

Response from the Royal Society of Biology to the call from HM Treasury for representations on the 2020 Comprehensive Spending Review

September 2020

The Royal Society of Biology (RSB) is a single unified voice, representing a diverse membership of individuals, learned societies and other organisations. We are committed to ensuring that we provide Government and other policymakers, including funders of biological education and research, with a distinct point of access to authoritative, independent, and evidence-based opinion, representative of the widest range of bioscience disciplines.

The Society welcomes the opportunity to respond to the Comprehensive Spending Review. We are pleased to offer these comments, which have been informed by specific input from our members and Member Organisations across the biological disciplines. A full list of the member organisations of the Royal Society of Biology can be found here: <https://www.rsb.org.uk/membership/organisational-membership>.

Royal Society of Biology responses to previous consultations and inquiries can be found in our searchable Policy Resource Library: <https://my.rsb.org.uk/item.php?orgresourceid=1>.

Summary:

- The biosciences have a clear and important role in delivering the ambitions of public investment and the Comprehensive Spending Review (CSR).
- The challenges of climate change and biodiversity loss are existential. They should be given greater priority in the CSR and addressed accordingly. This is timely as the UK prepares to host COP26.
- The COVID-19 pandemic highlights the importance of biosecurity and food security, and the effects of encroaching on natural ecosystems. Long-term investment is needed to support international cooperation in research and surveillance, along with policies and practices to mitigate risks.
- Opportunities to rebuild the economy in more environmentally sustainable ways must be urgently sought and taken. The commitments made by the Government so far are a welcome first step.
- Immediate action must be taken to allocate additional funding to schools to cover increased spending due to coronavirus response. Without such support at an early stage, the long-term impacts on teachers and students will be significant.
- The disruption to education resulting from COVID-19 must be minimised. Potential long-term effects in primary, secondary and tertiary education, as well as teacher recruitment and retention, need to be addressed. Further disruption of face-to-face teaching and learning at all levels, particularly regarding data, practical and laboratory skills, risks longer-term impacts on progression through the biosciences, and subsequent effects on the economy.

- Subject-specific training and continuing professional development for teachers must be embedded in the Early Career Framework and beyond, and any national student catch-up interventions must be subject-focussed and led by those with disciplinary expertise.
- There is enormous demand for research funding, and continued investment will be required to make the UK a “scientific superpower”. However, the effect of the pandemic on universities, institutes, charities and other organisations puts this goal at risk. Mitigating support is needed.
- The regulatory environment affects the UK research and development landscape. An example is regulation of genetic technologies, including genome editing, with strict rules currently limiting investment and the possibility to bring beneficial discoveries into use. The UK has an opportunity to develop new beneficial approaches in this area, which deserve appropriate consideration.
- The importance of skills is rightly recognised in the CSR. Learned societies and professional bodies currently play an important role in developing and driving up skills and professional standards.
- Steps are needed to address the gap in funding for translational research, balanced with support for other kinds of research, including discovery research.

Response in full:

1. Investment in scientific research supports economic growth, improves national productivity and is vital to achieving many of the Government’s ambitions.¹ Life sciences are a broad and essential component of the research and innovation landscape, delivering key societal and economic benefits.² The Royal Society of Biology uses the term ‘life sciences’ to describe all areas of the science of life, from molecules through whole organisms to ecosystems, and across all biological specialisms.³
2. The Comprehensive Spending Review (CSR) lists among its priorities “leading in the development of technologies that will support the Government’s ambition to reach net zero carbon emissions by 2050”. We urge the Treasury to increase the priority it places on reducing net emissions, not only through new technologies, but in all areas of policy. Investments in appropriate tree planting, habitat and peatland restoration and green infrastructure projects are all needed. In food production, agro-ecological practices, technological efficiency enhancements and improved soil health and carbon storage are necessary, while reducing waste and losses. We recommend that policy evolving from this review should use scientific evidence to promote, enable and ensure environmentally sustainable practices. Policies should describe how they will contribute to addressing both climate change and biodiversity loss.⁴ Advice from the Climate Change Committee and the Natural Capital Committee is clear: actions to address these crises are there for the taking, but further delay will only necessitate more drastic and costly action in the future, with only a short window until the goal of keeping climate warming below 2°C becomes impossible. The UK is capable of leading the world in tackling climate change and biodiversity loss, through evidence-led policy, discovery, support and

¹ Royal Society of Biology, 2018. Response to the Science and Technology Committee of the Commons inquiry on the Balance and effectiveness of research and innovation spending.

https://www.rsb.org.uk/images/article/policy/RSB_response_to_HoC_STC_inquiry_on_research_and_innovation_spending_submitted.pdf

² Royal Society of Biology, 2017. Response from the Royal Society of Biology to the House of Lords Science and Technology Committee inquiry into Life Sciences and the Industrial Strategy. https://www.rsb.org.uk/images/RSB_response_Life_Sciences_Industrial_Strategy_inquiry_submitted.pdf

³ Royal Society of Biology, 2020. About Us. <https://www.rsb.org.uk/about-us>

⁴ Royal Society of Biology, 2019. Response from the Royal Society of Biology to the Dasgupta Review on the economics of biodiversity. https://www.rsb.org.uk/images/RSB_response_to_Dasgupta_review_-_submitted.pdf

action. We will need to demonstrate this global leadership ahead of hosting the UN Climate Change Conference (COP26), and engaging in the UN Biodiversity Conference (CBD COP15) – both planned for 2021.

3. The devastation caused by COVID-19 underscores the importance of biosecurity and the need for funding and research to predict, prepare for and – to the greatest extent possible – prevent future outbreaks and pandemic events. The benefits of successful biosecurity practice are easily overlooked, but where threats are successfully mitigated, there are avoided costs,⁵ the value of which this outbreak has starkly revealed. Threats to biosecurity come from the movement of people, goods and wild and domesticated organisms, requiring a combination of border checks, monitoring, surveillance, research, collaboration and intelligence-sharing. Reducing disease spill-over between animal and human populations – the ultimate cause of the COVID pandemic – requires the preservation of biodiversity and wildlife habitats.⁶ Investment in science to support the global response to COVID-19 must be maintained, and global cooperation and collaboration on biosecurity enhanced. As in all areas, consultation with science user communities is needed in setting the direction of research, its application, and measuring its impact to aid future decisions.⁷ As well as protection from disease outbreaks, improved biosecurity could protect the UK population from major threats to food security and livelihoods, such as African swine fever⁸ and Xylella.⁹ The COVID-19 pandemic has shown the importance of secure and resilient food systems. Systems reliant on a few crops and livestock products are less resilient, with diversity in food production critically required.
4. The conversation about a “green recovery” has drawn attention to the enormous opportunities to rebuild our economy in more environmentally and socially sustainable ways. Investment in appropriate development, procurement and incentives to restart the economy are all needed. HM Treasury should move to take advantage of these opportunities, through policies that will simultaneously deliver jobs across all parts and nations of the UK, improve health through cleaner air, transition towards decarbonisation, and reduce pollution and waste. Examples of such policies include expanding schemes to support installation of better insulation and heat pumps to public and private buildings, driving down food (and other) waste, increasing recycling rates, promoting repair and reuse where possible, and banning the landfilling of biodegradable wastes.¹⁰ As always, positive measures in the UK must not create negative externalities in other countries. The agricultural sector must also be supported to contribute to net-zero with reduced emissions and increased carbon storage through improved soil health and agro-ecological approaches. Critical to achieving this will be the Environmental Land Management Scheme arising from the Agriculture Bill.
5. Ensuring “every young person receives a superb education” is a priority for the CSR. The unprecedented disruption to schools, colleges and universities risks leaving a generation with a diminished education. In the sciences, we are particularly concerned that further compression of teaching time due to ongoing disruptions to face-to-face teaching could lead to a greater perceived difficulty in our subjects, with a drop in progression through formal education. Evidence that schools,

⁵ Dobson et al., 2020. Ecology and economics for pandemic prevention. Science. <https://science.sciencemag.org/content/369/6502/379>

⁶ The Biologist, 2020. “There were at least three papers in 2019 that said coronaviruses might be a real problem in south China”. <https://thebiologist.rsb.org.uk/biologist-covid-19/189-biologist/biologist-covid-19/2396-there-were-at-least-three-papers-in-2019-that-said-coronaviruses-might-be-a-real-problem-in-south-china-2>

⁷ Royal Society of Biology, 2020. Response from the Royal Society of Biology to the BEIS R&D survey consultation on the UK R&D Roadmap 2020. https://www.rsb.org.uk/images/RSB_response_to_the_BEIS_survey_UK_RD_Roadmap_2020_submitted.pdf

⁸ Pirbright Institute, 2020. African swine fever virus. <https://www.pirbright.ac.uk/asfv>

⁹ Royal Society of Biology, 2018. Response to the House of Lords EU Energy and Environment Sub-Committee inquiry on Brexit: plant and animal biosecurity. https://www.rsb.org.uk/images/RSB_response_to_the_HoL_EU_EESC_inquiry_Brexit_plant_and_animal_biosecurity_for_submission.pdf

¹⁰ Committee on Climate Change, 2020. Reducing UK Emissions: Progress report to Parliament. <https://www.theccc.org.uk/publication/reducing-uk-emissions-2020-progress-report-to-parliament/>

colleges and universities are significantly reducing practical activity during this period is further cause for concern.¹¹ Good guidance^{12,13} and risk assessments are needed to ensure that students have the opportunity to develop lab and practical skills while observing COVID guidelines. Disadvantaged students are disproportionately impacted by gaps in learning.¹⁴ These students are also more likely to have been impacted by a lack of access and engagement with remote learning during the pandemic. It is vital that national interventions such as the National Tutoring Programme focus subject-specific support on students acknowledged as disadvantaged before the pandemic, as well as those who may be newly disadvantaged, having faced significant personal and school disruption in the last few months. Ensuring schools are able to function with increased social distancing and restrictions, avoiding further closure, must be priorities for Government. Schools have not received the additional funding they require to ensure enhanced cleaning procedures, additional space and staff cover for those shielding, access to digital devices and remote learning for students unable to attend due to self-isolation or shielding.

6. Through the pandemic and after, good quality bioscience education must be fit for purpose and available to all. Schools and teachers must be properly equipped and resourced. Teacher recruitment and retention is a concern.¹⁵ The current cohort of NQTs and trainee teachers will have less experience in the classroom, which may lead to decreased confidence and an increase in those choosing to leave the profession within five years. As we suggested in our submission to the Education Select Committee on the impact of COVID-19¹⁶, policies for education recovery following COVID-19 disruptions must be considered on a 3-5 year timescale, and could include: additional school funding incentives to encourage a further reduction of contact time for NQTs impacted by the pandemic; providing more time for planning and mentoring; increased subject-specific support as part of the Early Career Framework and career-long CPD; funding for subject expert led tutoring and further support for disadvantaged students who have been disproportionately impacted by partial school closures; and funding to ensure schools are able to provide a good practical experience for students while facing increased costs due to social distancing and cleaning requirements.
7. Support for teaching-intensive HE providers through the pandemic is crucial. These institutions do not benefit from the cross-subsidising available to research-intensive institutions. Failure of such institutions would create a barrier to the growth of a scientifically skilled workforce. Teaching-intensive institutions lead the way in widening participation and social inclusion – key factors that underpin the Government's goal of readying the UK workforce for a science-led future and levelling up all parts of the UK.
8. We support the ambition to “make the UK a scientific superpower”. Growth in R&D is heavily reliant on the private and charitable sectors. Given that the current economic outlook could see investment from these sectors falling significantly, we advocate for a response from Government. Front-loading public spending over a medium term cycle would maintain momentum and provide a clear signal of

¹¹ Association for Science Education, 2020. Good Practical Science – making it happen post-COVID-19 survey report <https://www.ase.org.uk/sites/default/files/GoodPracSci%20-%20Report%20FINAL.pdf>

¹² Association for Science Education, 2020. Good practical science – making it happen post-COVID-19 report and recommendations <http://www.ase.org.uk/sites/default/files/GoodPracSci%20-%20Benchmarks%203.0.pdf>

¹³ Royal Society of Biology, 2020. Ensuring the pipeline: laboratory training in the time of coronavirus https://www.rsb.org.uk/images/COVID19documents/Royal_Society_of_Biology_Ensuring_the_Pipeline_Laboratory_training_in_the_time_of_coronavirus.pdf

¹⁴ Education Endowment Foundation, 2020. Impact of school closures on the attainment gap: rapid evidence assessment [https://educationendowmentfoundation.org.uk/public/files/EEF_\(2020\)_-_Impact_of_School_Closures_on_the_Attainment_Gap.pdf](https://educationendowmentfoundation.org.uk/public/files/EEF_(2020)_-_Impact_of_School_Closures_on_the_Attainment_Gap.pdf)

¹⁵ Allen, Hannah and McInerney, 2020. Musical Chairs: Understanding and tackling COVID-10 disruption to the teacher and recruitment Market <https://www.gatsby.org.uk/uploads/education/reports/pdf/report-musical-chairs-teacher-recruitment-during-a-pandemic.pdf>

¹⁶ Royal Society of Biology, 2020. Submission to the Education Select Committee. https://rsb.org.uk/images/RSB_submission_Covid-19_Education_Select_Committee_inquiry_8_June_2020.pdf

the Government's commitment to R&D, encouraging investment from the private sector. Support for future discovery will require supplementary public investment towards both funding new research projects and maintaining and expanding capital infrastructure. We further support an overall increase in core UKRI Research Council budgets. There remains enormous demand for funding. Of competitive research and innovation grant applications made to the BBSRC in 2018/19, only around 25% were successful (by value).¹⁷ The prolonged uncertainty about future access to EU grants is a serious concern.¹⁸ Although access to funding is only part of the benefit of full association with Horizon Europe, equivalent funding will need to be provided in the undesirable event that the UK associates as a third country. To fulfil and maintain the ambition to be a "scientific superpower", an appropriate balance of applied, translational and discovery research is necessary. Allocation of public funding should reflect this balance, rather than focusing exclusively on immediate-term impact. The RSB supports a dual system that balances funding in response to specific, directional calls from funders, and quality-related funding based on the assessment of research outcomes and impact by the Research Excellence Framework.¹⁹ We strongly support the Haldane principle and the key role for the research sector in identifying areas of funding merit. The Society supports the Government's pledge in the recent BEIS R&D Roadmap to make science, research and innovation across the UK central to tackling the major challenges we face – with focus on the UN Sustainable Development Goals – and taking advantage of opportunities while continuing to contribute internationally, for example through Official Development Assistance (ODA) schemes.

9. The right regulatory environment to support life sciences research is vital. Current strict rules on genome editing, aligned with the EU, are likely to prohibit potential UK growth in areas like crop breeding, and deter relevant businesses from basing their research in the UK. This could be an opportunity for the UK, having left the EU, and an anticipated review may allow the UK to build on its strength in this area.²⁰ The use of data and artificial intelligence in biomedicine is another area in which the UK has the opportunity to lead the way on regulation, with potential to improve health and support the economy. Thorough and early consultation and dialogue with all interested communities and broader society are important to any such process, which could build on an enhanced understanding of the importance of scientific evidence in policy decisions resulting from the COVID-19 pandemic.
10. The COVID pandemic has had enormous impacts on universities, charities and other organisations in the research ecosystem, which threatens to set back the goal of increasing the UK's scientific output. We are especially concerned about the harms to the skills base that would result from the loss of charities, societies and other organisations that provide training and support to specialist research personnel and engagement with standards in many areas, and whose existence is imperilled by the present economic disruption. Pressures faced by researchers in this environment have led many to reconsider careers in research. A recent researcher survey from the British Neuroscience Association found over a quarter of respondents are considering leaving research altogether, due to the effects of the COVID pandemic.²¹ The crisis of the pandemic has, however, produced flexibility in funding structures, processes and policies, along with the evolution of new collaborative ways of working that will be useful to apply to further areas of research. These points

¹⁷ UK Research & Innovation, 2020. Decisions on competitive funding. <https://www.ukri.org/funding/funding-data/decisions-on-competitive-funding/>

¹⁸ Wellcome, 2020. Securing a strong outcome for research in the EU-UK future relationship: Reaching an agreement on UK participation in Horizon Europe. <https://wellcome.ac.uk/sites/default/files/reaching-agreement-uk-participation-horizon-europe.pdf>

¹⁹ Royal Society of Biology, 2018. Response from the Royal Society of Biology to the House of Commons Science and Technology Select Committee's inquiry on Balance and effectiveness of research and innovation spending. Paragraph 2.1.1-3, page 4-5. URL: https://www.rsb.org.uk/images/article/policy/RSB_response_to_HoC_STC_inquiry_on_research_and_innovation_spending_submitted.pdf

²⁰ Royal Society of Biology, 2020. Response from the Royal Society of Biology to the Science and Technology Committee (Commons) inquiry into a new research funding agency for the UK. https://www.rsb.org.uk/images/A_New_UK_Funding_Agency_-_RSB_response_-_submitted.pdf

²¹ British Neuroscience Association, 2020. The future of neuroscience research after COVID-19. <https://www.bna.org.uk/mediacentre/news/covid-19-survey-results/>

were made in discussion between representatives of Benevolent AI, BioIndustry Association and Cancer Research UK at a recent RSB panel event.²² A useful outcome would be the development of funding models that combine investment in R&D from private and public sources.

11. We are pleased the CSR recognizes the importance of skills at all levels, essential for the Government's scientific ambitions. Reductions in data, laboratory and practical skills training that could result from COVID precautions will have a much longer term impact on the economy and the bioscience sector. Home-grown expertise is increasingly important with a reduction in global mobility likely to result from COVID-19 and EU Exit. Training and skills development will require resources. In the biosciences, provisions for apprenticeship and skills training are varied. Raising standards in apprenticeships and skills training can be done through the accreditation of bioscience programmes within the further education and training provider sector. Royal Society of Biology (RSB) accreditation recognises and supports the development of skills and education in the biosciences, ensuring graduates acquire knowledge and skill sets that make them highly employable. Technical and vocational routes at all levels would benefit from a similar external accreditation review, and initial work is being conducted by the Society in this area. The RSB also promotes continued professional development through its professional registers, aiming to drive up skills and professional standards across the workforce, including workers in technical, academic, and industry roles. The RSB, along with other learned societies, academies and membership organisations, could contribute to addressing particular skills shortages, for example in entrepreneurship, data and artificial intelligence, and sustainable environmental development, through assessing areas for development in curricula and training. Attracting and retaining skilled individuals at all levels and from diverse backgrounds is important. Achieving this will involve acknowledging and addressing elements of research culture that present barriers or create a negative work environment.²³ The character and reputation of the UK are also important to recruitment of skilled individuals in a globalised marketplace, and the fairness and perception of immigration policy is central to this.
12. The recent R&D Roadmap acknowledged the persistence of the "translational/ start-up gap" in research funding for early stage commercialization.²⁴ Inadequate resourcing in technology transfer diminishes the lack of attractive, sustainable careers available in this sector, and must be remedied. The Roadmap also outlined steps to make better use of procurement to pull through innovation, which we welcome. This could be addressed in the formation of the proposed new research funding agency modelled on ARPA, and we expand on them in our recent submission to a Select Committee inquiry on the subject.²⁵

²² Royal Society of Biology, 2020. RSB Policy Lates looks at the positives and negatives for research in 'the COVID era'.

<https://www.rsb.org.uk/news/14-news/2416-rsb-policy-lates-looks-at-the-positives-and-negatives-for-research-in-the-covid-era>

²³ Wellcome, 2020. Research: let's reimagine how we work together. <https://wellcome.org/what-we-do/our-work/research-culture>

²⁴ BEIS, 2020. UK Research and Development Roadmap. <https://www.gov.uk/government/publications/uk-research-and-development-roadmap>

²⁵ Royal Society of Biology, 2020. Response from the Royal Society of Biology to the Science and Technology Committee (Commons) inquiry into a new research funding agency for the UK. https://www.rsb.org.uk/images/A_New_UK_Funding_Agency_-_RSB_response_-_submitted.pdf