

# Potential impact of the UK's withdrawal from the EU on funding for universities and scientific research

October 2016

The British Society for Immunology (BSI) is the largest immunology society in Europe. We have more than 3000 members 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. The BSI has strong links that extend internationally and we are a founding member of the International Union of Immunological Societies (IUIS) and a member of the European Federation of Immunological Societies (EFIS).

Immunological science underpins many aspects of human health. The UK is world leading in this area and we rank first in the G7 for the quality of our research in infection and immunology. The application of immunological research extends across communicable disease and vaccination to the management and treatment of chronic diseases such as diabetes, asthma, allergies, and cancer. It is also now becoming clear that immune responses are key to the development of many common disorders not traditionally viewed as immunological, including metabolic, cardiovascular, and neurodegenerative conditions. These diseases are growing in prevalence and are considerable health challenges in the 21st Century. Immunology is also fundamental to the life sciences industry; the discipline is core to the development of modern antibody therapies, cellular therapies, small molecule drugs, vaccines and 'biologics' (therapeutic biomolecules).

## Key points:

- Science is a global pursuit. Spending on research must be considered in that context and pays back handsomely in driving national prosperity; however, we lag well behind key competitor nations in research spend.
- A mixed economy of funders that includes government funding (administered through the research councils/NIHR) and other sources (including charities, private business, and the EU), has enabled the UK to remain a leader in world class science.
- Historically, we have been very successful in competing for EU funding. EU funds (administered through the Horizon 2020 Framework Programme) deliver a vital investment in UK science and research. Loss of these funds would damage:
  - Our ability to lead and innovate in the highest quality science.
  - Our collaborations across Europe and elsewhere.
  - The attractiveness of the UK to excellent scientists from overseas.
  - The careers and training of talented early career researchers.
  - Internationally, researcher training, which depends on inward and outward mobility and is key to modern science. Isolationism is profoundly damaging to scientific progress.

# Potential impact of the UK's withdrawal from the EU on funding for universities and scientific research

October 2016

## **Current funding context**

Funding is the lifeblood of outstanding research and innovation. In immunology, high quality research not only advances our health and wellbeing but is also crucial to improving economic prosperity as a core component of a thriving life sciences industry.

## ***UK immunology world-leading***

A mixed economy of funders comprised of research councils, charities, business and others has enabled the UK to develop a world leading research base. We rank first in the G7 for the quality of our research in infection and immunology.<sup>i</sup> As a whole, we are responsible for 15.9% of the world's most highly cited articles despite being home to only 4.1% of researchers, 3.2% of global R&D spend, and 0.9% of the global population.

## ***Investment in science lags behind competitor nations***

Since 2004 UK public and private investment in scientific research has been internationally low and falling. Between 1985 and 2013 Gross Expenditure on Research and Development (GERD) grew by 52% in real terms but fell as a proportion of GDP from 2.01% to 1.67%, well below the EU target of 3%.<sup>ii</sup> Science is a global pursuit and national investment must be considered in a global context. It is therefore concerning that domestic investment in R&D is historically low compared to competitor nations, particularly Asia (Figure 1 shows latest complete data available for select countries).<sup>iii</sup>

## ***Despite its importance and potential value, immunology is neglected***

The 2015 Spending Review brought the welcome news that the science budget would be protected in real terms, rising each year in line with inflation. Nevertheless, spending in immunology continues to decline. For example, the value of grants awarded by the Infection and Immunity Board at the Medical Research Council (the research council responsible for distributing government funding for medical research) has fallen from £42.1m in 2012/13 to £26.2m in 2015/16.<sup>iv</sup> This is despite the success of immunological research in opening up novel highly successful approaches to the treatment of inflammatory diseases and cancer. Indeed, spending on inflammatory and immune science at the MRC is just 5% of total expenditure. By contrast spending on cancer is double this and on neurological and mental health quadruple.

# Potential impact of the UK's withdrawal from the EU on funding for universities and scientific research

October 2016

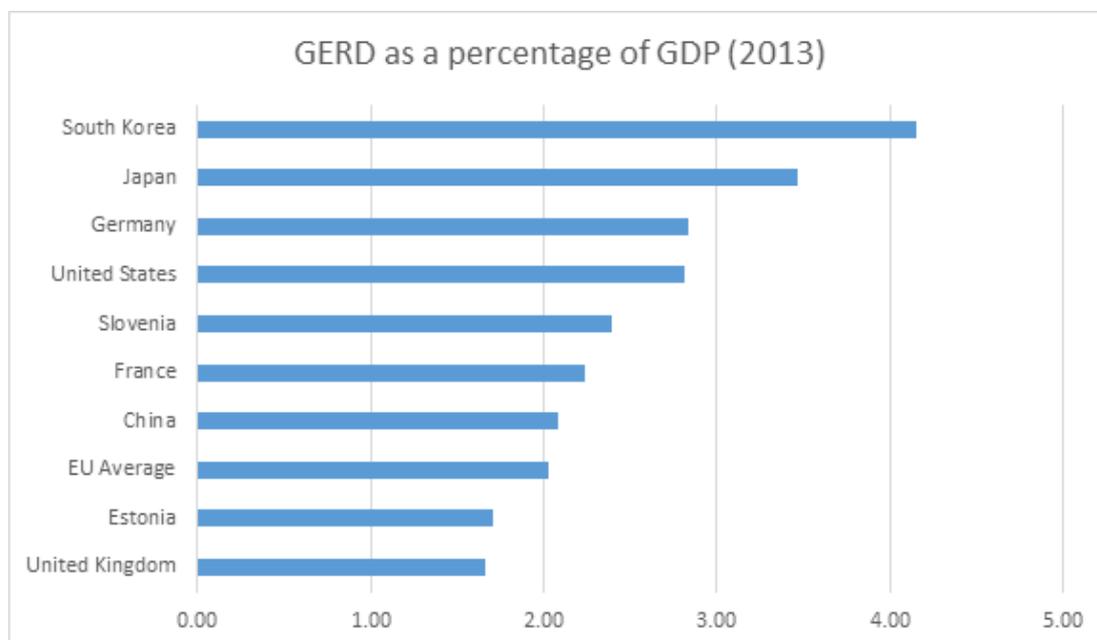


Figure 1 GERD as a percentage of GDP in 2013

## ***EU funding a vital component of overall funding mix***

European funding therefore constitutes a valuable source of income for UK researchers. 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. We have an exceptional record of securing these funds and between 2007 and 2013 UK-based researchers secured €8.8bn, a value second only to Germany. During this time Oxford, Cambridge, Imperial College London, and University College London, were awarded more Framework Programme funding than any other universities in Europe. The UK benefits disproportionately from EU science programmes, with figures from the ONS showing that we contributed €5.4bn for the €8.8bn we got back.<sup>v</sup>

## **Impacts of the UK's withdrawal on funding for universities and scientific research**

In August, the Chancellor announced that the Treasury would underwrite EU funding from Horizon 2020 grants even when specific projects continue beyond the UK's departure from the EU. This is a welcome move but does not address the issue of access to vital EU funding in the long term.

Post-Brexit access to Horizon 2020 funding could be retained through the UK gaining associated member status (as achieved by countries like Switzerland and Israel). However, the future model ultimately adopted depends largely on the outcome of political negotiation. Preserving access should be an absolute priority, as failure to do so would be extremely deleterious for UK science and immunology.

An alternative model could see the UK Government negotiate bilateral or multilateral arrangements with countries in and outside of the EU, or invest in more globally collaborative science through funds like the Global Challenges Research Fund. However, these would likely take many years to set up and in any case should complement, rather than replace, existing arrangements.

# Potential impact of the UK's withdrawal from the EU on funding for universities and scientific research

October 2016

## **Loss of collaborative funding opportunities**

Loss of access to Horizon 2020 means more to universities and researchers than a loss of vital research income. Horizon 2020 funding grants are intrinsically collaborative, linking UK researchers with the best science from across the EU. For example, Joint Programming Initiatives coordinate scientific collaborations on issues of pan-continental importance, such as Antimicrobial Resistance.

Meanwhile the Innovative Medicines Initiative (IMI) is a joint undertaking between the EU and the European Federation of Pharmaceutical Industries and Associations (EFPIA). It is the largest public-private partnership in the life sciences, with a budget of €3.3bn funding more than 50 projects over 10 years. Half of this value comes from Horizon 2020 while roughly the other half is committed by private life sciences companies that are part of the EFPIA. The aim of IMI is to fund collaborative research partnerships between academic and life science researchers and other stakeholders. One such initiative that has benefited significantly from the project is Be The Cure, a collaboration linking immunologists in Glasgow, Leeds, Manchester, Kings College London, and Oxford with 20 other academic and 14 industrial partners across Europe. The project has received €35m in EU funding which has supported world leading research on Rheumatoid Arthritis.

## **Impact on early career researchers**

Loss of EU funding would also significantly impact Early Career Researchers, who are able to utilise a number of schemes under Horizon 2020 to launch or build their careers. For example, the European Research Council, the funding body that will distribute €13bn of Horizon 2020 funds from 2014-2020, offers starting grants to enable promising young researchers to make the transition from post-doc to independent investigator.

Moreover, Horizon 2020 also greatly supports female early career researchers. At the beginning of the last government £6.78m of public funding was available to specifically support the careers of women in Science, Technology, Engineering, and Mathematics (STEM) through the UK Resource Centre for Women in STEM. This stream was shut down in 2012 while other sources

have also scaled back funding support in this area such that in 2014/15 only £2.47m of domestic funding was available to support female researchers.<sup>vi</sup> European funding makes up for diminishing UK programmes in this area, as one immunologist told us:

*"In such an environment, women like me rely on EU funding to plug the gap. Loss of EU schemes is likely to disproportionately affect women, as it is well documented that women are less successful at winning grants and making the transition to independent researcher compared to male counterparts. Furthermore, I am currently on maternity leave, a right protected by the EU which if lost or scaled back in post-Brexit legislation would also damage my ability to remain in science."*

## **Impact on researcher mobility**

European funding also supports high levels of researcher mobility. For example, Marie Skłodowska-Curie Actions provide grants that enable researchers to work in different sectors, institutions, and disciplines across Europe. Marie Curie actions are available at all career stages and enable vital opportunities for scientists to immerse themselves in new settings and learn new skills. These opportunities are particularly vital at the early career stage and many highly talented young scientists have launched their research careers in the UK because they have been supported to locate here through Marie Curie grants.

Types of Marie Curie awards include Innovative Training Networks, which fund partnerships between universities, research institutions, and non-academic bodies, Individual Fellowships, which enable experienced researchers to move to other countries within or beyond Europe, and Research and Innovation Staff Exchanges that finance short term mobility exchanges between different sectors or institutions. These initiatives are hugely important in enabling scientists to move around and broaden their horizons, learning new skills and following the greatest science wherever it is found.

# Potential impact of the UK's withdrawal from the EU on funding for universities and scientific research

October 2016

## **Impacts on higher education and small businesses**

Leaving the European Union will have very specific impacts for higher education and life sciences and biotech businesses. For example, the European Investment Bank has played a key role in helping universities finance infrastructure upgrades to enable them to compete in a global marketplace with world class research facilities. In March the University of Edinburgh borrowed £200m from the EIB while just weeks later UCL announced that it had secured £280m of EIB investment, the largest sum ever lent by a bank to a university.<sup>vii</sup> Small innovative businesses have also been able to leverage significant amounts of EU funding through the European Investment Bank, the European Investment Fund, Horizon 2020, and European Regional Development Funds. These sources of income are a fundamental part of the investment ecosystem for small start-ups, for example university spin-offs, and are often crucial to leveraging private investment for expansion.

Universities are further reliant on fee income from students. Anecdotal evidence from our members indicates that it is not uncommon for non-UK EU PhD students to outnumber UK residents. It is therefore extremely concerning that the latest figures available from UCAS indicate a 9% fall in applications from EU students for the most competitive university courses.<sup>ix</sup>

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

<sup>ii</sup>UK Gross Domestic Expenditure on Research and Development: 2013

<sup>iii</sup>Data from Eurostat (2015). Gross domestic expenditure on R&D (GERD)

<sup>iv</sup>MRC Annual Report 2015/16

<sup>v</sup>UK Office for National Statistics. (2013). UK Government Expenditure on Science, Engineering and Technology

<sup>vi</sup>Science and Technology Committee (2014). Sixth Report: Women in scientific careers.

<sup>vii</sup>£200m loan boosts University standing

<sup>viii</sup>UCL agrees £280m European Investment Bank loan for campus developments

<sup>ix</sup>UCAS (2016). UCAS Undergraduate analysis reports.