ANNEX F

SSAC REPORT – Engineering Biology: Opportunities for Scotland

Industrial Strengths and Future Growth Opportunities for Engineering Biology in Scotland

Executive Summary

Since 2014, Scotland has created small but growing cluster of companies deploying Engineering Biology in the production of novel products and services across multiple markets, from medicines to materials. Companies are predominantly micro or SME businesses, as would be expected for a still emerging sector.

The current cluster of core Engineering Biology companies is around 35 strong and most fall within a broad biomedicine theme. However, with world class research, benefiting from UKRI investments in Engineering Biology, a strong supportive innovation ecosystem, specialist research facilities, and scale up capability, Scotland is well placed to accelerate growth of its economy through application of Engineering Biology across a wide range of sectors.

Engineering Biology is a platform technology- what is today's biotechnology will be tomorrow's Engineering Biology, and those companies that fail to embrace the power of this platform will fail to remain competitive nationally and globally. In the near term (1-5 years), existing Scottish industrial sectors that can be fast tracked by Engineering Biology include Industrial Biotechnology (>147 companies) and Biopharmaceuticals (>150 companies). Longer term (5-20 years), and with necessary investment, regulatory changes and policy, the technology could accelerate other sectors such as agritechnology, feed/food and drink, materials and textiles and environmental protection.

Introduction

Engineering Biology is the practical and industrial application of synthetic biology for economic, social and public benefits. It is not an industrial sector per se but an enabling *technology platform* that can (and indeed does) benefit a wide range of market sectors from advanced therapies, food and feed, consumer goods, materials and textiles, fuels and even construction. It is an exciting and transformational technology platform, which has the potential to revolutionise product development, create more sustainable products with a lower carbon footprint, and address many global challenges around food, feed, energy and healthcare. With this definition in mind, this Annex offers a snapshot of the Engineering Biology sector in Scotland today but also attempts to capture its *potential* for the future.

The challenge of definitions

Few companies would define themselves as 'Engineering Biology' businesses, focused instead on articulating the value of their product or service to customers and

consumers in their target market; the method by which they design, develop or manufacture their product does *not* offer a business marketing advantage per se.

To further complicate this challenge, multiple definitions of Engineering Biology are currently used across industry, government, academia and professional bodies in the United Kingdom. Some are quite focused definitions, while others cast a much wider net around what companies might be included. This posed a challenge for doing a rigorous analysis of the Scottish Engineering Biology landscape and our ability to cross-check with other reports and industrial analysis. As a solution, we have used both narrow and wider interpretations of Engineering Biology to articulate both near and longer-term economic opportunities for Scotland.

Industry definitions used in this analysis

Synthetic Biology is the design, engineering and re-engineering of biologically based parts, devices, and systems. **Engineering Biology** is an evolution of synthetic biology, encompassing the wider capabilities of the biosciences, engineering, and the physical sciences to support the exploitation of synthetic biology knowledge for economic and public benefit. It is an interdisciplinary field that spans the entire innovation ecosystem, from breakthrough synthetic biology research to translation and application (UKRI definition).

For this analysis, we have allocated companies to tiers according to the following definitions:

Tier 1A: Companies directly implementing Engineering Biology principles today within their workflow to develop products and processes across a range of sectors. Also included are companies with a publicly stated interest in applying Engineering Biology but who might not define themselves as an Engineering Biology company. For example, companies recently winning funding from the UKRI Engineering Biology Missions Awards are included as this is a declared intent to apply the platform.

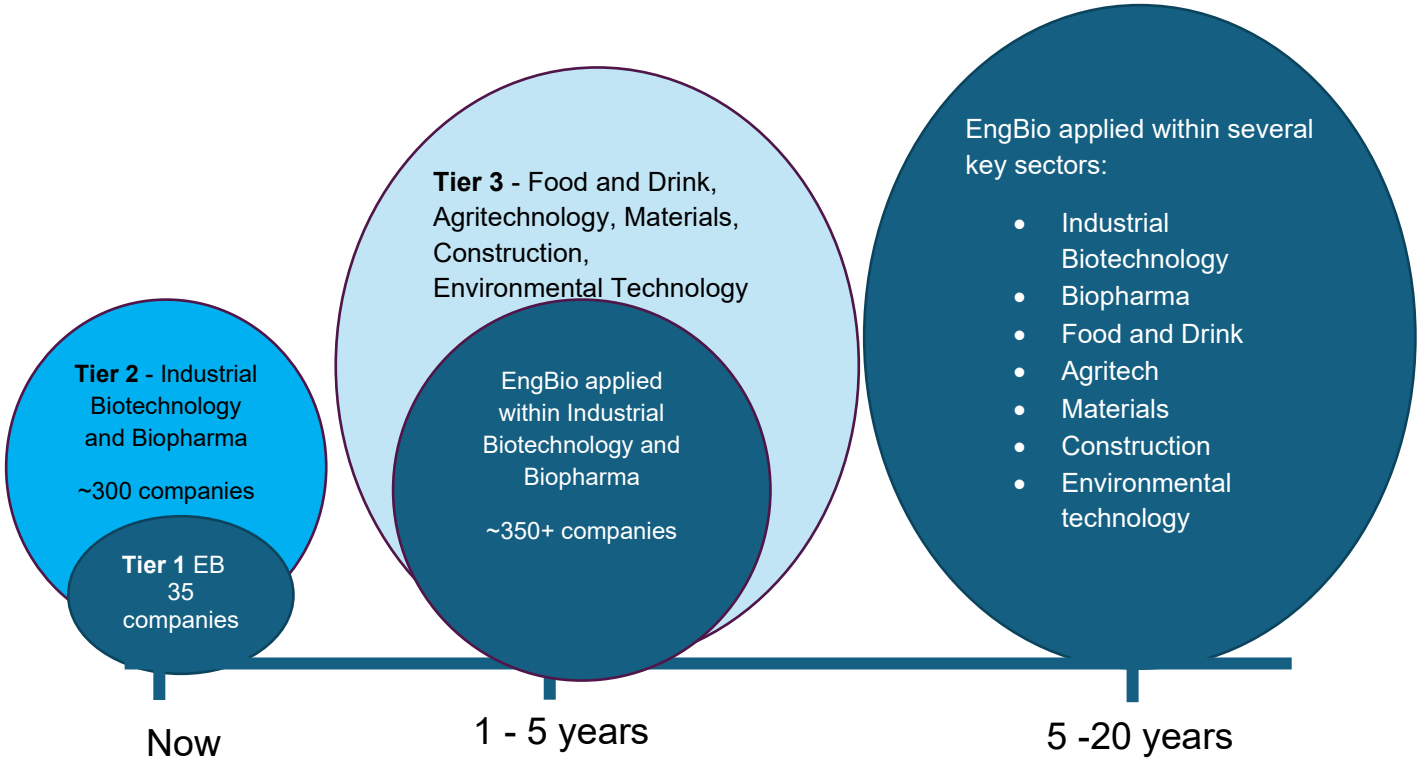
Tier 1B: Companies that directly, and specifically, support Engineering Biology through their products and services. This includes companies developing the enabling technologies (such as artificial intelligence/data, bioprocess development, DNA assembly) which are required to unlock the full impact of Engineering Biology, and those providing specialist manufacturing and services that are specific to Engineering Biology, such as DNA synthesis and sequencing.

Tier 2: Companies which could benefit from Engineering Biology in the short to medium term (1-5 years). Sectors that can most easily adopt and benefit from Engineering Biology with minimum or no regulatory change includes companies working within Industrial Biotechnology and Biopharmaceuticals and Advanced Therapies, both well-established sectors in Scotland.

Tier 3: Medium to long term (5-20 years) include companies in sectors such as food and drink, agriculture, materials and packaging, textiles and construction that might adopt Engineering Biology principles. The latter may require regulatory change, or

more extensive system-wide change of operation and infrastructure, so the opportunities for Scotland are less certain.

Figure 1: Current and Future Areas for Growth of the Engineering Biology Sectors



Industry sector categorisation

Within Tier 1A and B, companies are designated against one of the UKRI National Engineering Biology Programme application-inspired themes (Table 1), or as “Broad-scope research tools and services” for those with activities falling across multiple categories, or for those providing research tools and supporting technologies or services. Specialist manufacturing without an R&D component, such as DNA synthesis, would also be included in this tier as “Supply chain companies”, however Scotland does not currently have any companies listed within this category.

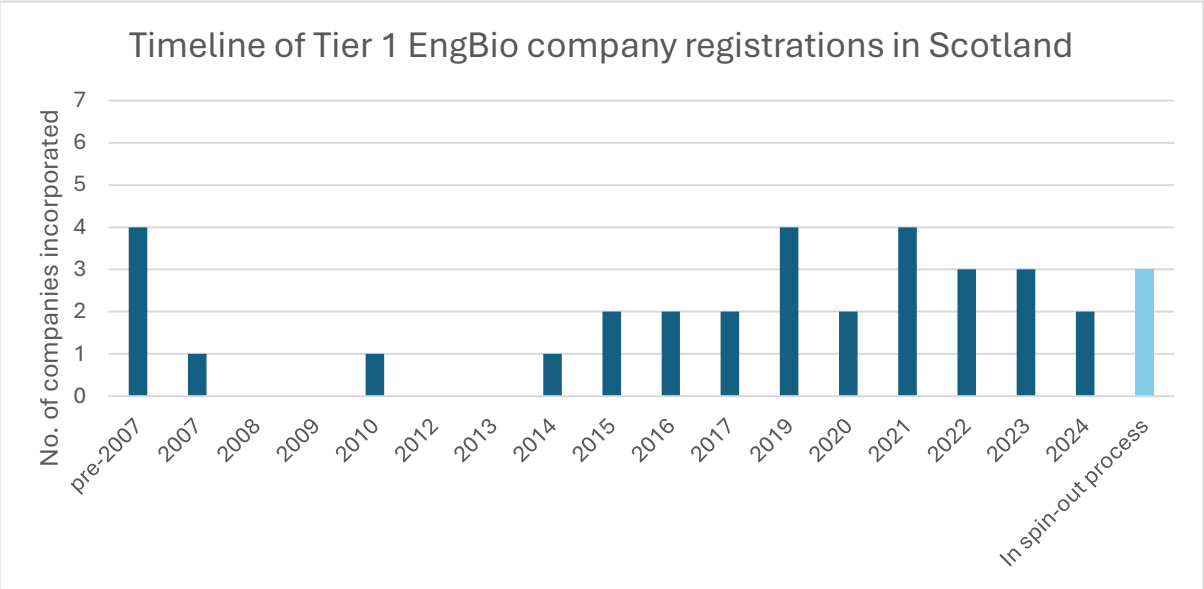
Table 1: Categorisation of the Scottish Industrial Landscape for Engineering Biology

UKRI Application-inspired themes	
Biomedicine	Enhancing human health through innovation in prevention, diagnosis and therapeutics
Clean Growth	Greener manufacturing, power and supply chain solutions
Food systems	Productive and sustainable food and farming solutions
Environmental solutions	Healthy, productive and resilient environmental solutions
Cross-cutting research, enabling technologies and supply chain companies	
Broad-scope/ Research tools and services	Companies providing research tools & services across multiple application sectors. For example, specialist contract research, development and manufacturing organisations (CRDMOs), companies developing enabling/platform technologies for Engineering Biology e.g. specialist AI tools, bioprocess development, tools for gene editing and protein expression etc.
Supply chain companies	Supply chain companies that are specific to Engineering Biology e.g. specialist manufacturing and services such as DNA synthesis

Engineering Biology Industrial Landscape

The first Engineering Biology companies were created over 20 years ago (e.g., Ingenza was founded in 2003) and there has been a slow but steady rise in annual company listing since 2014 (Figure 2) when the first Synthetic Biology for Growth Programme was launched by the UK Government. Scotland is now home to a small but growing base of companies deploying Engineering Biology. Most companies are micro businesses or SMEs.

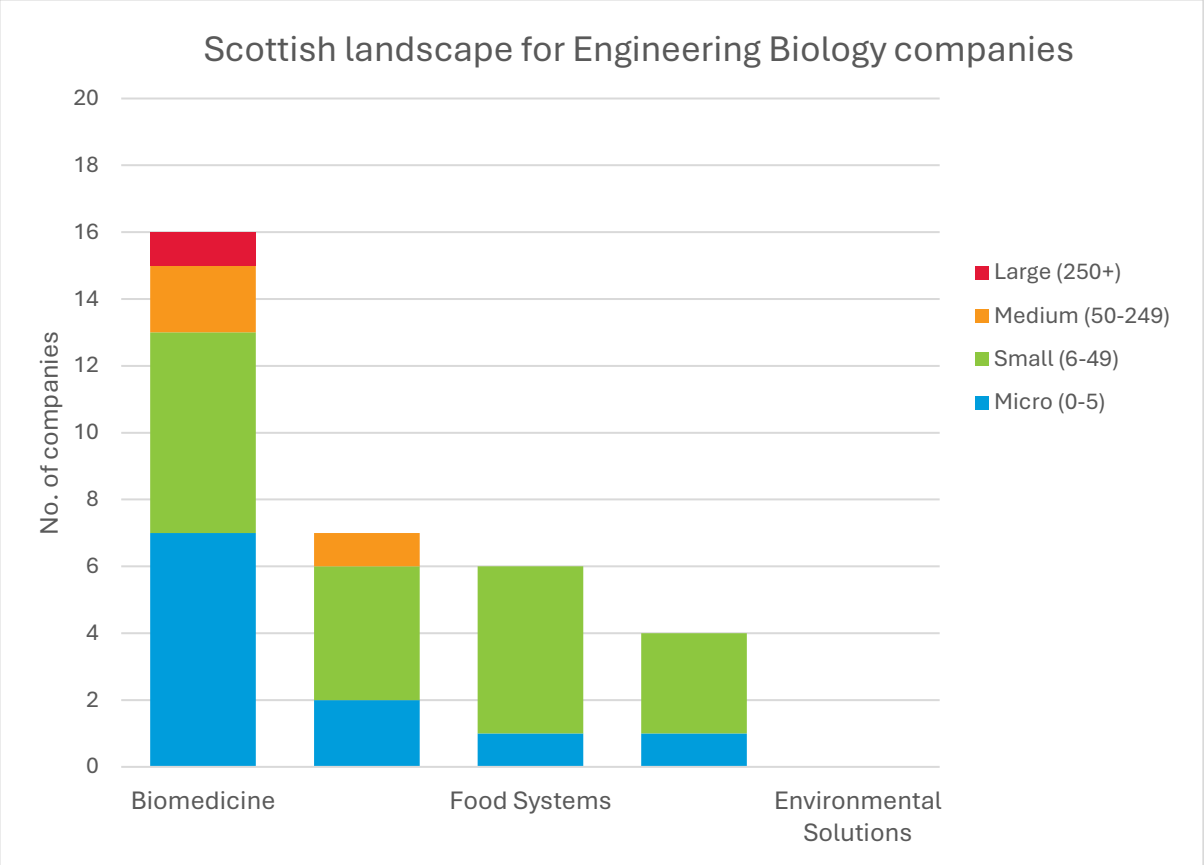
Figure 2: Timeline for Engineering Biology listings in Scotland (Tier 1 companies only)



Tier 1A companies (n=22) include Ingenza, Green Bioactives, Roslin Technologies, ScotBio, Xias Bio, EVA Biosystems, Prozymi Biolabs, Solasta Bio, and Beta Bugs. Tier 1B companies (n=13) fall within the supply chain/research services category including NCIMB, Lentitek, AskBio UK (Synpromics) and Concinnity Genetics. In these numbers and in **Appendix 1: Tier 1 company listings**, we have only included companies who have been public about their intention to apply Engineering Biology. For others this is commercially confidential.

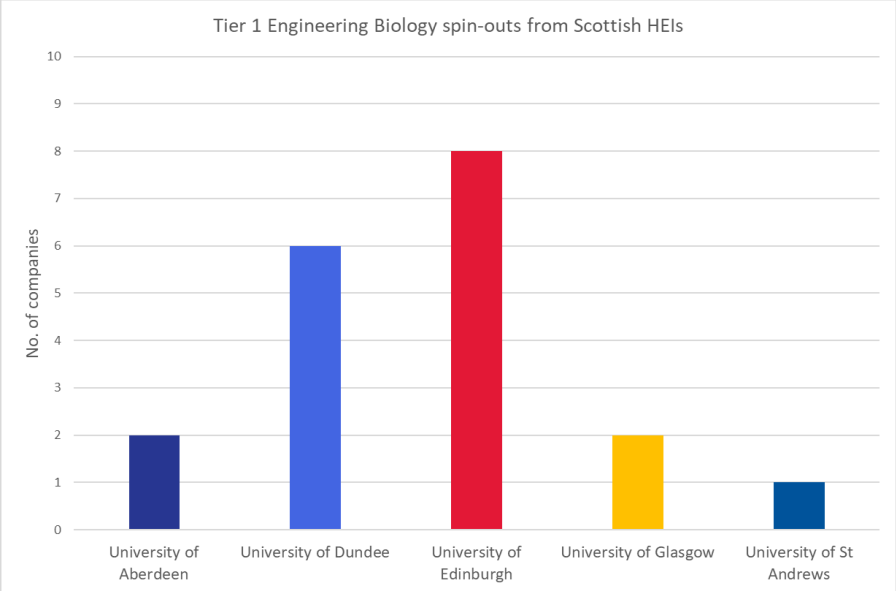
Most companies fall within the biomedicine theme (Figure 3), which mirrors the wider UK picture as described in the UK DSIT National Vision for Engineering Biology.

Figure 3: Engineering Biology company breakdown by theme



Over half (56%) of the Tier 1 Engineering Biology companies registered in Scotland started as spinouts from Scottish Universities, which reflects the strength of the research carried out within the Universities and the supportive innovation ecosystem (Figure 4). The majority (8) arose from the University of Edinburgh, which has the largest group of synthetic and systems biology in Scotland and one of the largest outside London. The University of Edinburgh is followed by the University of Dundee. Two high profile medium/large biomedicine spin-outs (Amphista therapeutics and Exscientia) were originally spin-outs of the School of Life Sciences at the University of Dundee but have since re-located to England, therefore they are not included in the current landscape in Figure 3. They are included in the statistics for Figure 2 and Figure 4 to reflect the relevant assets arising from Scotland's strengths in Engineering Biology.

Figure 4: Origins of Engineering Biology companies by host University



Articulating the potential for industry

Engineering Biology is the future of biotechnology, and so any sectors using biotechnology (e.g. DNA engineering, cell biology, molecular biology, plant breeding) could implement Engineering Biology processes into their research, development and manufacturing platforms. As an enabling technology that can be applied across multiple sectors, Engineering Biology is predicted to have impact across a much wider range of companies beyond Tier 1A/B.

Industrial Biotechnology and Biopharmaceuticals including Advanced Therapy Medicinal Products (ATMPs) are early adopters of Engineering Biology. Many of the Tier 1 companies fall within these broad sectors. We can therefore draw on pre-existing data from other industry sectors to provide an indication of the *potential* number of companies that could benefit from Engineering Biology in the near term.

Scotland launched a National Plan for Industrial Biotechnology in 2012, which has continued to be backed by the Scottish Government. The National Plan (revised in 2022) set an ambition to create a sector supporting 220 companies with an associated turnover of £1.2 billion by 2025. Industrial biotechnology is the application of modern biotechnology to the sustainable production of materials, chemicals, and fuels from living cells and/or enzymes and using renewable sources (either virgin biomass or using waste). Industrial biotechnology and Engineering Biology definitions and market applications are tightly associated: many industrial biotechnology processes could be improved or optimised though Engineering Biology paradigms. We might assume therefore, that the wider Engineering Biology capability and potential in Scotland has substantial growth potential aligned with that of the industrial biotechnology sector. The last published values in the National Plan for Industrial Biotechnology (2020) indicated that there were 147 industrial biotechnology companies in Scotland, employing >3000 direct employees. Current

analysis by IBioIC suggests this is growing and on track to meet its 2025 targets of 220 companies, >4000 employees and a £1.2 billion annual turnover[1].

The life sciences sector in Scotland is also world leading in the development of biologics and ATMPs, which includes vaccines, and cell and gene therapies. According to Life Sciences Scotland company directory[2], there are 97 companies working across vaccines, advanced therapies and biologics supply chain. All these companies fit within the wider UKRI Engineering Biology definition. Including the wider pharmaceutical and pharma services sector, who could benefit from improved drug screening offered by EngBio for example, brings the number up to >150[3]. This activity is supported by world class research in stem cells, regenerative medicine and mammalian cell synthetic biology, generating a rich pipeline of tools and platforms to develop next generation products and new companies.

In conclusion, Engineering Biology can be deployed across a wide variety of sectors, driving the creation of new products and new business opportunities and connecting to pre-existing and new supply chains. In Scotland alone, over 300 businesses in Industrial Biotechnology and Biopharma/ATMPs offer a substantial and growing opportunity for Engineering Biology. This is designated as Tier 2 in this report, articulating the latent but near term (1- 5 years) opportunity for growth (Figure 1).

Beyond that, on a longer (5-20 year) time frame, market sectors such as Food and Drink, Consumer Goods, Textiles and Materials, Water and the Environment, and Bioenergy, could also benefit from Engineering Biology solutions. There are already signs of growth in these market sectors, with exciting new businesses such as Roslin Technologies (cultivated meat), Solasta Bio (biopesticides) and EVA Biosystems (biodegradable plastics). However, changes in policy, regulatory pathways and consumer acceptance may be required to fully realise opportunities in these sectors.

[1] National Plan for Industrial Biotechnology, June 2022 update

[2] https://www.lifesciencesscotland.com/lss-company-directory

[3] ScotGov company data 2021: 157 companies acroos therapeutics, pharmaceuticals and pharma services/contract research.

APPENDIX 1: Tier 1 EngBio company listings

Methodology

Company size is defined according to the Scottish Government classification, with the addition of “micro” for the smallest companies [ref]:

Company size	Employees
Micro	0-5
Small	6-49
Medium	50-249
Large	250+

A spin-out company (otherwise known as a “tech-transfer start-up”) is defined as meeting condition 1 and at least one of conditions 2-4 below:

1. The company was set up to exploit IP developed by a recognised UK university;
2. The university owns IP that it has licensed to the company;
3. The university owns shares in the company;
4. The University has the right to purchase shares in the company at a later date.

Data sources included Pitchbook and UK Government Companies House database.

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Tier 1a

Biomedicine

Aptalink Therapeutics

Company No: Not registered yet
Enterprise Size: Micro
Incorporation/Registration: In process of spin-out
Company Website: https://aptalink.co.uk/
Location: Edinburgh
Additional Information: Spin-out of University of Edinburgh

Aptalink are developing novel RNA aptamer-based tools for research, diagnostic and therapeutic use. Aptamers are precision-engineered single-stranded RNA or DNA molecules which can bind to targets with high specificity. Aptalink are exploring applications for pinpointing cancer biomarkers, such as the binding of previously 'undruggable' cancer targets in a gene therapy context.

Elasmogen

Company No: **SC467513**
Enterprise Size: Small
Incorporation/Registration: 2014
Company Website: www.elasmogen.com
Location: Aberdeen
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional information: A spin-out from University of Aberdeen.

Elasmogen is a therapeutic biologics company developing dual-targeting products for difficult-to-treat autoimmune disease. Their soloMER® technology is protected by a portfolio of patents and they are currently progressing their lead first-in-class soloMER drug conjugate into clinical development.

Excellio Labs

Company No: **SC768276**
Enterprise Size: Micro
Incorporation/Registration: 2023
Company Website: www.excelliolabs.com
Location: Roslin, Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional information: A spin-out from the University of Edinburgh

Excellio Labs focuses on targeted drug delivery for precision medicine using engineered exosomes as tissue-specific drug (and nucleic acid) delivery systems, with therapeutic applications including cancer neurodegenerative and cardiovascular disease and regenerative medicine. They will offer these to pharmaceutical companies and to clinics offering advanced regenerative therapies. Their first route-to-market will be the cosmetic industry [ref].

GLOX Therapeutics
Company No: **SC760230**
Enterprise Size: Small
Incorporation/Registration: 2023
Company Website: www.gloxtherapeutics.com
Location: Glasgow
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology
- 72190 - Other research and experimental development on natural sciences and engineering

Additional Information: A spin-out from the University of Glasgow

GLOX therapeutics was built out of 20+ years of research into precision antibiotics. It is developing a pipeline of engineered precision bacteriocins to target drug-resistant pathogenic bacteria whilst preserving patients' gut microbiomes. It secured £4.3 million seed funding in 2023. Along with and a further £1 million grant in 2024 from PACE (a public-private initiative) and in 2025 a £0.5 million Life arc CDP grant to target pathogens associated with Cystic Fibrosis.

PhaSER Bio
Company No: **SC748032**
Enterprise Size: Micro
Incorporation/Registration: 2022
Company Website: https://www.phaserbio.com/
Location: Edinburgh
Nature of business (SIC):

- 62090 - Other information technology service activities
- 63120 - Web portals
- 71200 - Technical testing and analysis
- 72110 - Research and experimental development on biotechnology

Additional Information: A spin-out from the University of Dundee, developed in collaboration with CXR biosciences, Taconic Farms and Scottish Enterprise. Legal name Phaser Biomedical Ltd.

PhaSER biomedical is using a unique panel of transgenic mouse models humanised for pathways of drug metabolism to improve pre-clinical drug-discovery and development. By improving predictions of adverse drug/drug interactions and providing a platform for the more informed design of clinical trials, their models can reduce time lines and attrition, and reduce animal use. A longer-term goal of the company is to use these models to validate AI and mathematical computational approaches which predict the risk of adverse drug reactions in patients on polypharmacy.

The company is currently getting a high level of interest and engagement traction from major Pharma and medical charities e.g. the Bill and Melinda Gates Foundation, academic institutions and drug regulators.

Resolution Therapeutics
Company No: **11112568**
Enterprise Size: Medium
Incorporation/Registration: 2017/England
Company Website: www.resolution-tx.com
Location: Edinburgh/London
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: A spin-out of the University of Edinburgh. Previously known as Syncona Collaboration Ltd.

Founded by Prof Stuart Forbes at the University of Edinburgh, who pioneered regenerative macrophage cell therapy for liver disease. The company is based in the Centre for Regenerative Medicine on the Edinburgh Royal Infirmary Campus and they develop cell therapies for treatment of end-stage liver disease. In Nov 2024 they announced a major series B fundraise of £63.5 million. They enhance macrophage functionality through genetic engineering and have 3 pending patents.

RHAPSEDA
Company No: N/A
Enterprise Size: Micro
Incorporation/Registration: N/A
Company Website: www.linkedin.com/company/rhapseda/about/
Location: Dundee
Additional Information: A spin-out from the University of Dundee

RHAPSEDA is a company in the process of spin-out from the University of Dundee with funding from Scottish Enterprise's High Growth Spin Out Programme. The company aims to create a research and development vaccine business in Scotland. It has developed a bio-conjugation production platform for the efficient development of glycoconjugate vaccines which were traditionally difficult and expensive to create. Their initial focus is on developing universal StrepA vaccine candidates, which is a priority target from the WHO, with no existing vaccine.

Roslin Cell Therapies
Company No: **SC512315**
Enterprise Size: Large
Incorporation/Registration: 2015
Company Website: www.roslinct.com
Location: Roslin, Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

RoslinCT is a leading global contract development and manufacturing services organization (CDMO) focused on development of Advanced Cell and Gene Therapies. They were one of the first in the world to produce clinical-grade human pluripotent stem cells, and developed the First CRISPR-Edited Cell Therapy Product (exa-cel) for the treatment of sickle cell disease and transfusion-dependent beta thalassemia. They have 5 locations around Edinburgh, and also one location in Boston (USA).

Trogenix
Company No: **14930146**
Enterprise Size: Small
Incorporation/Registration: 2023
Company Website: www.trogenix.com
Location: Edinburgh/London
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: A spin-out from the University of Edinburgh

Trogenix are a clinical-stage biotech company engineering precision genetic medicines with potential for curative responses in solid tumours. Their proprietary "Odysseus" platform develops DNA elements called Synthetic Super-Enhancers which are selectively activated to only target diseased cancer cells. This is combined with a precision delivery system for potent, localised treatment. Trogenix combine controlled cell killing, immune modulation, and long-term protection to create new hope for previously uncurable diseases. They raised £12.5 million of venture funding in August 2024.

X-Genix
Company No: **SC689546**
Enterprise Size: Micro
Incorporation/Registration: 2021
Company Website: https://x-genix.com
Location: Fife
Nature of business (SIC):

- 74909 - Other professional, scientific and technical activities not elsewhere classified

Additional Information: A spin-out from the University of St Andrews.

Developer of a patented halogenase enzyme discovery platform technology, designed to harness the power of enzymes to replace some of the less environmentally friendly steps in pharmaceutical production.

Zythera
Company No: In spin-out process
Enterprise Size: Micro
Incorporation/Registration: 2023
Company Website: www.zythera.com
Location: Edinburgh
Additional Information: A spin-out from the University of Edinburgh. Part of the UKRI Engineering biology Mission Hub

ZYTHERA is revolutionizing enzyme replacement therapies (ERTs) for lysosomal storage diseases (LSDs) through the integration of artificial intelligence (AI) and engineering biology. Their approach addresses the limitations of current ERTs, which are often expensive, immunogenic, and slow to develop and aims to deliver more effective, affordable, and accessible treatments for patients with LSDs. At the core of ZYTHERA's platform is a proprietary generative AI model that designs and prioritizes

enzyme variants with optimal therapeutic properties, enabling the creation of diverse enzyme libraries. These variants undergo rapid screening using a high-throughput microbial system, allowing for the evaluation of hundreds of enzymes within weeks. Promising candidates are then produced in Chinese Hamster Ovary (CHO) cells, engineered for stable, single-copy genomic integration. This ensures the production of human-like enzymes with consistent quality.

Clean Growth

E.V.A Biosystems
Company No: **SC706113**
Enterprise Size: Micro
Incorporation/Registration: 2021
Company Website: www.evabiosystems.com
Location: Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

E.V.A Biosystems is using Engineering Biology to develop their products, which are intelligent biological additives that enable conventional plastics to self-degrade only when exposed to specific environmental triggers, such as seawater or landfill conditions. Their technology is designed to work with the low-cost, widely available plastics that are already in use, offering a scalable and practical route to tackling plastic pollution without disrupting existing manufacturing processes.

Green Bioactives
Company No: **SC618904**
Enterprise Size: Small
Incorporation/Registration: 2019
Company Website: www.greenbioactives.com
Location: Penicuik
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: A spin-out company from the University of Edinburgh, also known as “GBL”.

Green Bioactives is bioengineering plant cells to increase the production of high value natural products (secondary metabolites) in bioreactor-based biomanufacturing to generate ingredients used in diverse commercial applications e.g. for the cosmetic, pharmaceutical, food, and agricultural markets. They launched their first product (GBL-Memory) for the nutraceutical market in 2024. They completed seed funding in 2022, and received >£300,000 in grants from Scottish Enterprise and Innovate UK (Engineering Biology Collaborative R&D programme) in 2024 for the project “A bioengineered plant cell biomanufacturing platform for the sustainable production of a natural biopesticide” [ref]. They have 6 active and 5 pending patents.

ScotBio
Company No: **SC331585**
Enterprise Size: Small

Incorporation/Registration: 2007
Company Website: www.scotbio.com
Location: Livingston
Nature of Business (SIC):

- 21100 - Manufacture of basic pharmaceutical products

Additional Information: Legal name Scottish Bioenergy Cooperative Ventures Limited.

ScotBio is a Scottish biotechnology company that produces sustainable, algae-based ingredients for use in food, cosmetics, and therapeutics. They use patented LED lighting systems and closed-environment photobioreactors to precisely control algae cultivation, ensuring high-quality, contaminant-free products with superior nutritional value and functional properties, and have recently commissioned a first-of-its-kind 10,000-litre modular photobioreactor at their production facility in Livingston to facilitate scale-up to commercial production. With a 15+ year history of collaborating with leading UK academic institutions, ScotBio has also developed novel antiviral compounds and plant-based proteins through bioengineering the byproducts of algal cultivation, creating a multi-product bioproduction platform with the power to transform renewable energy and CO_2 directly into solutions to some of the biggest global challenges, such as food security, sustainability, and preparedness for present and future healthcare challenges.

Xias Bio

Company No: **SC657022**
Enterprise Size: Small
Incorporation/Registration: 2020
Company Website: www.xiasbio.com
Location: Glasgow
Nature of business (SIC):

- 72190 - Other research and experimental development on natural sciences and engineering
- 74909 - Other professional, scientific and technical activities not elsewhere classified
- 82990 - Other business support service activities not elsewhere classified

Xias Bio have a platform for the design, engineering and manufacturing of new multi-functional chimeric proteins, for applications in cosmetics, personal care and biotech. They currently have a range of eight protein products available for licensing, and also offer a bespoke protein design service. They raised £3.8 million Series Seed funding in 2024.

Food Systems

AquaGen Scotland Ltd

Company No: **SC551515**
Enterprise Size: Small
Incorporation/Registration: 2016
Company Website: www.aquagen.no
Location: Stirling

Nature of business (SIC):

- 01629 - Support activities for animal production (other than farm animal boarding and care) not elsewhere classified

Additional Information: Part of the AquaGen Group, which is headquartered in Trondheim, Norway and founded in 1985. AquaGen (Company no: 964367701) is an operating subsidiary of EW Group (acquired in 2013).

Developer and supplies genetic starting material and fertilized roe to the global aquaculture industry. AquaGen Scotland are engaged in producing Atlantic Salmon with targeted breeding and selection for their production potential in Scottish waters. AquaGen works closely with two of Scotland's largest salmon farming companies, Cooke Aquaculture Scotland and Scottish Sea Farms.

BetaBugs

Company No: **11000463**
Enterprise Size: Small
Incorporation/Registration: 2017
Company Website: www.betabugs.uk/
Location: Roslin, Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: Registered in England but headquartered in Edinburgh.

Beta Bugs is an insect genetics company that develops and distributes black-soldier fly genetics to the insect farming industry as a sustainable alternative to current sources of protein for animal feed. This rapidly developing industry, accelerated by participation from waste processors, retailers and food manufacturers, transforms agricultural and industrial waste into a green, circular and regionally produced nutrient-rich ingredient for the pet, aqua and livestock sectors, in the process displacing environmentally damaging fishmeal and soymeal.

The business is based at the Easter Bush Campus, where it has based its breeding programme, benefiting from active collaboration with the Roslin Institute on insect genetics. Pilot manufacturing operations are sited in Loanhead, Midlothian and used to supply the UK market with Beta Bugs product. Further manufacturing capacity is being brought on-stream in line with market growth. Ultimately, the business' ambition is to be the world leader in Black Soldier Fly genetics, positively impacting the entire sector by increasing the yield from insect farming facilities.

To date, business growth has been supported through a combination of private sector funding from Tricapital Angels Limited, and high-net worth individuals from the agri-food and life sciences sector, along with co-investment from public sector funders Scottish Enterprise and InnovateUK

Biomara

Company No: **SC726610**
Enterprise Size: Micro
Incorporation/Registration: 2022
Company Website: https://www.biomara.tech/
Location: Edinburgh

Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

BioMara applies engineering biology by designing, scaling, and commercialising biology-derived products. Specifically high-purity fucoidan and functional food ingredients from sustainably harvested seaweed. Using proprietary extraction technologies that retain fucoidan bioactivity and molecular structure and a zero-waste biorefinery model, BioMara uses synthetic biology tools to deliver alternatives to existing health and food products to transform these sectors.

Prozymi Biolabs

Company No: **SC688453**
Enterprise Size: Micro
Incorporation/Registration: 2021
Company Website: www.prozymibiolabs.com
Location: Roslin, Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: A spin-out from the University of Edinburgh.

Prozymi Biolabs is a biotech company that develop an enzyme technology for degradation of toxic parts of gluten, enabling the production of gluten-free bread made from wheat. They are currently in a product development phase and the R&D activities of the company are mainly focussed on engineering biology approaches for development of enzyme solutions. They received seed funding from the University of Edinburgh Data Driven Entrepreneurship program in 2021, and further grants from Scottish Edge and Scottish Enterprise in 2022. Since then, Prozymi Biolabs have been recipients of many awards and have also participated in various accelerator programmes.

SOLASTA Bio

Company No: **SC661647**
Enterprise Size: Small
Incorporation/Registration: 2020
Company Website: www.solastabio.com
Location: Glasgow
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional information: A spin-out from the University of Glasgow

SOLASTA Bio produces peptide-based biopesticides to provide precision-targeted pest control for the agricultural industry that is at least as effective as traditional chemical insecticides. They raised £10.8 million in their Series A funding round in 2024 [ref]. They have 2 active and 11 pending patents.

Roslin Technologies

Company No: **SC529447**
Enterprise Size: Small
Incorporation/Registration: 2016

Company Website: www.roslintech.com
Location: Roslin, Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional information: A spin-out from the University of Edinburgh

Roslin Technologies are a biotech company focused on developing and commercialising stem cell technology for animal species. In particular, they develop induced pluripotent stem cells and embryonic stem cells for the emerging cultivated meat market (cultivated meat is meat grown directly from animal cells in a bioreactor). They were the first company to commercialise pluripotent stem cells and their team specialises in cell banking, media formulation and bioprocess optimisation for large-scale production. They are the leader in cell line supply for cultivated meat globally and have customers/partners in North America, Europe and Asia.

Broad-scope research tools and services

CEXAL
Company No: **SC685963**
Enterprise Size: Micro
Incorporation/Registration: 2021
Company Website: www.cexal.com
Location: Edinburgh
Nature of business (SIC):

- 32500 - Manufacture of medical and dental instruments and supplies
- 71122 - Engineering related scientific and technical consulting activities
- 72110 - Research and experimental development on biotechnology
- 77400 - Leasing of intellectual property and similar products, except copyright works

CEXAL is a biotech start-up developing point-of-need biosensor-based diagnostics. They have developed a range of molecular assays based on DNA probes for bacterial testing (genotyping and phenotyping) and small-molecule analysis. They are partners on one of the UKRI Engineering Biology Collaborative R&D programme projects “Optimisation of CAS-based rapid microbial biosensor”

Ingenza
Company No: **SC237393/SC425526**
Enterprise Size: Medium
Incorporation/Registration: 2002
Company Website: www.ingenza.com
Location: Roslin, Edinburgh
Nature of business (SIC):

- 74909 - Other professional, scientific and technical activities not elsewhere classified
- 72110 - Research and experimental development on biotechnology

Additional information: Originally a spin-out company from the University of Edinburgh. Also named “Ingenza Biologics”.

A contract research and Development and Manufacturing organisation (CRDMO) with expertise in engineering microbial strains and mammalian cell lines for production of biologics, small molecules and natural products. Widespread applications across biomedicine, pharma, clean growth and sustainable biotechnology and biomanufacturing. They recently announced plans to move to new custom-built facilities in 2025, expanding to over double their footprint to 25,000 sq ft and creating 50 new jobs [ref]

Tier 1b

Biomedicine

AskBio UK (Synpromics)

Company No: **SC384375**
Enterprise Size: Medium
Incorporation/Registration: 2010
Company Website: www.askbio.com/
Location: Roslin, Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: Formerly “Synpromics”. Acquired in 2019 by parent company Asklepios BioPharmaceutical (AskBio) who are a wholly owned, independently operated subsidiary of Bayer AG (US).

The company focuses on improving integrated gene therapy through data-driven design. Their platform includes a high-yield cell line, an expansive capsid library and a synthetic promoter library and bioinformatics database, enabling product-specific promoter design and selection. They have 162 patents and patent applications for gene therapy development, clinical processes and manufacturing.

Concinnity Genetics

Company No: **SC786187**
Enterprise Size: Micro
Incorporation/Registration: 2023
Company Website: www.concinnitygenetics.com/
Location: Edinburgh
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology

Additional Information: A spin-out from the university of Edinburgh

Concinnity Genetics designs novel control mechanisms for the cell and gene therapy market using our innovative AI platform and synthetic biology expertise. Their platform enables the design, building and screening of large & complex libraries of RNA-based control systems, outperforming conventional methods in size, speed and efficacy. These control systems enable the precise control of the therapy in response to a diverse range of small molecule inducers, which is already enabling substantial improvements over previous best-in-class RNA-based control systems. This small molecule control can result in a diverse range of behaviours including responsiveness to clinically administered FDA-approved drugs, patient disease state or tissue localisation. By enabling precise control mechanisms, Concinnity’s unique RNA-based systems will transform the safety of cell and gene therapies.

Lentitek

Company No: **SC633239**
Enterprise Size: Small
Incorporation/Registration: 2019
Company Website: www.lentitek.com
Location: Edinburgh

Nature of business (SIC):

- 21100 - Manufacture of basic pharmaceutical products
- 71200 - Technical testing and analysis
- 72110 - Research and experimental development on biotechnology
- 74909 - Other professional, scientific and technical activities not elsewhere classified

Lentitek has developed a unique manufacturing technology that can improve the production quality of the lentivirus vector used in advanced therapies such as CAR-T and gene therapies. Their technology uses a novel promoter that can significantly reduce issues such as vector genome splicing and payload breakthrough expression. It has successfully demonstrated proof-of-concept and secured private funding, and is currently seeking application partners for its technology.

Platinum Discovery
Company No: **SC593948**
Enterprise Size: Micro
Incorporation/Registration: 2018
Company Website: https://pt-discovery.com
Location: Dundee
Nature of business (SIC):

- 62090 - Other information technology service activities
- 72110 - Research and experimental development on biotechnology

Additional Information: Founded in 2019 as a sub-brand of Platinum Informatics Ltd and now a standalone company, Platinum Discovery Ltd. A spin-out of the University of Dundee.

Platinum Discovery Ltd is a research partner focused on accelerating the development of cancer vaccines and autoimmune therapies. Through employing modern proteogenomics, advanced biologics, and data science technologies, Platinum Discovery expedite the identification of novel drug targets, biomarkers, neoantigens, and therapeutic strategies, thereby accelerating the development of effective and personalised treatments. They also directly implement Engineering Biology principles within their workflow to develop products and processes, specifically in drug discovery and oncology vaccine development.

REPROCELL Europe Ltd
Company No: **SC231284**
Enterprise Size: Small
Incorporation/Registration: 2002
Company Website: https://www.reprocell.com/about
Location: Glasgow
Nature of business (SIC):

- 71200 - Technical testing and analysis

Additional Information: Previously Biopta Ltd, acquired by REPROCELL Inc. in 2016 (Japanese biotech company)

REPROCELL offer access to products and services in the field of engineering biology. They manufacture three-dimensional bioengineered human tissues, primarily based on their proprietary Alvetex® technology and stem cell technologies. The markets for this technology are primarily drug discovery, preclinical drug testing, consumer product testing (e.g. chemicals, cosmetics) and academic research in life sciences. They offer services as a contract research organisation, primarily for drug screening for pharma companies. REPROCELL's labs in Glasgow and Durham can conduct tests of safety and efficacy in their bioengineered tissues, or in patient-derived fresh tissues. They also sell a range of products to enable researchers to more easily bioengineer human tissues in their own laboratories.

RoukenBio

Company No: **SC822502**
Enterprise Size: Medium
Incorporation/Registration: 2024
Company Website: https://rouken.bio/
Location: Motherwell, North Lanarkshire
Nature of business (SIC):

- 74909 - Other professional, scientific and technical activities not elsewhere classified

Additional information: Previously Antibody Analytics (founded 2015)

RoukenBio support the global drug development industry with pre-clinical research, to enable clients to select the therapeutic candidates with the best *in vitro* safety and efficacy profiles to progress to clinical testing in patients. Engineered cell lines are often critical through the drug development journey. RoukenBio provide tailored solutions for recombinant cell line generation, gene expression modulation, gene editing and reporter cell line development, supporting target validation, drug screening and mechanistic studies. Their extensive, continually updated in-house catalogue includes a wide range of pre-developed, engineered mammalian cell lines. They also develop new molecule biology tools for advanced cell engineering (*in vitro*) to generate cell lines of specific characteristics to aid candidate selection.

TenBio

Company No: **SC642032**
Enterprise Size: Small
Incorporation/Registration: 2019
Company Website: www.ten-bio.com
Location: Dundee
Nature of business (SIC):

- 86220 - Specialists medical practice activities

Additional Information: Spin-out of University of Dundee

Ten Bio's proprietary *TenSkin*™ model — a high-fidelity, full-thickness human skin platform — enables the scalable, human-relevant testing of engineered biologics, gene and cell therapies, live microbial products, and synthetic biology-based formulations. Their platform supports both academic and industrial innovators who are engineering new biological constructs, facilitating a more predictive and ethical pathway to clinical translation.

Broad scope research tools & services

Chromatin Bioscience
Company No: **SC502581**
Enterprise Size: Micro
Incorporation/Registration: 2015
Company Website: https://www.chromatinbio.com/
Location: North Berwick
Nature of business (SIC):

- 74909 - Other professional, scientific and technical activities not elsewhere classified

Chromatin Bioscience is a biotechnology company applying engineering biology to develop synthetic gene control systems that enable precise, cell-type-selective, and durable expression of therapeutic genes. Their proprietary platform, chromatinLENS, integrates epigenomic data and computational design to identify natural gene regulatory elements and engineer synthetic promoters. These are tailored for specific applications across gene and cell therapy, bioprocessing, agritech, and industrial biotechnology and contribute to improving safety, efficacy, and scalability for the bioeconomy.

EpitogenX
Company No: **14361802**
Enterprise Size: Small
Incorporation/Registration: 2022/England
Company Website: https://epitogenx.com/
Location: Aberdeen
Nature of business (SIC):

- 64209 - Activities of other holding companies not elsewhere classified

Additional Information: EpitogenX is a holding company, parent of the earlier established Vertebrate Antibodies (VAL), also based in Aberdeen.

EpitogenX utilise their proprietary technology mainly to produce multiplex stable antigens for accurate serology testing for in-lab and point-of-care diagnostic/testing systems. Their technology is based around two key platforms: their EpitoPredikt™ AI software for identification of immunodominant epitopes, and the EpitoGen® bioengineered recombinant scaffold for epitope/antigen display which forms the basis of their diagnostic assays. They also offer services to researchers in antibody development and validation, epitope mapping, recombinant protein production, directed evolution, and consulting at their ISO 9001 certified facilities. They are partnered with the University of Aberdeen.

Impact Solutions
Company No: **SC230837**
Enterprise Size: Small
Incorporation/Registration: 2002
Company Website: www.impact-solutions.co.uk
Location: Livingston
Nature of business (SIC):

- 74909 - Other professional, scientific and technical activities not elsewhere classified

Additional Information: Impact Solutions spun-out of BP Chemicals in 2002.

Impact Solutions is an independent UKAS laboratory and Innovation Centre that has over 20 years of experience driving innovation in waste valorisation, recycling, and sustainability. As part of company's evolving strategy, an interdisciplinary team of researchers is exploring the application of Engineering Biology to create sustainable technologies and high-value products. They are partners with the **University of Edinburgh** on two of UKRIs Engineering Biology Collaborative R&D programme projects, specifically focussing on using Engineering Biology to develop low-cost bio-enzymatic processes that transform waste feedstocks, such as fish waste, into high-value chemicals for the lubricants industry. They are also applying Engineering Biology to the rapidly growing field of biodegradation testing for polymers in liquid formulations (PLFs). Through an Innovate UK Knowledge Transfer Partnership with **Heriot-Watt University**, Impact Solutions is developing novel testing approaches that combine enzyme immobilisation with continuous flow chemistry, dramatically reducing biodegradation timelines from months to hours.

Moredun Scientific

Company No: **SC107439**
Enterprise Size: Small
Incorporation/Registration: 1987
Company Website: https://moredun.org.uk/moredun-scientific
Location: Penicuik Science Park
Nature of business (SIC):

- 72110 - Research and experimental development on biotechnology
- 75000 - Veterinary activities

Moredun Scientific is a contract research organisation specialising in animal health and aquaculture product development and biosafety testing of biopharmaceuticals. Their services most relevant to Engineering Biology include (i) proof of concept and clinical trials for vaccines (which are often created through engineering biology) for livestock and farmed fish. (ii) Biosafety testing of biopharmaceuticals (many of which have been created using engineering biology).

NCIMB

Company No: **SC078368**
Enterprise Size: Small
Incorporation/Registration: 1982
Company Website: www.ncimb.com
Location: Aberdeen
Nature of business (SIC):

- 72190 - Other research and experimental development on natural sciences and engineering

Additional Information: Previously named "The national collections of industrial and marine bacteria" (1959-1982)

NCIMB is a biotechnology company housing the UK's largest public repository of bacterial reference strains for research and biotechnology applications. They offer

storage/preservation, microbiology and lab services, specialist media, quality control products and multispecies microbial ecotoxicity tests. They invested in next generation sequencing capability in 2017 and they are partners on one of UKRI's Engineering Biology Collaborative R&D programme projects "Harnessing the power of engineering biology to develop and translate novel live biotherapeutics"