

How the UK can seize the opportunity to define a new relationship with the EU

January 2017

The **British Society for Immunology (BSI)** is a learned society representing over 3,000 immunologists working in academia, clinical medicine and industry. Our main objective is to promote and support excellence in research, scholarship and clinical practice in immunology for the benefit of human and animal health.

Key points

- The UK ranks first in the G7 for the quality of our research in infection and immunology.ⁱ Immunology in the UK has long thrived as part of a vibrant global ecosystem that is greatly enhanced by our close relationship with Europe. Brexit is therefore a challenging scenario for immunology and science more widely.
- This briefing outlines four key priorities that would help the UK define a positive new scientific relationship with the EU. These are:
 - Maintaining access to the EU's Horizon 2020 programme and its successor
 - Increasing public investment in scientific research
 - Maintaining barrier-free entry for workers with exceptional skills (e.g. scientists)
 - Guaranteeing the rights of EU nationals currently resident within the UK.
- Securing these commitments will retain what's best about our scientific relationship with the EU while also seeking to build our domestic science base. They protect our ability to continue collaborating at scale, preserve access to the skills and talent we need, and provide the robust and sustainable funding environment required to ensure immunology can continue to flourish when the UK leaves the EU.

Introduction

The UK is a scientific superpower, with world leading research carried out by internationally renowned scientists. Indeed, amongst the G7 group of nations we rank first for the quality of our research in infection and immunology.

UK immunology has thrived as part of a European ecosystem that supports an open exchange of talent, knowledge and technology that has enabled the collaboration necessary to accelerate scientific discovery. Under the EU science framework, our researchers have also benefited from access to crucial European funding.

The Prime Minister has said she is committed to "ensuring a positive outcome for UK science as we exit the European Union". The BSI is determined to do all it can to help make a virtue out of necessity and to forge a positive new scientific relationship with the EU. This means preserving our ability to recruit and retain the very best scientists, regardless of nationality. It also means protecting the mechanisms that support our ability to collaborate at scale with the very best science, wherever it is found. And finally, it means supporting our science base, putting science and innovation at the heart of a thriving knowledge-based economy, and cementing our place as one of the best places in the world to do cutting-edge research.

In science we have always accomplished more working together than in isolation and this spirit of cooperation and integration must continue to thrive in a post-Brexit landscape. In this briefing we outline key commitments that can help seize the opportunity before us to define a positive new relationship with the EU that recognises the value of science, innovation and immunology.

Brexit priorities

Priority 1: Negotiate continued access to Horizon 2020 and its successor programme

Horizon 2020, the EU's flagship science programme, funds research and promotes scientific collaboration through a number of interlinked initiatives worth nearly €80bn across six years. Research grants are allocated competitively, meaning that only the highest quality science is funded. The UK has an exceptional record of securing these funds and between 2007 and 2013 UK-based researchers secured €8.8bn in funding, having contributed €5.4bn to the programme.ⁱⁱ

Horizon 2020 is more than a simple funding mechanism. Many of its research grants are internationally collaborative and involve multinational consortia

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(which the UK often plays a leading role in). It has been instrumental in encouraging collaboration across Europe: for example, 'Be The Cure' is an EU funded collaboration linking immunologists in Glasgow, Leeds, Manchester and Oxford with 20 other academic and 14 industrial partners across the European continent to pursue cutting-edge research into rheumatoid arthritis. Similarly, Horizon 2020 Marie Curie fellowships fund scientific placements overseas, enabling researchers to build the relationships and networks that are the cornerstone of international collaboration.

Post-Brexit access to Horizon 2020 and its successor is achievable through negotiation (for example countries like Switzerland and Israel participate as "associate members"). Failure to continue our involvement with the programme would diminish our international standing and marginalise our researchers from some of the best science in the world. Horizon 2020 is a valuable source of research funding and one of the most important frameworks for international research collaboration. Securing our future in this programme and its successor should be a priority.

Priority 2: Increase science funding to put innovation at the heart of a revitalised knowledge economy

At the 2016 Autumn Statement the Chancellor announced a new £4.7bn investment over four years to "enhance the UK's position as a world leader in science and innovation". This is a welcome move and we await more details on where this spending will be directed.

Yet despite increases in spending the UK continues to fall behind other international competitors in terms of total R&D investment. After the increases announced at the Autumn Statement, public investment in R&D is around 0.59% GDP, somewhat below the OECD average of 0.67%. Taking public and private investment together, the latest figures show that we spend around 1.72% of GDP on science, significantly less than the 3% target set by the EU and below the OECD average of 2.4% GDP.ⁱⁱⁱ Slovenia, the Czech Republic, and Estonia all spend more on research as a proportion of GDP than the UK, while sustained and significant increases in science spend by competitor nations, particularly in Asia, means that the UK is being rapidly outpaced in terms funding for research.

Brexit presents an opportunity to recalibrate the science budget and – in the context of the Government's Industrial Strategy – place science and innovation at the heart of a revitalised knowledge economy. Our life sciences industry, working with academia and the NHS, is part of a biomedical revolution which has made us a world leader in innovation. It has taken us many years to reach this position. Capitalising on this status will require the pursuit of a long-term strategy to strengthen R&D investment across both basic and translational research activities to bring science spend more in line with other advanced economies. Doing so would send an important signal about the Government's commitment to maintaining the UK's status as one of the best places in the world to do science and research.

Priority 3: An immigration system that supports our ability to recruit the very best high value workers (e.g. immunologists)

Great science is only made possible by great scientists, and the UK's strength in immunology is an asset we are able to project across the world to attract the best and the brightest to work here. Researcher mobility supports not only a steady flow of students, researchers, and highly skilled workers (many of whom plug key skills gaps for the UK), but also the fluid transmission of ideas, innovations and knowledge that drive modern day research.

Just as important as attracting top talent is the freedom UK researchers have in being able to go overseas to broaden their horizons, learn new skills, and expose themselves to pioneering science. Indeed, between 1996 and 2012, 72% of the UK's scientists spent time at a non-UK institution^{iv}, gaining valuable new insight and building productive and lasting collaborative links. Mobility is also integral to collaboration. UK immunologists collaborate with colleagues in America, Asia and Australia, but the open borders of Europe, the common regulatory protocols of EU legislation, and our shared strategic priorities with partners on the continent mean that partnership with European countries is growing at a faster rate than anywhere else.^v Over half of the UK's research output was the result of international collaboration in 2015 and, notably, 60% of this was with partners in the EU.

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To make a success of Brexit we must be able to continue competing for the best scientific talent and our scientists must be free to learn and collaborate with the best Europe has to offer. Immunologists are high value workers and their work is of huge significance not only to science but also to the wider economy. We urge policymakers to explore bold options for streamlined entry systems for scientists and other high value workers, for example through a bespoke visa framework that preserves access to the skills and expertise sectors like science and academia so desperately need and that cannot be addressed within the domestic workforce.

Priority 4: Guarantee the rights of EU nationals currently resident within the UK

British scientific heritage is littered with examples of foreign nationals whose research has brought huge scientific and economic benefit to the UK only because they chose to adopt this country as their own. Nobel Prize winners such as César Milstein and the current President of the Royal Society, Sir Venkatraman Ramakrishnan, came here in part because of the magnetic attraction of world class science combined with an open and welcoming society.

Today, non-UK academics make up more than a quarter (26%) of staff in our universities with 16% (22,000) of those coming from within the EU.^{vi} Our national science base benefits hugely from this international mix. Beyond the cultural cross fertilisation that occurs through working closely with colleagues from different nations, a diverse workforce is also associated with increased research impact. For example, analysis of the 2014 Research Excellence Framework identified an association between high scoring institutions and the number of staff they have with international experience.^{vii} There are also benefits to productivity, as established in a 2013 report for the Department for Business, Innovation and Skills in which they found that migratory scientists tend to publish more articles per year on average than those with no previous non-UK affiliations.^{iv}

We have long profited from the extraordinary contribution foreign immunologists have made in this country. However, many of these individuals now feel vulnerable and uncertain about their future. We call on the Government as a matter of urgency to commit to giving

EU nationals currently residing here the right to remain and to continue enjoying the same privileges (such as access to public services like the NHS) as naturalised British citizens. Doing so would send a strong message to these people: that they are welcome, valued, and remain a vital part of our society.

ⁱ InCites TM, Thomson Reuters. (2012). Report Created: Jun 5, 2015, Data Processed March 18, 2015, Data Source: Web of Science

ⁱⁱ UK Office for National Statistics. (2013). UK Government Expenditure on Science, Engineering and Technology

ⁱⁱⁱ Eurostat. (2015). Gross domestic expenditure on R&D (GERD).

^{iv} Elsevier. (2013). International comparative performance of the UK research base.

^v Digital Science. (2016). The implications of international research collaboration for UK Universities.

^{vi} CaSE. (2016). Immigration: Keeping the UK at the heart of global science and engineering.

^{vii} Manville et al. (2015). Characteristics of high performing research units. Prepared for the Higher Education Funding Council for England.