

Written evidence submitted by British Society for Immunology

Introduction

- 1.1. The British Society for Immunology (BSI) is the largest immunology society in Europe. We represent the interests of over 3500 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. We are also a founding member of the International Union of Immunological Societies (IUIS), a member of the European Federation of Immunological Societies (EFIS), and work to develop close links with our international partners in North America, Australia and China.
- 1.2. Immunological science underpins many aspects of human health and the progression of disease. The application of immunological research extends across communicable disease and vaccination to the management and treatment of chronic diseases such as diabetes, asthma, allergies, arthritis, multiple sclerosis and even cancer and dementia. It is now becoming clear that immunological processes are key to the development of many common disorders not traditionally viewed as immunologic, including metabolic (diabetes), cardiovascular (atherosclerosis), and neurodegenerative conditions (dementia). These diseases are growing in prevalence and represent considerable health challenges for the 21st century.
- 1.3. As a nation we are world leading in our immunological research and rank first for research in infection and immunology amongst our G7 partners¹. Research into infection and immunity is crucial to tackle the alarming emergence of multidrug resistant microbial infections ("superbugs") and the recurring threat of viral pandemics (influenza, HIV, Ebola, Zika etc.), as well as improve and maintain global protection against common infections such as measles, diphtheria, mumps, polio, meningitis and tuberculosis. Many modern therapies that have improved outcomes and quality of life for millions of people with acute and chronic disease are based on targeted interventions using monoclonal antibodies. Immunological research has also led to ground-breaking advances in diagnostic approaches (flow cytometry for HIV infection and for leukemia; ELISA for essentially all biomarkers currently measured in diagnostic laboratories; histology for cancer) etc.
- 1.4. As highlighted in our report, [Immunology: An international, life-saving science](#), this world leading status has been built up over many years of global scientific collaboration and information exchange. The strength of our immunological science is an asset we are able to project to attract the best and the brightest minds from around the world. Membership of the EU has greatly facilitated these international links and we must ensure that as the UK's new relationship with the EU begins, fostering collaborations and partnerships is kept at the forefront.
- 1.5. The BSI welcomes the opportunity to submit evidence to this inquiry ahead of the science and innovation Summit in February. Our response builds on previous submissions to this committee. Here we focus on our key priorities.

Summary

- As phase II of negotiations begin and the UK's new relationship with the EU begins to take shape, it is very important to ensure the new partnership with the EU resolves outstanding issues that could potentially harm science, research and healthcare.
- In order for R&D output to continue to excel, the UK must retain access to European funding frameworks and programmes that support research, collaboration and skills training.
- The UK must have an immigration system that supports freedom of movement and does not impede the ability to recruit the very best researchers and high value workers from within the EU and internationally.
- The UK must retain access to infrastructure, networks and agencies and there must not be any impediment to transfer of expertise and information to the UK as a result of Brexit.
- The UK must give out a global signal that it is open to new talent and is committed to retaining scientific talent that is already here.
- It is important that communication with the science community continues to help inform policy and long-term plans for research.
- The BSI and partners in the science and healthcare sector welcomed the ambitious vision set out by the Government in the Future Partnership Paper on Collaboration in science and innovation. We especially welcomed the government's recognition that the sector needs certainty with regards to funding as well as the ambition to be part of the successor programme. The Government must now act on its ambitious vision and provide certainty for the future of UK science.

SCIENCE IN THE UK

The UK continues to be world-leading in immunology and other scientific disciplines. Much of this success can be attributed to the enormous financial support and collaborative research and training available through EU structural funding programmes and investment.

2.1 The UK punches well above its weight as a research nation – this is something that should not be taken for granted. The UK's share of worldwide R&D spend is approximately 2.7%, while accounting for 4.1% of researchers and 15.2% of the world's most highly-cited articles.ⁱⁱ

2.2 In order for scientific research and innovation to continue and prosper, the UK must retain access to UK/EU structural funding and research programmes up to and beyond 2020. The UK is one of the main benefactors of Horizon 2020 funding and its predecessor FP7 and a net benefactor. Between 2007 and 2013, the UK secured d €8.8bn in funding, having contributed €5.4bn to the programme. In the event, that continued access to this framework cannot be secured, it will be

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essential that the government negotiates secure funding to facilitate international collaborative mechanisms to maintain and grow the research environment.

Example of EU funding supporting world-class immunology research:

Horizon 2020 is more than a simple funding mechanism. Many of its research grants are internationally collaborative and involve multinational consortia (which the UK often plays a leading role in). It has been instrumental in encouraging collaboration across Europe. For instance, 'Be The Cure' is an EU funded collaboration linking immunologists in Glasgow, Leeds, Manchester and Oxford with 20 other academic and 14 industrial partners, including AstraZeneca and GlaxoSmithKline, across the European continent to pursue cutting-edge research into rheumatoid arthritis. The programme is part of the EU's Innovative Medicines Initiative (IMI), a funding framework that aims to connect academia and industry.

2.3 The UK must also retain access to funding through the ERC, Erasmus, Marie Skłodowska-Curie and Structural Funds, which in addition to Horizon 2020 contribute to the success of the life sciences and the national economy. Marie Curie fellowships fund scientific placements overseas, enabling researchers to build the relationships and networks that are the cornerstone of international collaboration. The highly competitive European Research Council provides funding opportunities for researchers and is especially recognised as valuable by early-career researchers seeking an independent research career.

2.4 The Government must also be held to account to increase total investment in UK R&D. The Government has committed to meet a target of 2.4% of GDP invested in UK R&D within ten years, and a longer-term goal of 3%ⁱⁱⁱ. Overseas investment, including investment from the EU (such as Horizon 2020 and structural funds) also makes a significant contribution towards the target so losing this investment would be a major setback.

2.5 Post-Brexit access to Horizon 2020 and its successor as well as other European funding platforms is achievable through negotiation (for example countries like Switzerland and Israel participate as "associate members"). Failure to continue our involvement with these programmes 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, its successor and other research funding programmes should be a priority.

INTERNATIONALISM

Great scientific breakthroughs often rely on international collaboration and foreign talent. For continued success, the UK must not impede skilled workers and must guarantee rights for EU researchers.

3.1 Scientific knowledge does not respect borders drawn on a map and is inherently an international endeavour, and this is particularly true for immunology research. Free movement of people is important for unimpeded flow of students, researchers and highly skilled workers, both from overseas to the UK, and from the UK abroad, and has allowed to create a community of world-class immunological talent. Research output will be hindered by hard borders in place for highly

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skilled researchers and other skilled workers essential for the research pipeline. Similarly, the UK needs to ensure frictionless exchange of samples, specimen, data and other resources.

- 3.2 Central to the success of UK immunology research is participation in international clinical studies. At the moment, the UK can only participate in European trials if they adhere to the same regulations. This is especially important for rare diseases, where international collaboration is crucial to ensure access to sufficient numbers of patient and therefore reliable datasets. International studies therefore must continue after Brexit in order to ensure the UK is not limited in its ability to collect valuable and significant data for rare diseases.
- 3.2 The success of UK immunology and other scientific disciplines extends beyond Europe, to American, Canada and Asia. It is important to recognise and to build on international links. The British Society for Immunology and the Chinese Society for Immunology are embarking on a partnership to facilitate greater collaboration between UK and Chinese researchers. A formal [letter of intent](#) was signed in 2017 at a joint UK-Chinese immunology meeting in Shanghai. The research councils and government agencies should continue to support and encourage multinational partnerships in immunology and the wider life sciences to emerging powerhouses, such as China.

Example of a non-EU network at risk losing output from disruptions to free movement:

The European Molecular Biology Laboratory (EMBL) is an intergovernmental organisation funded by 21 treaty members. It prides itself as “at the forefront of innovation in life science research” with historic successes in first systematic genetic analysis of embryonic development in the fruit fly and first sequencing the human genome to today generating large complex molecular datasets, allowing researchers to understand immune responses in unprecedented detail. It is the embodiment of international collaboration at the cutting edge of life sciences research with five sites across Europe each serving a specific field. The European Bioinformatics Institute (EMBL-EBI) in Hinxton, near Cambridge, is one of these sites and acts as a global hub for hosting, development and curation of bioinformatics data. Although the UK's current membership in the EU has no impact on its eligibility of the EMBL-EBI to compete for funding, there are a number of disruptions which will result from obstructions to free movement of people within the EU. Thus, consequences of losing free movement extend beyond EU-specific networks.

- 3.3 The UK needs an immigration system that supports free movement and continues to attract global scientific talent at all professional levels. We urge policymakers to explore 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.
- 3.4 Similarly, the UK needs to participate in high profile exchange programmes for British students, scientists and clinicians to receive short and long-term training and gain specialist knowledge in the leading institutions in the world. This is invaluable to the research base in the UK where skills and expertise gained overseas can then be brought back to the UK to conduct state-of-the-art research, apply knowledge for commercial exploitation, and improve clinical practice.

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- 3.5 Free movement is also essential for UK researchers in the EU and EU researchers in the UK. Today, non-UK academics make up 26% of staff in UK universities with 16% of those coming from within the EU^{iv}. Though the two parties reached a 'common understanding' at the end of Phase 1, the rights of these people still must be guaranteed and issues addressed. Guaranteeing the rights of EU nationals currently resident within the UK and freedom of movement for these people should be a top priority going into Phase 2.

NETWORKS, INFRASTRUCTURE AND AGENCIES

Leaving the EU risks leaving networks, infrastructure and agencies that are key to success in UK research, innovation and patient care.

- 4.1 Leaving the European Union will result in the relocation of key agencies, such as The European Medicines Agency (EMA) and EU Reference Laboratories and the potential loss of expertise sharing from agencies such as the European Centre for Disease Control (ECDC). The ECDC, for example, is essential for monitoring and combatting major public health crisis', such as major flu outbreaks, at the EU level^v. The Government must ensure that flow of information from EU agencies such as the ECDC and access to European Reference Laboratories continues after Brexit. Euratom, which is currently essential for basic clinical research and clinical use of radioisotopes.
- 4.2 Regulations should remain congruent with those of the EU or to a similar standard and changes made to The European Withdrawal Bill with regards to medicines must be thoroughly scrutinised and key stakeholders consulted.

Further, maximum cooperation and alignment with the European Medicine Agency (EMA) is especially important and negotiations on this future relationship should be a top priority. We welcomed the letter from Jeremy Hunt MP and Greg Clark MP recognising the importance of a continued close working relationship with the EMA and a new relationship that supports the UK life sciences and brings the greatest benefit to patients^{vi}. Though stated in the letter that they will work to ensure licensing times do not become longer than at present, the science community still lacks clarity on what the post-Brexit landscape will look like for bring medicines and new technologies to market and this must be pursued without haste.

Countries such as Switzerland that are not members of the EU, EEA and therefore not member of the EMA are estimated to receive access to new medicines an average of 157 days later than the rest of the EU^{vii}. This must not happen to the UK. Patients in the UK must not receive delayed or restrictive access to new medicines and medical technologies.

- 4.3 Through the negotiations, transition period and beyond, there must be adequate support for and communication with UK agencies that rely on support and knowledge sharing with European counterparts, such as the EMA, ECDC and EU reference networks.
- 4.4 In addition to retaining access EU agencies and infrastructure to or harmoniously transitioning EU laws into UK law, the Government must continue to encourage homegrown infrastructure. We welcomed the commitments made in the Industrial Strategy White Paper, as well as the £70 million from the Industrial Strategy Challenge Fund for manufacturing announced by Science and Universities Minister, Sam Gyimah MP in January^{viii}.

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4.5 A transitional agreement with the EU on regulatory frameworks, databases, and medicines protocols is required immediately. A phased approach should be considered and there must be maximum cooperation and alignment with the European agencies.

TALENT RETENTION AND RECRUITMENT

The UK has always been very successful in recruiting and retaining the best scientific researchers. UK science is only as good as the scientists it employs, so ensuring this is not inhibited or slowed down is critical to future success.

- 5.1 Leaving the EU presents an opportunity to position the UK as a global science hub with both EU and non-EU partners. The UK must put out positive messages that the UK is open to new talent and must maintain an incentive for EU and international talent to enter the UK science pipeline. In addition, the UK must guarantee the rights to remain for EU researchers who have built a career and life in the UK.
- 5.2 We welcomed the £100 million Rutherford Fund announcement and the Tier 1 assurances to continue to attract the best talent. The Government should also develop incentives and pathways to recruit students and skilled workers who may not fall under the Rutherford or tier 1 categories, such as laboratory technicians, early career researchers and students who bring in a large proportion of funding to our academic institutions.

ⁱ All Party Parliamentary Group on Global Health. 2015. The UK's contribution to health globally: benefitting the country and the world.

ⁱⁱ Elsevier. 2016. International comparative performance of the UK research base.

ⁱⁱⁱ Autumn Budget.

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

^v European Centre for Disease Prevention and Control. 2018. Influenza.

^{vi} Financial Times. 2017. The UK wants to continue to work with the EU on medicines.

^{vii} Brexit Health Alliance. 2018. Brexit and the impact on patient access to medicines and medical technologies.

^{viii} Department for BEIS, Innovate UK, Lord O'Shaughnessy and Sam Gyimah. 2018. Industrial Strategy boost for UK medicines with £70 million of funding to develop new treatments.