



The Convention on Biological Diversity

CBD Notification 2017-025- Submission of Information on Synthetic Biology

Written Response from Research Councils UK

1. **Research Councils UK (RCUK)** is the strategic partnership of the UK's seven Research Councils¹. Our collective ambition is to ensure the UK remains the best place in the world to do research, innovate and grow business for the benefit of society and the economy. Together, we invest more than £3 billion in research each year, covering all disciplines and sectors. This response is made primarily on behalf of the following Research Councils:
 - Biotechnology and Biological Sciences Research Council (BBSRC)²
 - Engineering and Physical Sciences Research Council (EPSRC)³
 - Medical Research Council (MRC)⁴
2. The information below has been provided by the above Research Councils in response to the request for information outlined in CBD Notification 2017-025.

Background of Interest:

3. Synthetic biology applies engineering principles to biology, seeking to create or design new biological systems, devices or parts that can perform useful functions. The UK is a world leader in synthetic biology research and multi-disciplinary research within this field, which sits at the interface of bioscience and engineering, is supported by investment from the Research Councils.
4. World-class bioscience is critically dependent on new technologies, methodologies and resources and a number of Research Councils have investments in synthetic biology. For example, BBSRC is investing in world-leading multi-disciplinary synthetic biology research within the UK. The MRC also has long-standing interests in research areas related to synthetic biology, as exemplified by the MRC Laboratory of Molecular Biology⁵, Cambridge. EPSRC continue to focus on ensuring that engineers in particular, along with mathematicians and physical scientists, are fully engaged and play a leadership role in developing the future of this field.
5. Working alongside EPSRC and the MRC, in addition to Innovate UK, BBSRC is leading the [RCUK Synthetic Biology for Growth Programme](#) which is a £102M investment comprising of:

¹ www.rcuk.ac.uk

² www.bbsrc.ac.uk

³ www.epsrc.ac.uk

⁴ www.mrc.ac.uk

⁵ <http://www2.mrc-lmb.cam.ac.uk/>

- Six new multidisciplinary synthetic biology research centres funded by BBSRC, EPSRC and MRC.
 - A network of DNA Synthesis research centres.
 - Capital investments in Centres for Doctoral Training (CDT's), in Synthetic Biology (co-funded by BBSRC and EPSRC), and Bioprocess Leadership (funded by EPSRC only).
 - Seed funding for innovative companies.
6. Recent research applications funded through the RCUK Synthetic Biology for Growth Programme include the creation of the world's first artificial enzymes, the development of organoids⁶ to enable animal-free drug testing, the engineering of plants to produce a swine flu vaccine, the modification of bacteria to produce pharmaceuticals and the 'Synthetic Yeast Genome Project'.⁷
7. Outside of this programme, other significant Research Council investments in the field include the following:
- [Synthetic Biology Innovation and Knowledge Centre \(IKC\)](#) funded by EPSRC, BBSRC and Innovate UK.
 - EPSRC's Frontier Engineering awards supported two major projects utilising Synthetic Biology for applications in water security. These both involved significant outreach activity.^{8,9}
 - A flagship EPSRC Programme grant; 'Synthetic Portabolomics: Leading the way at the crossroads of the Digital and the Bio Economies'¹⁰ is also supported.

Submitted evidence:

8. In response to the request for research, cooperation and activities within the following sub-category:

(b): To promote and enable public and multi-stakeholder dialogues and awareness-raising activities on the potential benefits and potential adverse effects of organisms, components and products of synthetic biology on biodiversity, involving all relevant stakeholders and with the full effective engagement of indigenous peoples and local communities.

Research Councils wish to highlight the following activities we have been involved in:

- [Synthetic Biology Dialogue](#): This report, initiated by BBSRC and EPSRC and with support of the Sciencewise programme¹¹, presents the findings of a series of public workshops and stakeholder interviews on the science and issues surrounding synthetic biology.

⁶ <http://www.nature.com/ncb/journal/v18/n3/full/ncb3312.html>

⁷ <https://connect.innovateuk.org/web/synthetic-biology-special-interest-group/synbio-case-studies>

⁸ <http://research.ncl.ac.uk/nufeb/>

⁹ http://www.gla.ac.uk/news/archiveofnews/2013/march/headline_270619_en.html

¹⁰ <http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/N031962/1>

¹¹ <http://www.sciencewise-erc.org.uk/>

- [Responsible Innovation Framework](#): Published by the Technology Strategy Board (now known as Innovate UK), with input from BBSRC, ESRC and EPSRC, this framework supported companies to anticipate and give responsible consideration to the intended and potential unintended impacts of the commercial development and use of synthetic biology, prior to applying for funding for the Technology Strategy Board's synthetic biology feasibility studies competition.
 - [Synthetic Biology – opening up the conversation](#): This BBSRC collaboration with Forum for the Future and Friends of the Earth aimed to understand, and enable others to understand, the risks and opportunities associated with synthetic biology and the many different perspectives on these. The main project outcome is a tool to support decision makers to systematically explore different applications of synthetic biology, available [here](#).
 - [Framework for Responsible Innovation](#): EPSRC has published a general 'Framework for Responsible Innovation' developed in collaboration with ESRC. As a public funder of research, we have a responsibility to ensure that our activities and the research we fund, are aligned with the principles of Responsible Innovation, creating value for society in an ethical and responsible way. We recommend that all researchers demonstrate awareness of and commitment to, the principles of Responsible Innovation.
9. In addition, Research Councils wish to highlight the [UK Synthetic Biology Strategic Plan 2016](#), which was produced by the Synthetic Biology Leadership Council, with input from the Research Councils. This strategic plan reaffirms the commitment of the Research Councils to maintaining a strong underpinning research portfolio and also focuses on translating and commercialising synthetic biology research into application.

