

Written evidence submitted by the MRC Human Genetics Unit at the University of Edinburgh and the MRC Protein Phosphorylation and Ubiquitylation Unit at the University of Dundee (USC0001)

We write in response to the UK Parliament Scottish Affairs Committee's Call for Evidence in relation to **Universities and Scotland**. Our evidence pertains to "*How Scottish university research fits in with UK university research*".

We write as the directors of two UKRI Medical Research Council (MRC) Units based in Scottish Universities; the MRC Human Genetics Unit at the University of Edinburgh (<https://www.ed.ac.uk/mrc-human-genetics-unit>)

and the MRC Protein Phosphorylation and Ubiquitylation Unit at the University of Dundee (<https://www.ppu.mrc.ac.uk>).

As part of UKRI, the MRC invests 40% of its annual budget on an intramural portfolio of institutes, units and centres. MRC Units are long term investments that tackle important, often high risk, research questions that cannot be addressed adequately through short-term response-mode grant funding. MRC Units develop new methods and research facilities, foster interdisciplinarity, and spearhead training of the next generation of research leaders.

Most MRC Units are embedded within universities (MRC University Units) and, because of the scale and sustainability of their research funding - reviewed and renewed every 5 years, they have a major impact on the research landscape of the universities that they are embedded in, including in Scotland. The scale and quality of research funded in MRC Units greatly enhances academic leadership within the host university as well as the Research Excellence Grant (REG) income that the host university receives from the Scottish Funding Council. It provides a stable career path for research scientists with specialist expertise and underpins the provision of well-equipped state of the art facilities. MRC-funded programmes enable MRC Units to provide internationally leading training programmes for cohorts of PhD students and scientists.

We illustrate these points with specific examples of how the MRC HGU, the MRC PPU impact on research in their host Scottish universities, and how they integrate with the wider UK research landscape.

The Human Genetics Unit is the largest MRC Unit in the UK and its core grant - at £53M over a 5 year period - is the biggest single UKRI research grant to the University of Edinburgh. It leads its own 4-year MRC doctoral training programme (DTP) with approximately 40 PhD students in training at any one time. In addition, the MRC HGU has a significant role in the MRC DTP Precision Medicine as well as other UKRI PhD programmes (EastBio and Biomedical Artificial Intelligence). The HGU also leads a pioneering training programme, jointly funded by MRC, University of Edinburgh and Cancer Research UK, for cross-disciplinary fellows bringing postdoctoral scientists from physics and maths into biomedicine.

MRC investment in the HGU also has reach into the wider Scottish and North of England research communities through its joint leadership (with Heriot-Watt University) of the Edinburgh Super Resolution Imaging consortium (ESRIC). This is a national advanced imaging facility for biomedicine, established and sustained by ongoing capital investment by the MRC/UKRI estimated at >£6M since its establishment in 2013. ESRIC runs the only residential super-resolution imaging summer school in the UK allowing scientists at all levels – from students to facility managers - to interact with international leaders in the field, major microscope manufacturers and the latest commercial imaging platforms.

The MRC HGU is part of Health Data Research UK (HDRUK) leading genetic work packages at the Scottish hub and it works closely with the UK Biobank (UKBB), including developing novel computational compression algorithms that facilitate interrogation of UKBB data. In collaboration with groups in London, the MRC HGU is leading a new large UKRI/MRC-funded project into genetic factors that might contribute to chronic fatigue syndrome/myalgic encephalomyelitis and is a key partner in national and international efforts to study the genetic basis of critical illness, including of Covid-19.

Through its expertise in human genetics, bioinformatics and machine learning, the MRC HGU provides the computational interpretation pipelines for prioritising mutations that cause genetic disease across Scotland at population level. Genome sequencing data from all four regional NHS Scotland clinical genetics services is sent to the HGU for analysis and interpretation, and the data then returned to the referring clinical geneticists. This nationwide

genetics service is funded for three years by the Scottish Government and has made Scotland an international leader in genomic medicine.

Research within the MRC-PPU at the University of Dundee encompasses nearly 200 highly trained staff from over 25 countries whose research focuses on understanding, diagnosing and treating major human diseases including Parkinson's disease, cancer and immune disorders. Work undertaken at the MRC-PPU aims to tackle major unanswered questions in human health, by employing rigorous and innovative methodologies to produce robust data of the highest quality and by being able to recruit the most talented worldwide. To maximise success, we work closely with leading pharmaceutical companies and clinicians. The MRC-PPU is supported by a core grant from UKRI of £25M over 5 years. In addition, MRC-PPU investigators have been awarded a further £16M from Industry and £24M from other UKRI grants, Wellcome trust charities and foundations over the last 5 year period.

The MRC PPU hosts one of the countries largest and longest running collaborations between the pharmaceutical industry and academia. The Division of Signal Transduction Therapy (DSTT) consortium has attracted more than £65 million of funding into Scotland following its successful renewal in 2020. The weight of the research that the MRC-PPU undertakes with pharmaceutical companies is focused on helping industry gain knowledge and access to key services and reagents needed to launch and accelerate the development of future drugs.

The MRC-PPU organises itself to encourage collaborations between our researchers, and other Scottish, UK and International institutions in order to tackle major challenging projects on better understanding and treating human disease. The MRC-PPU possesses a strong desire to act as a hub to help support Scottish and UK Life Sciences projects. For example, in collaboration with the Centre for Virology Research at the University of Glasgow we recently exploited our capabilities to generate proteins and antibodies towards all Covid-19 components and distributed these worldwide through a new website (<https://mrcppu-covid.bio/>). We also have a number of collaborative projects with the UK Dementia Research Institute.

Training the next generation of PhD students and postdoctoral researchers to the highest level, in a multidisciplinary environment in order to maximise their potential to make major contributions to scientific progress and drug discovery, is a key priority for the MRC-PPU. To aid worldwide research, our Unit makes available to external researchers and industry all of

its unique technology platforms and reagents. This includes new state of the art mass spectrometry technologies that we have developed and use of our protein and antibody production, cloning and CRISPR/Cas9 genome editing service. All MRC-PPU scientific services and reagents can be requested through our website (<https://mrcppureagents.dundee.ac.uk/>).

In summary: Intramural UKRI investments in Scottish Universities have an enormous impact on the research activities and capabilities of Scottish universities, and are an integral part of the wider UK university research landscape. Therefore, UK government policy, through its funding of UKRI and the Research Councils, has an enormous impact on scientific research and training in Scotland.

Yours sincerely,

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