Vulnerable skills consultation

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The Biotechnology and Biological Sciences Research Council (BBSRC) and Medical Research Council (MRC), in association with the Society of Biology, recently conducted a survey of vulnerable or potentially vulnerable research skills and capabilities within the UK.

A skill can be defined as vulnerable for a number of reasons. These include: a small or decreasing number of individuals with expertise in a particular area, with or without adequate succession planning; limited training opportunities for individuals; a lack of career paths to preserve skills and local changes in support for areas without due consideration of the wider impact.

Addressing vulnerable skills is a concern across the science community and the Biochemical Society welcomed the chance to highlight sensitive areas of biochemistry. As such the Society responded to this survey and recommended that two key skills be considered by the Research Councils: metabolic biochemistry and physical biochemistry. These are both crucial areas that arguably underpin our fundamental understanding of biochemistry as a discipline.

Metabolic biochemistry is of key importance in deciphering genome sequences, metabolic engineering and research into obesity, diabetes and the metabolic syndrome as well as in plant biochemistry and microbial metabolism (new products). It is also re-emerging as a topic in cancer research.

The rapidly expanding field of industrial biotechnology is supported by novel areas of metabolic biochemistry research in the pursuit of novel routes to biofuels and platform chemicals from renewable resources. Research in relation to food security is also supported by areas of metabolic biochemistry, particularly in relation to secure harvests; for example, crop productivity and food quality depend on plant metabolism.

Given the relevance and importance of this area of expertise, its vulnerability may seem surprising. However, there is arguably a shortage of UK candidates for research positions in this area. This is perhaps because current numbers of researchers involved are low because of restricted scope of teaching in current undergraduate courses. As such, the future supply may not meet demand. There is also the concern that areas relevant to industrial biotechnology, such as genome-scale metabolic reconstruction from microbial genomes, are not represented in current textbooks and undergraduate courses.

The Society also highlighted physical biochemistry as a research capability that should be considered vulnerable. This includes the quantitative study of biochemical processes using physical techniques and principles that underpin the 'core' of many biochemical studies, providing the interface between structural and functional data.

Physical biochemistry supports many subject areas such as biofuels, synthetic biology, drug design and biopharmaceuticals; areas that all have been recognized as having significant impacts economically.

This topic, in some incarnation, forms the basis of many undergraduate biochemistry degrees. However, given the frequent need for advanced mathematics, it is often only popular with the subset of students that already studied mathematics. As such, it is a less pursued option for doctoral studies, where it is rarely studied as a sole subject, but as underpinning to synthetic and structural biology.

A survey of the top 20 institutions for biochemistry shows that each has a small number of people working in this area. However, the age profile of such people often tends towards retirement age. There can also be said to be a lack of career paths to preserve skills. Physical biochemistry has been a defined discipline for over 100 years, and therefore there is a temptation to regard it as always being there. However, if the base of the subject, as well as its future development is not secured, we will not have the skill sets to underpin many key research areas.

When considering vulnerable skills, there will always be an apparent tension between encouraging home-grown talent over buying in overseas expertise. The question 'why does the skill need to be enhanced in the UK, rather than by recruiting individuals from abroad?' is often asked. However, these two need not be seen as a zero-sum game. In order to attract overseas talent, there must be a solid scientific base for the subject existing in the country. Likewise, with a solid scientific base, overseas talent is naturally attracted to the country because of the favourable circumstances, thus enhancing the work already performed here. Alternatively, loss of home-grown talent not only reduces the basis for longevity in a subject, but also makes the country unattractive to overseas talent. ■

The BBSRC and MRC will use the information from the survey to help identify whether there are any research skills requiring strengthening and, if so, what interventions would have maximum benefit.