Department for Science, Innovation and Technology—written evidence (ENB0011)

1. What are the UK's key strengths in the area of engineering biology?

1. The UK is a leader in engineering biology (EngBio), thanks mainly to early, forward-thinking investment by government over the last decade and the strengths of our biopharmaceutical sector.
2. Compared to peer countries the UK has a strong performance in engineering biology-related investment and research:
    a. The UK has founded more biotechnology companies than any other nation in Europe, where the UK also has the most funding from venture capital and Initial Public Offerings (IPO).[1]
    b. The UK ranks third worldwide behind the US and China for total investment raised between 2017 to 2022, totalling over £5.2 billion.[2]
    c. The UK ranks fourth by field weighted citation impact among the top ten nations producing engineering biology scholarly outputs across 2018-22.[3]
    d. The UK ranks fifth worldwide for the number of academic papers produced in engineering biology between 2018 and 2022, behind China, the US and India, and narrowly behind Germany.[4]
3. The UK engineering biology sector demographics give an indication of the sector's shape.
    a. There are 1,162 UK Engineering Biology firms as of December 2023, spanning those applying engineering biology and those in the engineering biology supply chain.[5]

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[1] *The UK Biotech Sector,* McKinsey (2021)

[2] As defined by a Government Office for Science "Engineering Biology" developed keyword search of the Pitchbook investment database. *The most significant sources that contribute to the $6.8 bn over the period are: Later-stage VC (27%), Early-stage VC (19%), Mergers and acquisitions (19%), PIPE transactions (13%), IPO (7%), Buyout (5%)*

[3] See footnote 3 above.

[4] Government Office for Science developed keyword search adapted by DSIT for the SciVal database.

i. Among UK EngBio applications firms (707) the subsector with the most firms is *Health & Life Sciences* (576), with all *non-Health* subsectors together having 131 firms.
ii. Among UK EngBio supply chain firms (726), the largest subsectors are *Small Scale Manufacturing* (261) and *Biological Materials & Reagents* (160).

b. Among UK firms applying EngBio, there are 181 spinouts, with certain institutions spinning out a large proportion of these: Oxford (35), Cambridge (20) and UCL (13).[6]
c. Among High-Growth UK firms applying EngBio in the last decade, 50 have "exited" the UK private market, either via an acquisition or initial public offering (IPO).[7]

4. The UK has demonstrated leadership in the key innovations powering engineering biology.
    a. The rapidly falling cost and access to DNA sequencing has allowed for the assembly of large bioinformatic data sets. The UK's Oxford Nanopore has pioneered handheld nucleotide sequencing devices of superior sequence accuracy and length.
    b. The deployment of computational power, AI and machine learning on these datasets has allowed researchers to predict the relationship between DNA sequence, protein folding and, ultimately, protein functions. Tools such as DeepMind's AlphaFold were developed in the UK for this purpose.
    c. An ability to write custom DNA sequences cost-effectively will be critical to making the most of these new capabilities. UK firms like Evonetix and Touchlight are making major advances in synthesising DNA at greater lengths and larger volumes.

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[5] DSIT developed Real Time Industrial Classification using The Data City. See Figure 3 in the EB Vision & Technical Annex.
Note: Firms can be in multiple subsectors (16% have more than one classification), and one subsector (*Nuclotide Sequencing & Synthesis)* is classified as an EB Application & Supply Chain firm, so the above figures will not sum to the 1,162 total.
[6] *Exploring the UK's Engineering Biology Companies (Page 11),* Beauhurst (Feb 2024)
[7] *Exploring the UK's Engineering Biology Companies (Page 10),* Beauhurst (Feb 2024)

d. Powerful gene editing techniques such as CRISPR-Cas9 will empower new innovations. UK innovators were early adopters of these techniques, particularly in plant and mammalian cells.

5. The government sees significant economic opportunities for the UK in health, agriculture and food, chemicals and materials and low carbon fuels. Altogether, they could achieve $2-4 trillion globally of economic impact per year within the next 2 decades.[8] Our strengths in these areas are demonstrated by several promising companies:
    - Bit.bio (Cambridge) provide human cells to accelerate research, drug discovery and cell therapy discovery.
    - Colorifix (Norwich) modifies microorganisms to produce pigments for dying fabrics, reducing the carbon and water impacts of the dye process.
    - C3 Biotech Ltd (Manchester) have developed a method for the production of a cleaner, drop-in sustainable aviation fuel that can be manufactured on-site at point of use.
    - Tropic Biosciences (Norwich) are producing gene edited banana plants resistant to the TR4 pathogen that is decimating global crops.
    - Celtic Renewables (Edinburgh) – are manufacturing chemicals from waste at a new factory in Grangemouth
6. Government is looking at how best to support further growth of this critical technology with the ambition of creating a thriving engineering biology ecosystem within the UK.

[8] *The Bio Revolution: Innovations transforming economies, societies, and our* lives, McKinsey (2020)

2. What are the key applications for engineering biology?

7. The key applications for engineering biology can be grouped into the following categories:
    a. **Healthcare.** In health, engineering biology has been central to driving innovation especially in the last 25 years. It carries the potential for improved patient outcomes through more precise, personalised therapies such as CAR-T cancer therapy, and in cutting edge developments such as artificial organs and smart drugs. Government, through the Department of Health and Social Care and DSIT, is collaborating on mRNA vaccines and therapies with Moderna and BioNTech as well as investing in earlier diagnostics in Precision Medicine and targeted immunotherapies through the Cancer Mission. This includes support for the Coalition for Epidemic Preparedness Innovations (CEPI) which supports R&D against epidemic and pandemic threats including Ebola, Lassa fever and the largest portfolio of coronavirus vaccines. CEPI is a key implementing partner of the 100 Days Mission to reduce the time it takes to develop new vaccines and other medical products.
    b. **Chemicals and materials.** Engineering biology can create existing chemicals and materials more sustainably, as well as entirely new chemicals that are difficult to create through chemistry alone. The Department for Energy and Net Zero, the Department for Business and Trade and the Department for Environment Food and Rural Affairs are considering how sustainable biomass can be used to reduce the carbon emissions of the chemicals sector. This includes how the economy can use waste streams in a more economical way, creating a circular carbon bioeconomy.
    c. **Agriculture and food.** Defra's Genetic Technology (Precision Breeding) Act 2023 has unlocked opportunities to apply engineering biology for farmed plants and animals with gre

ater resistance to pests, disease, and environmental challenges. New veterinary vaccines and diagnostics are also in development that will provide tools against high priority animal pathogens and zoonotic diseases, such as avian flu, enabled by engineering biology. Internationally, the UK has co-funded the Consultive Group for International Agricultural Research (CGIAR) Programme: Accelerating Crop Improvement Through Genome Editing. The tools of engineering biology are being used for the development and manufacturing of alternative proteins, including cell-cultivated protein (CCP, also known as 'cultivated meat'). It has the potential to create protein with significantly reduced land use, greenhouse gases, and ecological impact than traditional meat products.

d. **Low carbon fuels.** Engineering biology can create new supplies of low carbon fuels that can be used for aviation as well as in cars. The Department of Transport have invested £25 million into LanzaTech UK's new facility in Port Talbot which will convert steel mill off-gases into ethanol and then uses alcohol-to-jet technology to produce sustainable aviation fuel.
e. **Waste and environment.** Engineering biology has diverse applications in waste valorisation. Most commercial examples in the UK convert organic waste feedstocks to ethanol, animal feed, fertiliser, and biogas. However, the bioleaching of metals from electrical waste is one emerging area of particular interest. These processes have the potential to extract valuable metals, such as gold and platinum from a range of waste electricals. A handful of companies globally are developing or applying new technology in this area and are seeing the early signs of commercial success. With support,

commercial applications could expand to extract a larger variety of metals more efficiently from these wastes.

f. **Defence**: Engineering biology presents the Ministry of Defence with significant opportunities to develop novel military capabilities, enhance existing capabilities and reduce our carbon footprint. The Ministry of Defence is also investigating the potential of engineering biology derived materials to overcome current physical limitations of equipment and supply chain shortages.

3. How can Government policy support the development of engineering biology?

8. Government committed to develop a strategic approach to engineering biology in the Science and Technology Framework (March 2023).
9. In December 2023 DSIT published the National Vision for Engineering Biology. The Vision outlines the UK's approach to engineering biology policy; namely to have a broad, rich engineering biology ecosystem that can safely develop and commercialise the many opportunities to come from the technology and the underlying science.
10. Its key announcements were:
    a. **A commitment to spend £2 billion on engineering biology** over the next ten years.
    b. **A new Engineering Biology Steering Group** to bring together both the current and the next generation of academic, start-up and industry leaders.
    c. **£5 million for the Engineering Biology Sandbox Fund** which will support projects that accelerate regulatory reforms for engineering biology-derived products and improve the quality of decision-making when assessing these products.
11. The government is also making plans to deliver the six different pillars of the vision:
    a. **World-leading R&D**: The government will target public investment towards world-class R&D on the critical challenges and foundational research that will enable innovation breakthroughs and the creation of new products. It will invest £2 billion over the next ten years in engineering biology. Since the publication of the Vision UKRI has confirmed a £100 million investment into mission-led engineering biology projects. This involves projects aimed at societal challenges such as food security and net zero. The £100 million is spread across six Mission Hubs and a series of Mission Awards.

b. **Infrastructure**: The government will invest in UK infrastructure to reduce the costs of both the early stages of engineering biology innovation, and its scale-up. It will also develop a plan for UK facilities supporting start-ups and scale-ups.
c. **Talent and skills**: Engineering biology, being a broad technology, has a diverse and often niche talent need. We are mapping the talent landscape to build our understanding and identify impactful policy interventions. DSIT is working with the Department for Education (DfE) to support developing the pipeline of individuals studying and working in priority sectors, including those taking up apprenticeships. In March, the Engineering and Physical Science Research Council and Biotechnology and Biological Sciences Research Council announced a new Centre for Doctoral Training in Engineering Biology (EngBio CDT) as part of a £1 billion investment into new CDTs. The new CDT will train the next generation of engineering biology talent, focusing on how engineering biology concepts and technologies can be translated into products with real-world impact.
d. **Regulation and standards**: The government will work across government and with all relevant regulatory and evaluation bodies to ensure that the UK's regulatory and evaluation landscape will help engineering biology-derived products to reach the market. Using the new Engineering Biology Regulators' Network, government will implement a set of regulatory sandboxes to create pathways for this to happen.
e. **Adoption in the wider economy**: We will foster a cohort of investors and customers who are well-informed about engineering biology's potential, and a pipeline of firms who understand potential customers' priorities. We will hold a showcase of the most exciting engineering biology firms. Government sector teams will raise awareness of engineering

biology across their sectors to ensure the pull through of products and services.

f. **Responsible and trustworthy innovation**: As outlined in the 2023 Biological Security Strategy, we will make the UK a world leader in responsible innovation by 2030. Government will lead an open dialogue on the benefits, challenges and risks of the technology, encouraging a renewed commitment to responsible research and innovation. We will work with allies and partners to shape international norms and standards, including through multilateral fora.

12. The £2 billion commitment will be deployed by partners across government. We will adapt spend over the decade to ensure that UK support is keeping pace with technology evolution, and future investment into engineering biology will be shaped by the emerging opportunities of the technology as it develops. Current examples of how engineering biology is currently supported include:

    a. UKRI's Engineering Biology Mission Hubs and Awards, and collaborative R&D grants to SMEs
    b. Projects within DEFRA's Farming Innovation Programme
    c. DFT's Advanced Fuels Fund investment into sustainable aviation fuel production at Port Talbot.
    d. DHSC and the National Institute of Health and Care Research's Biomedical Research Centres
    e. FCDO research funding for Product Development Partnerships and other development-focussed research initiatives

4. How can the UK maximise the economic potential of developments in engineering biology?

13. Engineering biology often requires intensive capital investment. Such investment is needed to build and operate the pilot manufacturing capabilities for demonstrating proof of concept, and then for large-scale manufacturing facilities.
14. A credible path to profitability is a key element that investors consider when deciding to back a firm, and having relationships with large customers is an important way to demonstrate that credibility. At the same time, potential customers need assurance SMEs can deliver product to the agreed quality and volumes, necessitating major capital investments.
15. Government should support UK engineering biology firms to attract both financial investors and customers. This will involve building on technology-agnostic business finance schemes such as those offered through the British Business Bank, and Innovate UK, while also ensuring that our firms can access safe sources of foreign investment.
16. Some examples of how Government is supporting the sector by building networks and communities are:
    a. Key figures from engineering biology companies, industry, innovators, prospective investors were brought together on the 18th of April as part of an engineering biology investment networking event.
    b. HMG officials, Innovate UK and a delegation of UK companies, and other sector organisations are attending SynBioBeta (the world's largest engineering biology conference) in May 2024 to help attract new business connections for UK companies and draw more investment into the UK
    c. To promote the UK sector to internationally mobile foreign direct investors, businesses, and pools of capital, DBT, supported by its partners, have created the first internationally facing EB investment offer which will be launched at SynBioBeta in May

2024. It will highlight a UK engineering biology ecosystem open to global ideas, investment, talent and trade underpinned by a culture of responsible and trustworthy innovation and open markets. DBT will achieve this through leveraging its in-house expertise and understanding of investment drivers, which includes sector teams and investor services, the Office for Investment and the Venture Capital Unit, as well as by consulting across government and with external stakeholders.

17. Our efforts will be supported by wider measures introduced by government to make the UK investment community more competitive. The Mansion House reforms announced this year committed the largest UK defined contribution pension funds to ambitious goals for their investments in unlisted equities. In addition, the Long-Term Investment for Technology and Science (LIFTS) aims to mobilise institutional investment into the UK's science and technology companies, while a new fellowship scheme will build on the pool of talented UK VCs to create a pipeline of world-leading investors in science and technology.

18. The Government recognises the important role that research and development plays in supporting innovation and economic growth across all sectors, as well as the benefits it can bring for society. Following consultation, the Government has merged the existing Research and Development Expenditure Credit (RDEC) scheme and the Small and Medium-sized Enterprise (SME) scheme from April 2024. This has simplified and improved the system, helping to drive innovation in the UK. The merged scheme has adopted the RDEC rate of 20%, which following the increase at Autumn Statement 2022 means the UK now has the joint highest uncapped headline rate of R&D tax relief in the G7 for large companies.

19. The Government has also legislated for further support for R&D intensive SMEs that was announced at Spring Budget 2023. This support is worth around £600 million per year and we expect that

around 23,000 SMEs will benefit from this scheme per annum. This builds on previously announced changes to support modern research methods by expanding the scope of qualifying expenditure for R&D reliefs to include data & cloud computing costs. Overall, R&D reliefs will support an estimated £55 billion of business R&D expenditure in 2028-29, a 25% increase from £44 billion in 2021-22.

20. Our globally recognised regulators and standards institutions also play a critical role. Together with the National Quality Infrastructures institutions, they can give confidence to businesses, consumers, and investors. For example, the Centre of Excellence in Engineering Biology Metrology and Standards is a virtual centre established to build capabilities at the partner organisations who include those within the National Measurement System and the expertise at Imperial College.

21. Academic entrepreneurs typically need to secure access to university IP if they spin out a company based on research. The independent review of university spin-outs concluded that best practice in licensing IP to spin-outs is still not universally adopted, and sets out recommendations for where practice should be. The government is encouraging universities to adopt these recommendations and monitoring uptake. Furthermore, the UK's Intellectual Property regime is recognised as one of the best in the world, and the UK's approach to IP in all trade negotiations is to reward research and innovation, whilst ensuring access to new innovations.

22. To reduce the risk of engineering biology advances developed in the UK being exploited overseas, the National Security and Investment Act ("NSI Act") requires certain acquisitions in the synthetic biology sector be notified to the Government and provides the Government with a means to scrutinise and intervene in acquisitions to protect national security.

23. On 18 April the Cabinet Office published its response to the recent NSI Call for Evidence. It details the steps the Government is taking to fine-tune the NSI system to ensure it stays ahead of the threats facing

the UK, and remains as pro-business as possible, without compromising the Government's ability to conduct proper scrutiny.

24. As part of its response the Government committed to publish updated guidance covering the key topics raised by respondents to the Call for Evidence, helping parties to interact with the system most effectively.

25. Furthermore, the Government committed to launch a formal public consultation on updating the mandatory area definitions by the summer which will ensure the mandatory system remains up to date, correctly targeted, and improve stakeholder understanding of the definitions.

26. Most UK export controls in this area derive from the Australia Group, an informal forum of countries which, through the harmonisation of export controls, seeks to ensure that exports do not contribute to the development of chemical or biological weapons. The Australia Group covers dual-use biological equipment and related technology and software, as well as human and animal pathogens and toxins. We will maintain our high level of engagement with the Australia Group and regularly assess new technology, in line with our commitments in the Biosecurity Strategy.

27. The UK also has flexible legal powers through its end-use ("catch-all") controls to make non-listed dual-use goods subject to a licence in certain circumstances. HMG recently concluded a review of exports controls as they apply to emerging technologies and will be announcing more on this shortly.

5. What are the risks posed to society by engineering biology?

28. Advances in engineering biology promise better and faster cures, more sustainable energy sources and more secure food systems. But as with other emerging technologies, it also creates new risks that must be understood and managed. The engineering biology risk picture is changing, fuelled by developments in converging tools and technologies, an increase in knowledge and expertise and lowering barriers to market entry. We need to cultivate an engineering biology ecosystem in which stakeholders are aware of these risks and the government interventions to mitigate them and are encouraged to act responsibly.

29. Government is working to learn lessons from other emerging technologies such as AI where we have seen how emerging knowledge and tools can lead to new risks, but also new opportunities. We need robust frameworks to mitigate risks from dual use research or malicious application of new technologies.

30. Government published the Biological Security Strategy in June 2023. It sets out how the country will become resilient to a range of biological threats, and a world leader in responsible innovation, by 2030. The Strategy, led by the Deputy Prime Minister and Cabinet Office, outlines the four pillars of our response to biological risks:

    a. **Understand** the biological risks we face today and could face in the future.
    b. **Prevent** biological risks from emerging (where possible) or from threatening the UK and UK interests.
    c. **Detect**, characterise and report biological risks when they do emerge as early and reliably as possible.
    d. **Respond** to biological risks that have reached the UK or UK interests to lessen their impact and to enable a rapid return to business as usual.

31. In the UK there is legislation in place to protect the public from accidental or deliberate misuse of engineering biology. This includes:
    a. Control of Substances Hazardous to Health Regulations 2002 (COSHH), for the regulation of Biological Agents that are human pathogens
    b. Genetically Modified Organisms (Contained Use) Regulations 2014, for the regulation of genetically modified microorganisms
    c. Specified Animal Pathogens Orders (SAPO), for the regulation of animal pathogens that are not endemic to the UK.
    d. The Importation of Animal Pathogens Order (IAPO), for the regulation of the import of animal pathogens to the UK.
    e. Part 7 of the Anti-terrorism, Crime and Security Act 2001 (ATCSA 2001) regulates the ability of sites such as universities and science research laboratories to obtain, store and work with certain pathogens and toxins.

32. DSIT has established a Biosecurity Leadership Council to bring together experts from across industry and academia to address the risks of emerging engineering biology technologies. The group has met three times since its establishment in September 2023. In discussion with the Council DSIT has identified gene synthesis screening as a priority area for developing responsible innovation policy.
33. To be a world leader in responsible innovation we must lead by example, demonstrate our intent to responsibly grow the bioeconomy without compromising national security or ethical standards, and encourage our international partners to follow suit. We must protect national security without compromising free trade and open markets.
34. We are working with partners to shape international norms and standards, utilising our reach and influence in the multilateral system. We are members of the G7, G20, OECD, NATO and Council of Europe among other groupings, and signatories to UN conventions such as the Biological and Toxin Weapons Convention and the Convention for

Biological Diversity. The UK plays an active role in these fora. For example, this year the UK contributed funding to launch the OECD Global Forum on Technology, which incubates an international multi-stakeholder expert group on synthetic biology. This expert group will provide a technical evidence base to inform the development of policy globally.

35. The UK works with international partners to monitor biological threats as they emerge. The UK has launched a Strategic Dialogue on Biological security with the US to reaffirm both nations' commitment to increase collaboration on biosecurity and demonstrate global leadership.

36. The UK's sharing arrangements with international partners, and our global information systems, are able to monitor risks as they emerge. UKHSA works closely with the WHO and other partners to exchange pathogen genomic sequences, scientific expertise and to improve surveillance around the world through platforms such as the Global Initiative on Sharing Avian Influenza Data (GISAID), and the Phylogenetic Assignment of Named Global Outbreak Lineages (PANGOLIN).

37. There are wider societal challenges beyond national security risks, including making sure that benefits of biotechnology are shared globally. The UK is co-chairing the negotiations under the Convention on Biological Diversity on operationalising the multilateral benefit sharing mechanism, including a global fund, for the use of Digital Sequence Information on genetic resources. Establishing such a benefit sharing mechanism will support unhindered access to genetic sequence information stored in online databases and support the conservation of biodiversity.

6. How should engineering biology be regulated?

38. Regulations and standards are key to creating an environment in which engineering biology can safely reach its full potential and provide confidence to the public and markets that products are high-quality and safe.

39. Regulations should be clear, appropriate and support innovation while maintaining high consumer safety standards. Government is committed to delivering a regulatory system that is pro-innovation, easy to navigate and facilitates widespread commercialisation of science and technology applications in the Science and Technology Framework.

40. The Regulation for Innovation Report on Life Sciences was published in May 2023, recommending the establishment of the Engineering Biology Regulators' Network (EBRN) and regulatory sandboxes for engineering biology.

41. In 2023, we established the Engineering Biology Regulators' Network (EBRN) to find opportunities for collaboration between regulators, knowledge and best practice sharing, and horizon scanning. It convenes thirteen regulators from seven sponsoring departments. Through the EBRN, we will build connections between UK regulators and the engineering biology community to support the development of appropriate regulatory reforms. Its first task is to map how products derived from engineering biology are currently being regulated.

42. Over the next three years we will spend up to £5 million on engineering biology regulatory sandboxes. These will help us tackle the most pressing regulatory challenges and opportunities. Through the EBRN we will establish three to five sandboxes that allow evidence-based analysis of products' quality and safety, essential for crafting suitable regulations that maintain the public's trust.

43. As part of the National Vision for Engineering Biology the DSIT-sponsored Regulatory Horizons Council (RHC) was commissioned to

provide independent, expert advice on the regulation of the engineering biology Sector. The RHC has commenced work on this advice, and recommendations will be shared with government later this year. The RHC was established in 2019 to provide independent expert advice to government on the regulatory reforms needed to ensure the rapid and safe introduction of emerging technologies.

44. Standards are also an important tool for effective and appropriate regulation. Development of engineering biology standards will be key to speeding up innovation by increasing the reproducibility and comparability challenges experienced when working with biological systems. The UK is committed to leading the development of responsible and fair standards.

7. **What are the possible barriers and limitations to good and effective use of engineering biology?**

45. In July 2023 DSIT issued a call for evidence to identify opportunities and challenges for the UK engineering biology sector. The National Vision for Engineering Biology sets out the UK's approach to tackling these barriers.

46. Our full view of the potential barriers and limitations is set out in the National Vision for Engineering Biology. Below is a partial list of potential barriers that were highlighted during the 2023 call for evidence:

    a. **Access to infrastructure**:

        i. Two-fifths of respondents highlighted a lack of bioprocessing facilities in the UK below the pharmaceutical grade. They told us that this drives companies to use 'over-engineered' equipment which is more expensive than the more basic equipment needed, and in turn leads to unnecessary competition for facilities.

        ii. Existing institutions provide valuable facilities and infrastructure, but our respondents told us they often lack some required equipment and/or are too expensive. Respondents typically agreed that a single large facility would struggle to cater to the sector's needs.

        iii. Respondents also highlighted the need for an increase in the number of skilled individuals who can run and maintain equipment at every scale, and sustainable, long-term funding for this sort of support.

    b. **Talent and skills:**

        i. Respondents to the call for evidence noted availability of skilled bioprocessing experts was lower than the sector's requirements across the design, operation and

maintenance of bioprocessing facilities and equipment. Demand outstrips supply for these technical skills at all levels, from workshop apprentices to engineers able to design and build biomanufacturing plants.

c. **Regulation**:
    i. Across all sectors, the most common message was that regulatory pathways for new products are complicated, difficult to understand or yet to be established.
    ii. A quarter of comments expressed either criticism or frustration that the UK was still working under the EU's 'precautionary mindset' instead of focusing on innovation and growth.

d. **Access to R&D funding**:
    i. Respondents identified investment in R&D as a critical focus area within the Science & Technology (S&T) Framework, and said government needs to continue supporting foundational research, even as we increase support to research at higher levels of technology readiness. Critically, respondents identified a need for longer-term funding to enable research to evolve and develop.

e. **Access to finance:**
    i. Respondents were clear that larger deal sizes are the most challenging for UK engineering biology firms to achieve – deal sizes of roughly £5million and above were judged 'very challenging' by more than half.

f. **Public acceptability:**
    i. There was some sense that the anticipated consumer acceptance of engineering biology varies by application area and use. Consumer acceptance will come from familiarity with products derived from engineering biology

that meet (or beat) the quality or price of existing products without sacrificing consumer safety.