

## **STRATEGY FOR UK BIOTECHNOLOGY AND BIOLOGICAL SCIENCES**

### **INVITATION TO COMMENT**

#### **Introduction**

The UK research and innovation landscape has changed considerably in recent years, and it continues to evolve with the creation of UK Research and Innovation. In BBSRC we are taking the opportunity to ensure the strategic direction for UK biotechnology and biological sciences is aligned with research needs, as well as with societal and economic drivers.

Between now and the end of the year, we will work with stakeholders to articulate a clear strategy and priorities for UK biotechnology and biological sciences. We would welcome your input and views to help shape the strategy.

In this document, we have set out some of our early thoughts on what might be key elements of the strategy. These are based on an initial consultation with BBSRC's strategy advisory network and Council, as well as reflecting ongoing strategy development activities across BBSRC. We pose a few questions throughout, and invite you to respond to these and provide any other comments **through the online questionnaire at:**

<https://app.keysurvey.co.uk/f/1161142/11d9/>

The deadline for responses is by the end of **Wednesday 11 October 2017**.

If you have any questions, please contact: [strategy@bbsrc.ac.uk](mailto:strategy@bbsrc.ac.uk)

## STRATEGY FOR UK BIOTECHNOLOGY AND BIOLOGICAL SCIENCES

### INVITATION TO COMMENT

#### **Strong foundations - maintaining the health of the UK bioscience base**

For UK bioscience to remain world-leading, and for it to be able to advance the frontiers of human knowledge and deliver economic and social benefits in the UK and beyond, it needs to be built on solid foundations. We have identified the following as key underpinning and cross-cutting capabilities that will require long-term support and integrated approaches across the bioscience research and innovation landscape:

**People and talent** - attracting the brightest and best into bioscience, equipping the research base with the range of skills and talent required for modern bioscience, and providing highly-skilled people for the public, private, third and research sectors.

**Infrastructure** - ensuring that the UK bioscience community has access to the infrastructure, facilities and resources necessary to carry out ground-breaking research, and to support the translation into economic and societal impact.

**Collaborations and partnerships** - enabling collaborations across disciplines and sectors, between industry and academia, and nationally and internationally.

**Q1** Are these the right foundations for UK bioscience? Are there other cross-cutting, underpinning capabilities that need to be developed and supported?

#### **People and talent**

*Attracting the brightest and best into bioscience, equipping the research base with the range of skills and talent required for modern bioscience, and providing a supply of highly-skilled people for the public, private, third and research sectors.*

This will require:

- a **holistic approach** which considers the entire workforce needed to deliver high quality bioscience research and innovation, including postdoctoral researchers and technical specialists
- training for a **depth of expertise** while ensuring that researchers are also equipped with the **breadth of professional and transferable skills** to be able to work in multidisciplinary teams, and with a variety of partners and stakeholders
- nurturing talent at all career stages, fostering a culture of **lifelong learning and development**, and encouraging researcher mobility
- making strategic interventions where needed to future proof the skills base and to address **emerging skills needs** and / or vulnerabilities.

**Q2** How well will this approach meet the skills needs of the research base and wider economy in the coming years? Are there other considerations?

## Infrastructure

*Ensuring that the UK bioscience community has access to the infrastructure, facilities and resources necessary to carry out ground-breaking research, and to support its translation into economic and societal impact.*

Cutting-edge bioscience is dependent on the availability of modern and sustainable research infrastructures, from essential bioinformatics and biological resources such as databases, genetic resources and culture collections, to state-of-the-art instrumentation and facilities such as high-throughput platforms for genomics, and advanced bioimaging technologies. Infrastructures that support innovation, for example by enabling users of research to access advanced research capabilities, are also crucial to the competitiveness of UK bioscience.

We recognise the need for the UK to take a more strategic approach to the sustainable provision and use of infrastructures for bioscience research and innovation, that encompasses different types of infrastructures, at local, regional, national and international scales. Within this, long-term support for the development and maintenance of reliable and sustained data infrastructures are expected to be a high priority as bioscience becomes an increasingly data-intensive discipline.

**Q3** What are the biggest gaps in UK infrastructure for bioscience research and innovation?

**Q4** How could the UK take a more strategic approach to the provision and use of infrastructures that are required for bioscience research and innovation?

## Collaborations and partnerships

*Enabling collaborations across disciplines and sectors, between industry and academia, and nationally and internationally.*

Tackling complex economic and societal grand challenges requires the integration of research across multiple disciplines. Furthermore, exciting developments in research and innovation often occur at the interfaces between disciplines. While ensuring the continued health of the discipline, our strategy for UK biotechnology and biological sciences must also promote and enable **multi- inter- and trans- disciplinary** ways of working.

Bioscience underpins a wide range of established and emerging industry sectors, and national and international policy areas. Partnerships with the **users and beneficiaries of research** (e.g. industry, policy-makers, charities, society) are important in shaping research agendas through better understanding of users' needs and aspirations. Similarly, the realisation of economic and societal benefit from the ideas, knowledge, skills and technologies that arise from bioscience research, relies on a deep, discipline-specific understanding of the diverse and diffuse routes to application, effective knowledge exchange, and partnership approaches that bring together companies and other research users with the academic research base in ways that are appropriate for the sector.

**International partnership** helps sustain the vibrancy of UK bioscience, promoting the free flow of ideas and researchers, delivering 'best with best' scientific collaboration that advance the frontiers of human knowledge, capitalising on complementary research and technology capabilities, and contributing to the development and delivery of international research

priorities. The strategy for UK biotechnology and biological sciences must be set in an international context, and should seek to strengthen the UK's position as a global partner of choice for bioscience research and innovation.

**Q5** How might opportunities for collaboration and partnership change in coming years, and how can UK bioscience make the most of these?

### **Pushing the frontiers of bioscience discovery**

BBSRC's strategic plan *The Age of Bioscience* describes the revolution that is taking place in bioscience, driven by new tools, technologies and approaches that enable researchers to explore key fundamental questions about living systems and how they function (the 'rules of life'). For example, understanding how cells communicate with one another, or how the interplay between an organism's genetic make-up and its environment will affect its physical characteristics. For the UK to remain at the forefront of this revolution, it is essential that we continue to promote creative, curiosity-driven '**frontier bioscience**' research that advances the boundaries of knowledge and delivers high-impact discoveries.

Advances in both fundamental and challenge-led research often involve the development or application of new **tools and technologies** and, increasingly, **data-intensive and predictive approaches** to biological discovery. Similarly, the emergence and exploitation of disruptive platform technologies can open-up transformative new opportunities for research and business innovation. The future strategy for UK biotechnology and biological sciences must support the synergistic relationship between research, innovation and technology development.

**Q6** What are likely to be the 'next generation' of breakthroughs that will revolutionise bioscience research, or open up new opportunities for innovation?

**Q7** How can the UK foster an environment in which creative, curiosity-driven research can thrive and advance the frontiers of bioscience knowledge?

### **Strategic challenges - building a more resilient, productive and secure future**

In the coming decades, bioscience will be at the heart of providing solutions to major challenges facing society, while simultaneously acting as a driver for innovation and growth in the bioeconomy by transforming traditional industries and creating new ones.

BBSRC's strategy identifies three challenge areas for particular focus, where bioscience can have the most impact, nationally and internationally:

**Agriculture and food security** - sustainably enhancing agricultural productivity, food security and resilience in the face of population growth, changing diets, climate change and other pressures

**Industrial biotechnology and bioenergy** - developing renewable bio-based feedstocks and processes for low carbon manufacturing of chemicals, materials, biofuels, helping to meet international emissions targets and reducing dependency on fossil fuels

**Bioscience for health** - improving health across the lifecourse, reducing the need for medical and social intervention

Our engagement activities have indicated that these remain the right areas of focus for UK bioscience, recognising that they are long-term challenges requiring sustained and concerted effort across the research and innovation ecosystem, and involving multiple disciplines.

**Q8** Are these the right strategic challenges for UK bioscience to focus on? Are there others?

**Q9** What do you see as the greatest opportunities for UK bioscience research and innovation to effect a step change in how these challenges are addressed?

**Any other comments?**

**Q10** Is there anything else that BBSRC should consider in developing a strategy for UK biotechnology and biological sciences that is not covered in the previous sections, including, for example, any particular risks or threats you see for UK biotechnology and biological sciences over the coming years?