

BIOSCIENCE FOR INDUSTRY STRATEGY PANEL**MEETING: 15 JUNE 2009****SUBJECT: UPDATE ON INNOVATION GROWTH TEAM PROJECTS****SUMMARY**

Innovation and Growth Teams (IGTs) are a BERR mechanism to facilitate the creation of a strategic view collectively from industry on what the innovation & growth challenges are for its future competitiveness. Two IGT reports with relevance to BBSRC have recently been released: *Bioscience 2015 Review and Refresh* and *IB 2025: Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy*. This paper summarises the key recommendations from these reports that are of specific relevance to BBSRC.

ACTION

The Panel is invited to **COMMENT** on the recommendations of the Bioscience and Industrial Biotechnology Innovation Growth Teams of relevance to BBSRC and implementation of the government responses.

ANNEXES

Annex 1 Summary of IGT Recommendations of Relevance to BBSRC

**Innovation and Skills Group
June 2009**

SUMMARY OF IGT RECOMMENDATIONS OF RELEVANCE TO BBSRC

Introduction

Innovation and Growth Teams (IGTs) are a BERR mechanism to facilitate the creation of a strategic view collectively from industry on what the innovation & growth challenges are for its future competitiveness.

In January 2009, the Bioscience Innovation Growth Team (BIGT) released a review and refresh of the 2003 report *Bioscience 2015*. The BIGT developed recommendations for industry and government in the pharmaceuticals and healthcare-related biosciences sector. The government response to the review and refresh report was released in May 2009. The reports are available at the links below:

Bioscience 2015: <http://www.bioindustry.org/bigtreport/>

Bioscience 2015 Review and Refresh:

http://www.bioindustry.org/biodocuments/BIGTR2/BIGT_Review_and_Refresh.pdf

Government Response to *Bioscience 2015* Review and Refresh:

<http://www.berr.gov.uk/files/file51169.pdf>

In 2008, a new IGT was formed for the industrial biotechnology sector (IB-IGT). The IB-IGT developed recommendations for industry and government to improve the competitiveness of the chemicals and chemistry-using sectors in developing sustainable products. The IB-IGT released their report in May 2009, and a government response is expected to be released in June 2009. The report is available at the link below:

IB 2025: Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy.

<http://www.berr.gov.uk/whatwedo/sectors/chemicals/IBIGT/page44395.html>

Relevant Recommendations from *Bioscience 2015* Review and Refresh

Recommendation 6: Follow on in Bioprocessing

Relevant Research Councils and Knowledge Transfer Networks along with the Technology Strategy Board and industry should build on the success of the Bioprocessing Research Industry Club to develop a set of follow-on activities. New funding must be in place for distribution in 2009 and onwards to build capacity for multidisciplinary bioprocessing research and training to 2015. The growth in capacity should make the emergence of new centres of excellence possible, and be sufficient to meet the needs of academic and industry recruitment. The Technology Strategy Board should continue to provide financial support to the provision of a Knowledge Transfer Network at least at the current level that will deliver the bioprocessing agenda set out in *Bioscience 2015* beyond 2009.

Government Response: *The Government broadly supports this recommendation. The Biotechnology and Biological Sciences Research Council (BBSRC) is currently evaluating the early impact of the Bioprocessing Research Industry Club (BRIC). An independent panel will be convened to report and make recommendations by summer 2009. The Club Steering Group and others will then consider whether there should be follow-on activities and what form these should take. Future plans will take into account the outcomes of the evaluation, BIGTR2 recommendations, as well as needs of industry and the impact of the economic downturn. Initial recommendations*

will be developed by a BBSRC-led Working Group in consultation with the BRIC Steering Group and wider Club membership.

In addition, BBSRC continues to allocate funds to masters training and PhD studentships in this area. The BBSRC welcomes the support from the BIGTR2 for the Knowledge Transfer Network (KTN), which has fulfilled a valuable role since its establishment.

The Technology Strategy Board (TSB) will work to ensure that collaborative working between key partners in the public and private sectors is achieved. Its KTNs, which also cover the area of bioprocessing, will receive appropriate funding, and it will work with the BBSRC to develop suitable follow-on activities to BRIC.

The TSB has completed a review of the KTNs and will now look to re-focus the work of the KTNs to align them more closely with the innovation priorities it has identified. It will also be increasing the support the KTNs give to international activities. The budget changes and the review of remit mean that a new combined KTN will be asked to put together a business plan in which bioprocessing will be a key activity as well as regenerative medicine and manufacturing operational excellence. In this context, the TSB will also work to ensure that collaborative working between key partners in the public and private sectors is achieved and that its KTNs, which also cover the area of bioprocessing, will receive appropriate funding. It will also work with the BBSRC to develop suitable follow-on activities to BRIC.

Recommendation 15: Reward Academic Collaboration

The Research Excellence Framework should recognise and reward excellence in both stand-alone research and collaborative research with industrial partners. There are real opportunities for the academic sector to play a greater role in a rapidly changing bioscience industry. In order to realise these opportunities, the evaluation framework used by the funding councils needs to promote greater collaboration between academia and industry.

Government Response: *The Government is broadly supportive of this recommendation. In a departure from the previous Research Assessment Exercise (RAE) in 2001, the most recent RAE in December 2008 was specifically designed towards better recognition of excellence in user-focused research. All of the 67 RAE panels were asked to think about how best to recognise a variety of user-focused work. Looking ahead, the next assessment will be done under a new "Research Excellence Framework". That system, currently being developed by the Higher Education Funding Council for England, will build on the positive developments of the 2008 RAE. It will also go further and will take account of the impact of research. The Government encourages and supports the Research Councils in recognition of all forms of collaborative research, not only with industrial partners but also excellence in impact in other ways, such as influence on policy and clinical practice.*

Recommendation 17: Translational Scale-Up Centres for Regenerative Medicine

Create two cell scale-up centres at research institutions to build capacity and capabilities (skills training and technology) in this specialist area of bioprocessing. Centres should work at the interface between the researcher, the manufacturer and the physician. It is also essential that Government should support the delivery of an enhanced industry representation.

Government Response: *The Government welcomes the emphasis in BIGTR2 on developing centres of excellence, in which basic cell research, clinical science, safety, materials science and manufacture expertise come together. Given the rapid pace of change in stem cell science, these centres will need not only critical mass, but also flexibility, quick reactions, and excellent scientific connections.*

We agree that the UK needs to develop strengths across a range of translational activities needed for effective stem cell therapies. The Research Councils including MRC and also TSB should help overcome this bottleneck. The right approach will vary widely according to the site and nature of therapy. Scale up issues will need to be addressed early in the scientific development of new treatments, at the same time as questions about the type and status of cells, numbers, dependence on tissue matrix, safety controls, and tolerance of variations are explored.

MRC has supported the development of the Centre for Regenerative Medicine in Edinburgh, which brings together basic research, Good Manufacturing Practice capacity, and good bioindustry and Scottish Enterprise links, and will explore further opportunities with partners in the public, charitable and private sectors, building on existing centres.

EPSRC has supported several relevant activities that bring together academia, industry (particularly manufacturing) and the clinician in Regenerative Medicine. These are:

- *An Innovative Manufacturing Research Centre (IMRC) for Bioprocessing at University College London led by Professor Nigel Titchener-Hooker*
- *An associated IMRC Grand Challenge in Regenerative Medicine led by Professor David Williams at Loughborough – “Regenerative Medicine – a New Industry”*
- *An Integrated Knowledge Centre in Regenerative Therapies and Devices led by Professor John Fisher at Leeds (with BBSRC and TSB).*

Close alignment of funding for early clinical research, basic science, materials science, processing and safety science will increase in importance, and the Research Councils (BBSRC, EPSRC and MRC) will continue to work together to ensure the science base funding is well coordinated.

The Government recognises the importance of regenerative medicine and the potential benefits of developing hubs of excellence in the scale-up of the various activities associated with this area. The Government also recognises we need wider skills and capabilities than are addressed within bioprocessing (essentially cell growth issues).

Recommendation 19: Maximising Capital recycling

Government and industry should work with the entrepreneurial community to produce an implementation plan identifying the infrastructure and mechanisms needed to make the most of the human and knowledge capital that flows from the restructuring of the UK bioscience industry. As part of this plan an information pack should be produced that shows the path from leaving a pharmaceutical company to successfully running a biotechnology company.

Government Response: *BERR is liaising with Trade Associations to consider how they might take forward the provision of an information pack that shows the path from leaving a pharmaceutical company to successfully running a biotechnology company.*

In response to the very rapid changes in the UK and global economies the Research Councils have introduced Skills Gap Awards. This new, and interim, scheme aims to

ensure that high quality scientific or research support skills, which currently reside in industry, and in areas where it has previously been hard to recruit into UK universities, are retained in the UK, through recruitment to UK universities.

The scheme, sponsored by the MRC, EPSRC and BBSRC, aims to provide fast-track start-up funding for appointments relevant to biomedical or biotechnology research which addresses important skills' needs in universities. Appointments will support high priority skills that underpin biomedical or biotechnology research, from any part of the private sector – in any area of biology, chemistry, imaging, engineering, clinical research, informatics or statistics. BBSRC will consider applicants working in the strategically important areas of 3R's (Replacement, Refinement & Reduction of animals in research) and *in vivo* mammalian physiology.

The MRC, who are managing the scheme on behalf of the Research Councils, expects to make 8-10 awards under the interim scheme, however additional funding may be made available if a high volume of good quality applications are submitted. It is expected that many of the appointees will be specialists or early career researchers, rather than leaders of large programmes; however proposals for very senior appointments will be considered. The Research Councils are currently considering proposals to provide support for two-way academic-industry exchanges on a more permanent basis.

Funds will be provided to establish new posts over the first one, two or three years, while the appointee may be seeking grant funding. Funding will be focused on situations where a new appointment would help address a well established, strategically important, skills gap, and the relevant role would complement and support existing research council investment, and would reinforce the university's research strategy. The host university will be expected to make a long-term commitment to the role. The appointment should also clearly address the strategic priorities of the supporting research councils.

The MRC's Strategic Appointment Scheme similarly aims to enhance the UK's research capability by attracting senior, internationally-recognised scientists and clinicians to work at professorial level in UK academic institutions. The scheme aims to support responsive and rapid appointments in an area of research that is particularly competitive. Primarily aimed at supporting scientists and researchers from outside the UK, the scheme may exceptionally support scientists from the UK industrial sector.

BBSRC is running a pilot Industrial Impact Fellowship Scheme⁹ to enable highly-skilled research and technology leaders to transfer their skills and experience from the industrial sector to BBSRC-funded centres, institutes or academic departments with significant BBSRC-funded research programmes. The scheme is aimed at researchers currently or recently in industry, who have skills and capabilities complementary to university research (such as project management, commercialisation and translational research). Between 5 and 10 fellowships are available to start by the end of 2009.

Recommendation 23: Review *in vivo* skills

Government should consider how an appropriate study of graduates with *in vivo* skills should be maintained including whether *in vivo* skills should be included under the strategically important and vulnerable subjects (SIVS) list.

Government Response: BBSRC, MRC and others will continue to strengthen the UK's training base and science in *in vivo* areas. Initiatives over the last five years have strengthened the UK's position, but we recognise that more is needed, and

MRC will expand its PhD studentship funding for the area in 2009. We are currently developing our Framework for the future of Higher Education for the next 10-15 years. As part of this process we are looking at how strategic subjects might be designated and supported to best meet the needs of the economy and society in the future. Our approach to a variety of subjects, including those incorporating in vivo skills, will need to be examined in this context.

EPSRC currently supports over 400 students from engineering and physical sciences disciplinary backgrounds studying for a PhD at the life sciences interface through 15 Doctoral Training Centres. A number of these centres include training in in vivo skills, including the centres based at the University of Strathclyde (medical devices), the Universities of Loughborough, Keele and Nottingham (regenerative medicine) and the Universities of Leeds, Sheffield and York (regenerative medicine).

BBSRC and the MRC have invested in Capacity Building Awards in Integrative Mammalian Biology Research, a partnership between Research and Higher Education Funding Councils, Learned Societies and a consortium of pharmaceutical companies. The £11 million fund is intended to springboard capacity building in integrative mammalian biology. A total of 46 studentships have been funded under the initiative.¹²

BBSRC has co-funded with the British Pharmacology Society and Physiological Society short courses in in vivo Integrative Pharmacology and Physiology Techniques. These courses are intended to address the shortage of researchers that obtain a good training in in vivo research techniques and to practise skills in whole-animal studies. The courses provide practical knowledge and understanding of the essential principles underlying mammalian in vivo systems-based research, including protocol and experimental design.

The MRC has awarded 22 new PhD studentships in in vivo sciences to seven universities at a value of £1.91m for 2009 and it is anticipated that similar numbers of awards will be available in 2010 and 2011. Additional support for capacity building in in vivo sciences may also be provided through initiatives focused on integrative mammalian biology, toxicology and drug safety science which collectively aim to support over 50 new PhD studentships and 2 new fellowships over a five year period.

BBSRC and the MRC are also working together to support jointly funded places on in vivo Masters courses. Twelve awards have been made for 2009 (£170k) and it is anticipated that a similar number of awards will be available in 2010 and 2011.

Furthermore, BBSRC will be meeting with MRC to discuss the provision of additional costs awards on PhD studentships in the in vivo area to meet more of the full cost of research training in this area.

Relevant Recommendations from *IB 2025: Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy*

Recommendation 6: The IB-IGT recommends that the Technology Strategy Board, EPSRC and BBSRC work together to support a single, virtual, centre of excellence in IB research and development that will capitalise on, and augment, existing academic centres where biologists, biotechnologists, chemists, chemical engineers and other relevant disciplines are co-located.

Recommendation 7: The Technology Strategy Board, EPSRC and BBSRC should work together through joint calls to ensure that the UK's world leading science base in genomics fermentation, biocatalysis, plant science, marine organisms and mycology is effectively developed and translated into IB applications.

Recommendation 12: The IB-IGT recommends that the Research Councils, EPSRC and BBSRC, the professional institutions in chemical engineering, chemistry and biology, the Sector Skills Councils, SEMTA and Cogent, should continue to work together to develop a joint strategy by the end of 2009 for the provision of IB skills; and ensure the pipeline of talent is captured.

Recommendation 13: The IB-IGT recommends that industry works with EPSRC, BBSRC, academia and the professional institutions to develop and fund a new taught MSc, MRes or similar type of programme for co-development of advanced practical skills in IB.

Recommendation 14: The IB-IGT recommends that industry works with the EPSRC, BBSRC and Higher Education Institutions to identify additional mechanisms for co-funded post-doctoral researchers to allow UK Centres of Excellence to compete effectively with equivalents in the EU.

Recommendation 21: The IB-IGT recommends that Government, industry*, Research Councils, NGOs, and professional institutions should develop an effective, balanced and informative communication strategy, including stakeholder and public engagement, for IB.

*this will include brand owners and retailers