

Consultation on BBSRC's new Strategic Plan 2010 – 2015

Response submitted by the Society for General Microbiology

Introduction

The Society for General Microbiology (SGM), founded in 1945, is an independent learned and professional scientific body dedicated to promoting the 'art and science' of microbiology. It has established itself as one of the two major societies in its field, with some 5,000 members in the UK and abroad. Further information about SGM is provided in Appendix 1.

General comments

This response has been collated from inputs from a number of members of SGM's governing Council. In general, the individual responses were supportive of the strategic priorities and enabling themes. The SGM response will, of course, relate mainly to microbiology. A world-class base for microbiology in the UK will be crucial for the BBSRC strategic priorities of Bioenergy and Biorenewables, Food Security and Bioscience for Health.

A substantial proportion of the global biomass is microbial, including microbial algae; much of the new biotechnology of harnessing bioenergy and biorenewables will involve microbial fermentation and related processes. Defining and classifying the microbial biota and developing skills in this field and in microbial ecology in natural and harnessed environments will be essential. Regarding food security, microbiology impinges on both plant and animal food resources. It is important to reiterate that microbiology includes virology, mycology, eukaryotic microbes, prions and archaea, as well as bacteria. It is also essential to maintain adequate levels of underpinning or so-called niche skills such as systematics, fermentation and physiology.

A frequently-expressed concern was that BBSRC seems to be heading more and more into ring-fenced initiatives led by government priorities and economic factors, with a concentration on 'big science' at the expense of basic and curiosity-led research. It is good that a commitment to responsive mode funding is mentioned in the strategy document, but the funding needs to be maintained at adequate levels.

Specific comments

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Mention that some strategic priorities and enabling themes are continued from the 2003 – 2008 strategic plan; others are new. Mention which retained ones are to receive increased priority. Useful if 'skilled people and jobs' mentioned 'training.

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The plan should focus on areas where the UK is traditionally and potentially strong: basic microbiology, basic plant science, evolutionary biology, systems biology, genome analysis, structural biology, biological chemistry, cell biology, bioinformatics and tools. The fields of metagenomics and synthetic biology should be fostered. What is going to happen to evolutionary biology in the country of Charles Darwin if the BBSRC strategic plan does not make even a passing mention of it on the 150th anniversary of the publication of *On the Origin of Species*?

Support of the BBSRC Institutes should be continued, although their mention in the plan sits uncomfortably with the current divestment by BBSRC of responsibility for them, which makes the commitment ring rather hollow.

Regarding the question about constraints in public funding leading to more focus on areas where BBSRC can have most impact, top quality curiosity-driven research must be protected. Identification of priority focus areas should involve the research community – they are best placed to see the full potential of technologies coming on stream, but they need to be encouraged to think of useful applications as well as high impact papers.

The concentration of IAH animal virology at a single site (Pirbright) with modern facilities is welcomed, but adequate provision must be maintained at for microbiological studies, including bacteriology and mycology, at other BBSRC institutes such as Babraham, John Innes and Roslin.

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Consider adding basic biosciences as a fourth key strategic priority, as it would develop the recognized strengths of biological sciences in the UK. Curiosity-driven research is often high risk, but is the source of major breakthroughs.

Quantitative and modelling approaches are important, but should not be over-emphasized to the detriment of other areas.

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Is food safety through the supply chain material for BBSRC research?

The Genome Analysis Centre (TGAC) is supported, but must be complementary to rather than competing with the Sanger Centre, where the Wellcome Trust provided a strong lead in establishing genomics of bacteria, eukaryotic parasites, and most recently, viruses. The risk of over centralization and loss of local expertise in bioinformatics must be guarded against.

International collaborations will be important as food security is an international as well as a national problem. Geopolitical considerations may be added.

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The human intestinal microbiome should be added as an essential element in any full understanding of basic human biology and health. The tools for its investigation and monitoring by next generation sequencing are available now and the UK is lagging behind US and European advances in this area.

There is mention of diagnostics and in its broadest sense, i.e. encompassing food and environmental areas as well as disease, this is an area where there is enormous potential for biotech innovation and start-up/SME involvement, as it is not entirely dominated by big pharma. Also there are great opportunities in this area at the interface with engineering and physical sciences.

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These targets merit strong support, and the development of mathematics and computational skills should be pursued with vigour.

The adoption of multidisciplinary approaches and teamwork needs specific fostering and even training for experienced scientists who have developed in a previous era. There is a need to open the eyes of industry as well. We need more examples of how systems approaches have fed all the way through to innovative and profitable industrial processes. Why does systems biology attract so few high quality applications for funding? Does it need to be more clearly defined? Does the emphasis on systems approaches run the risk that the value of high quality conventional biological research is unfairly being minimized?

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The emphasis on PI as the main career objective sidelines the problem that most postdocs do not reach this and fall by the wayside. These people represent an enormous investment in training and have valuable contributions to make as skilled researchers and technical experts. It is wasteful for this system to discard them, and the concordat must do more to provide them with a career structure.

The vacation research bursaries for undergraduates are an excellent investment, and go some way to make up for the decline in practical work in undergraduate courses. SGM has long recognized the value of this, and in 2008 provided vacation studentships to a record 65 students, at a total cost of £112,000.

As mentioned above, training in interdisciplinary working needs to be provided for PIs as well as junior researchers.

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The research and technology club model could possibly be extended to drug delivery and bionanotechnology.

Concern has been expressed about whether the objectivity and quality of peer review in the industry clubs will always match BBSRC committee good practice.

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The awards are an excellent incentive for researchers at all levels, but could be structured to include incentives for individuals closer to the beginning of their careers.

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The list of other named funders is limited to government bodies, but could usefully be expanded to include named large charitable funders such as the Wellcome Trust, where collaboration and joint programmes are important.

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International collaboration and EU funding are very important; considering the amounts of money the EU spends on R&D it might rate more of a mention, including how the BBSRC strategic plan meshes with current and proposed EU funding streams.

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The economic impact studies tackle an area that has not received enough prominence in the past, and it will be essential to communicate the findings widely and effectively.

Appendix 1

About the Society for General Microbiology

The Society for General Microbiology (SGM) was founded in 1945 and is now the largest microbiological society in Europe. It has over 4500 individual members of whom 75% are resident in the UK. The remainder are located in more than 60 countries throughout the world. Almost all full members are qualified to doctoral or higher level; there are 1000 postgraduate student members. More than 600 schools and a number of companies are corporate members.

The Society provides a common meeting ground for scientists working in academic centres and in a number of fields with applications in microbiology (medicine, dentistry, veterinary medicine, pharmaceuticals, numerous industries, agriculture, food and beverages, the environment and education). The majority of Society members are employees of universities, research institutes, health services, government agencies and small to multinational companies.

The science of microbiology covers a great diversity of life forms: disease-related molecular structures such as prions and viruses, archaea, bacteria, fungi, protozoa and algae. Microbes are of crucial importance in a number of processes affecting all life on Earth: the cause and control of disease, fertility of soils and aquatic environments, fermentation, biodegradation of waste materials and dead biomass, bioprocessing steps in drug and antibiotic production, and molecular biotechnology.

The Society's objective is to advance the art and science of microbiology. It does this by:

- Organizing regular scientific meetings at centres throughout the UK and abroad, where microbiologists meet to hear and discuss the latest research findings. The largest meetings last 4 days and involve up to 1400 participants.
- Publishing four major international learned journals: *Microbiology*, *Journal of General Virology*, *Journal of Medical Microbiology* and *International Journal of Systematic and Evolutionary Microbiology*. The journals are available on-line through HighWire Press (<http://www.sgmjournals.org>).
- Representing the science and profession of microbiology to government and the media. The Society is represented on a number of biological and biomedical committees and organizations, in the UK and internationally, thereby exerting influence on science policy and education, regulatory affairs and international collaboration.
- Promoting microbiology as a career for young people, by increasing awareness of microbiology in schools and aiding the development of teaching resources. The Society also provides grants for young scientists to attend scientific meetings and training courses.
- Keeping members informed of current developments in professional and scientific matters in microbiology, through publication of the magazine *Microbiology Today* and other means.

The Society is a Charity registered in England and Wales (No. 264017) and in Scotland (No. SC039250) and a Company Limited by Guarantee, registered in England and Wales (No.

1039582). It is governed by a Council drawn and elected from the membership. The Society employs a staff of over 30 at its headquarters.

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