

NUFFIELD COUNCIL ON BIOETHICS

Department for Science, Innovation & Technology call for evidence: Engineering biology

Written evidence submitted by the Nuffield Council on Bioethics

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Introduction

The Nuffield Council on Bioethics (NCOB) is a leading independent policy and research centre, and the foremost bioethics body in the UK. We identify, analyse, and advise on ethical issues in biomedicine and health so that decisions in these areas benefit people and society.

Executive summary

The NCOB's response makes three key recommendations related to how future framework(s) for the engineering biology ecosystem could be designed, specifically ensuring interdisciplinarity and that ethical considerations are a part of the process from inception to fruition. We would welcome the opportunity to work with the Department for Science, Innovation and Technology (DSIT) on how best to approach incorporating these recommendations.

Specifically, we recommend:

- An increased and continued role for the NCOB working with DSIT, and the wider government, to ensure that ethical considerations are always part of the regulatory and legislative process.
- DSIT work with the NCOB to create a framework that incorporates ethical considerations in future engineering biology policy, not just as a measure to ensure it adheres to regulatory parameters, but for societal benefit and to aid the development of ethically conscious legislation.
- Space should be made for responsible research and innovation (RRI) when understanding and outlining the purpose of the technology; innovation should address the cause not just the symptom. This should involve ability to explore, capacity for failure and further funding. Alongside this, appropriate expertise must be utilised – it should not be just those developing the scientific components of the technology who decide the basis for the research. It should involve and incorporate ethical, social and legal aspects and NCOB and experts in RRI should be consulted on how best to do this.

NCOB submission

Our response and recommendations draw on and are informed by previous NCOB work that has direct or related contextual analysis, applicable recommendations, and parallels. These include:

- *Emerging biotechnologies: technology, choice and the public good*¹
- *Novel techniques for the prevention of mitochondrial DNA disorders: an ethical review*²
- *Genome editing and farmed animal breeding: social and ethical issues*³

¹ [Emerging biotechnologies - The Nuffield Council on Bioethics \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/2017/02/emerging-biotechnologies-technology-choice-and-the-public-good/)

² [Novel techniques for the prevention of mitochondrial DNA disorders: an ethical review \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/2017/02/novel-techniques-for-the-prevention-of-mitochondrial-dna-disorders-an-ethical-review/)

³ [Genome-editing-and-farmed-animal-breeding-FINAL-WEB-PDF.pdf \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/2017/02/genome-editing-and-farmed-animal-breeding-final-web-pdf/)

- *The future of ageing: ethical considerations for research and innovation*⁴

In 2012, the NCOB published *Emerging biotechnologies: technology, choice and the public good*. This report recommended that when framing science policy through societal challenges, a ‘public ethics’ approach should be taken to avoid an overemphasis on technological rather than social solutions to problems with substantial social dimensions. Furthermore, the report argues that in all cases which technical advice is sought by policy makers, there should be a demonstrable attempt to avoid sole reliance on a limited range of established experts in particular fields. This ability to prevent premature establishment of orthodoxies in fields characterised by uncertainty and rapid technological advancement remains important.

These recommendations are still applicable today. In order to harness the transformative potential of engineering biology products, there must be balance between being pro-innovation and RRI and regulation. The notion that there should be a ‘capacity for failure’ when RRI is harnessed, was one of several observations that came out of a recent international workshop which explored RRI and synthetic biology. This ability allows for reflexivity alongside innovation. Moreover, allowing this space for exploration will be a crucial part of understanding what works and what does not.

Within the recently published *UK Science and Technology Framework*⁵, DSIT emphasise that the agenda for this framework will only be delivered if the public sector, civil society, academia, industry and private sector, and international partners work together, and the public is continually engaged. They go on to list a number of intended outcomes they are striving for by 2030. Below is a selection of these where we would welcome involvement as the government develops its thinking (there are others in the framework that are also relevant, but for brevity we have not included them all).

1. Using government horizon-scanning capability to support regulators to consider how emerging technologies could become critical technologies. NCOB’s expertise could be harnessed to support this. Our horizon-scanning provides a unique ethics lens which others do not always incorporate in their future focus.
2. Improved knowledge, talent and resource sharing within government, between the public sector, academia and businesses; training government leaders to raise their awareness. The NCOB could provide a multi-disciplinary approach and an ethical dimension to this knowledge exchange and training.
3. Lead international efforts to shape standards and regulations for critical technologies. The NCOB has international networks and collaboration with the global ethics community; these partnerships could be utilised to ensure ethical considerations are taken into account during the development of standards and regulations.

The government’s vision that ethical responsible innovation is a part of this sector means NCOB, as the UK’s independent national bioethics body, has a vital role to play in supporting this. **We are calling for an increased and continued role working with government to ensure that ethical considerations are always part of the regulatory and legislative process.**

Global place

The government should work with equivalent international regulatory bodies and legislators to ensure a coordinated approach to the governance of these new technologies. Historically, the UK has played an important role in the regulation of emerging biotechnologies. A key example is the use of mitochondrial DNA transfer techniques for couples at risk of having children with severe, inherited mitochondrial disorders. Our 2012 report⁶, concluded that the use of these techniques could be an ethical treatment option provided those seeking the treatment met all the requirements for eligibility and helped inform the eventual legislation. This is a direct example of where ethics and public dialogue wasn’t just ‘red tape’, but helped bring about changes to the legislation to allow

⁴ [The future of ageing - The Nuffield Council on Bioethics \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/publications/the-future-of-ageing)

⁵ [The UK Science and Technology Framework: taking a systems approach to UK science and technology \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/614442/uk-science-and-technology-framework-taking-a-systems-approach-to-uk-science-and-technology.pdf)

⁶ [Mitochondrial DNA disorders - The Nuffield Council on Bioethics \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/publications/mitochondrial-dna-disorders)

groundbreaking innovation to happen in ways that were carefully considered and had garnered public support.

The UK has the expertise and infrastructure in place to work with the international community to both showcase our innovation and build future, fruitful collaborations. This will be an important part of maintaining our place on the global stage and increasing international recognition of the UK's strengths and ambitions in science and technology. Moreover, demonstrating the benefits of investment and collaboration with the UK.

Public engagement and building trust

The NCOB, in partnership with the Biotechnology and Biological Sciences Research Council (BBSRC), with support from Sciencewise, recently (2022) undertook a public dialogue on genome editing and farmed animals⁷. This dialogue is a good example of how public dialogue should be designed, carried out and utilised to inform wider bodies of work and policy decisions and legislation. We also recently published a report on *Genome editing and farmed animal breeding: social and ethical issues*⁸, this report is highly regarded and helped inform the Genetic Technology (Precision Breeding) Act 2023⁹. In the report, we highlighted distinctive ethical issues from the previous iteration of the legislation which needed exploration, particularly in relation to farmed animals. That many of our recommendations were responded to within the legislation demonstrates the value of involving an organisation which examines and places ethics at its heart.

Learnings could also be taken from our *Future of Ageing* report, specifically that contributors to the public dialogue emphasised the importance of people of all ages, and from diverse backgrounds, being involved in influencing the research agenda to help prioritise research outcomes that would be most beneficial to people. In this case it was regarding ageing, but the sentiment can also be applied in the engineering biology context.

We would be happy to work with DSIT and the wider government to ensure that ethical considerations are part of public and policy engagement in relation to engineering biology.

⁷ [Public dialogue on genome editing and farmed animals - The Nuffield Council on Bioethics \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/public-dialogue-on-genome-editing-and-farmed-animals)

⁸ [Genome-editing-and-farmed-animal-breeding-FINAL-WEB-PDF.pdf \(nuffieldbioethics.org\)](https://www.nuffieldbioethics.org/genome-editing-and-farmed-animal-breeding-final-web-pdf)

⁹ [Genetic Technology \(Precision Breeding\) Act \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/2023/10)