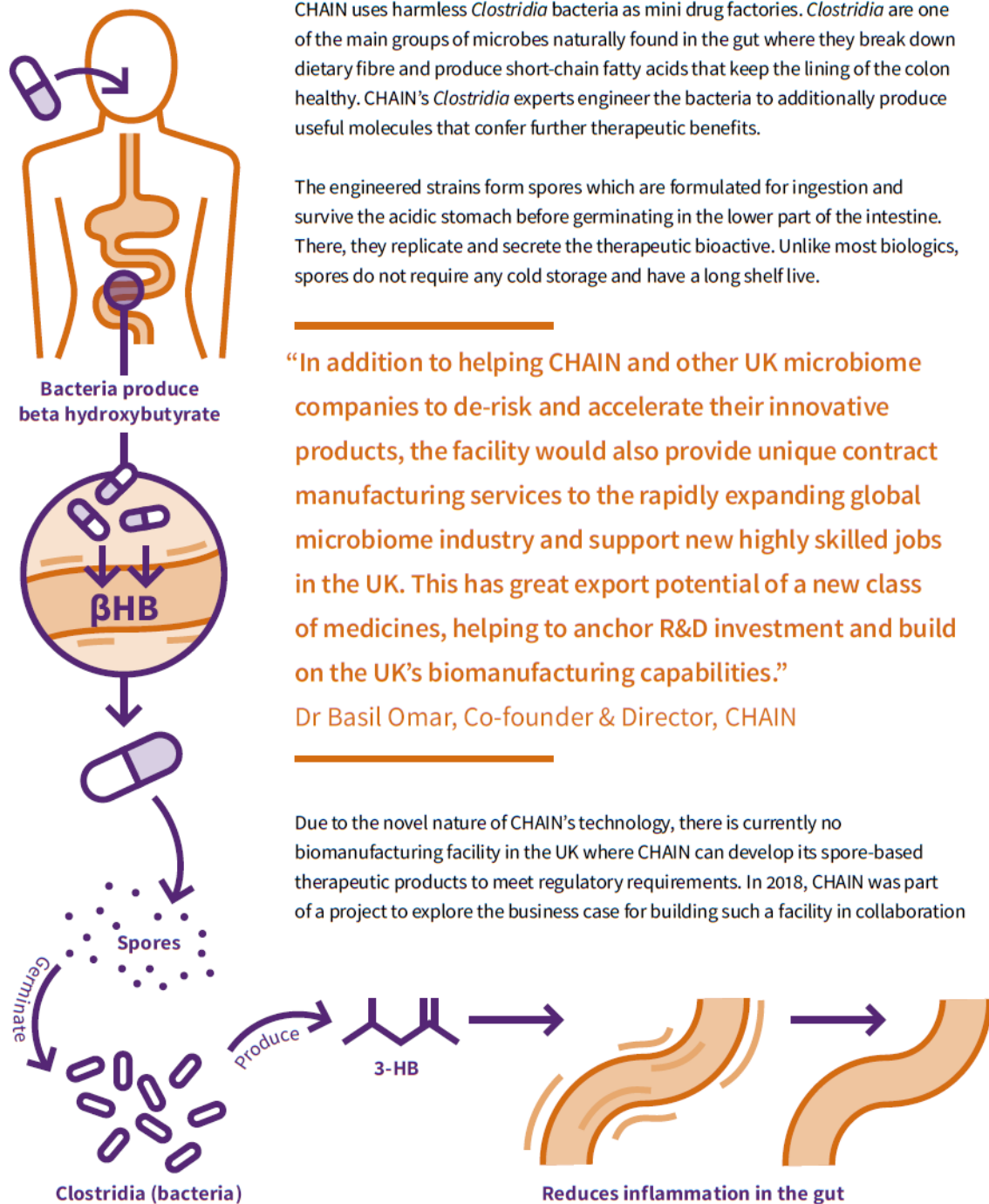
CHAIN uses harmless *Clostridia* bacteria as mini drug factories. *Clostridia* are one of the main groups of microbes naturally found in the gut where they break down dietary fibre and produce short-chain fatty acids that keep the lining of the colon healthy. CHAIN's *Clostridia* experts engineer the bacteria to additionally produce useful molecules that confer further therapeutic benefits.

The engineered strains form spores which are formulated for ingestion and survive the acidic stomach before germinating in the lower part of the intestine. There, they replicate and secrete the therapeutic bioactive. Unlike most biologics, spores do not require any cold storage and have a long shelf life.

“In addition to helping CHAIN and other UK microbiome companies to de-risk and accelerate their innovative products, the facility would also provide unique contract manufacturing services to the rapidly expanding global microbiome industry and support new highly skilled jobs in the UK. This has great export potential of a new class of medicines, helping to anchor R&D investment and build on the UK's biomanufacturing capabilities.”

Dr Basil Omar, Co-founder & Director, CHAIN

Due to the novel nature of CHAIN's technology, there is currently no biomanufacturing facility in the UK where CHAIN can develop its spore-based therapeutic products to meet regulatory requirements. In 2018, CHAIN was part of a project to explore the business case for building such a facility in collaboration



with two other UK companies. The project size was £100,000 and funded through the Medicines Manufacturing Challenge of Wave 1 of the ISCF.

The funding received through the ISCF facilitated new collaborations and helped to de-risk the project. CHAIN and its collaborators are in discussions with private investors and local government to secure funding for the spore manufacturing facility.

CustoMem

London

Innovation support:

Innovate UK +
Horizon 2020

Sub-sector:

Environment

CustoMem helps to protect global environmental and human health by engineering bio-based materials to capture target chemicals in wastewater. The company was spun-out from Imperial College London in 2015 and is today is headquartered at White City in London.

In 2017, CustoMem was awarded a £100,000 grant from Innovate UK. The award was key to develop and produce CustoMem's first product, a novel material that can selectively and efficiently remove dangerous chemicals from industrial wastewater. CustoMem Granular Media (CGM) is a bio-based material and can be customised to bind some of the most polluting, resistant artificial substances. It does so in a manner that allows both the material, and the pollutants it removes, to be recycled.

The Innovate UK grant also enabled CustoMem to initiate three customer trials to prove the performance of CGM. The success in these trials enabled the company to win a two-year €1.4 million Horizon 2020 award. The award is funding a project, started in April 2018 and currently underway, which will ensure that CGM is scaled and deployed for water treatment.

“Funding from Innovate UK and Horizon 2020 was vital to allow us to develop, produce and scale our product. The awards have also allowed us to grow our internationally diverse team of experts from four full-time employees in 2017, to eleven today, with seven more due to join in 2019.” Henrik Hagemann, Co-founder and Chief Executive Officer, CustoMem

CustoMem's technology has already attracted large industrial companies which are facing increasingly stringent waste-regulations. In Spring 2019, CustoMem completed a £2.5 million private funding round, further enabling the company to grow and scale its technology.



BioAscent

Glasgow

Innovation support:

Medicines Discovery

Catapult

Sub-sector: Health

BioAscent provides comprehensive integrated drug discovery services to companies, universities and research institutes.

The company's Compound Cloud contains approximately 120,000 compounds, which can be accessed on-demand. Typically, these compounds are tested against disease targets to identify the specific active compounds for optimisation. The active compound(s) then become the starting point for drug development.

To enhance the Compound Cloud further, the compounds could be analysed and grouped together into targeted subsets. As an SME with limited resources, BioAscent required external support to leverage scarce expertise. BioAscent partnered with Medicines Discovery Catapult (MDC) which helped to deliver the project.

MDC, based in Cheshire, is a national facility providing unique scientific capabilities and expertise, connecting the UK community to accelerate innovative drug discovery. The MDC team helped BioAscent to apply artificial intelligence (AI) across the entire Compound Cloud library to learn which features of a compound make it active towards different drug targets. The project added value to the Compound Cloud and enabled the creation of compound subsets – ultimately helping BioAscent's clients to conduct faster and more efficient drug discovery.

“It has been great to access the AI expertise at MDC for this collaboration. The MDC team have taken an innovative approach to characterising the compounds in Compound Cloud which we believe adds value to the collection. From our perspective the collaboration was easy to establish and worked extremely well, and we look forward to working with MDC on further AI initiatives in the future.” Phil Jones, Chief Scientific Officer, BioAscent

Green Biologics

Oxfordshire

Innovation support:

Innovate UK

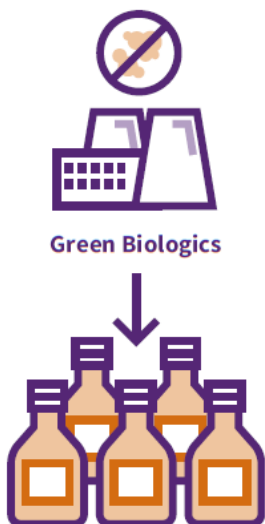
Sub-sector:

Environment

Green Biologics is an industrial biotechnology company that engineers biology to manufacture cleaner speciality chemicals, used to make a wide range of products, from pharmaceuticals and cosmetics to paints and plastics.

Green Biologics has re-commercialised the clostridial Acetone-Butanol-Ethanol (ABE) process, which allows the company to produce bio-based chemicals that avoids the high environmental cost of standard hydrocarbon-based manufacture.

Headquartered in Oxfordshire, Green Biologics benefits from the UK's strength in training scientists and the emphasis on interdisciplinary collaboration. Strong links with university groups, encouraged and supported by funding from the research councils, such as the BBSRC and the EPSRC, have resulted in a productive environment in which to carry out applied industrial research. The Networks in Industrial Biotechnology and Bioenergy, funded by the BBSRC, have been particularly beneficial in promoting collaborations between Green Biologics and academics from across the UK.



Innovate UK grant funding of just over £3 million since 2009 has been a key factor in supporting Green Biologics' long-term growth and securing over £100 million of investor funding.

Green Biologics benefits from R&D tax credits, which has allowed the company to focus on the development of their technology and retain talented staff. Green Biologics has also had the support of several Innovate UK grants, totalling a value of just over £3 million since 2009, which have been used to develop the company's sustainable solutions.