

# **The highs and lows of academic- industrial collaborations**

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## Introduction

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The UK is recognised for its world-class biomedical research and its strengths in biotechnology and pharmaceutical companies. The two sectors face challenges: universities are told by Government that they must deliver research for social and economic benefit, rather than just knowledge, and must engage more effectively with the commercial world; for industry the discovery of effective and safe new drugs is a complex process, and ideas and approaches are increasingly sought in the academic world.

There is a continuing sense that, although the UK is a world leader in public sector biomedical research and is the location for much pharmaceutical and biotechnology company research, the connections need to be improved. Professor Rothwell provided a wide-ranging perspective on the challenges and opportunities for better partnership between academia and industry, drawing on her own extensive experience of collaborations and contacts across the sectors. The landscape is heterogeneous, with companies varying greatly in size from the multinational pharmaceuticals to small start-ups, universities varying greatly in research experience and the nature of the interaction varying greatly from informal, personal interaction through to major institutional collaborations. From her own experience in collaborations, Professor Rothwell judged that the relationships had been mostly positive, irrespective of the size of the company or nature of the collaboration; lack of success tended to occur when the industrial and academic partners did not have matching expectations for the collaboration.

## Summary

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### **University sector perspectives of industry collaboration**

Traditional assumptions within the university sector about industry collaboration have often been negative and simplistic, assuming that the role of industry was to pay for academic know how and discoveries, discounting a potential scientific contribution from the industry partner. Indeed, some academic research Fellows were generally critical of industry research quality and practices, viewing a job in industry as a failure in research career development.<sup>1</sup>

Many academics assume that the research culture in industry is highly constrained and that research directions are changed frequently. A move to industry is believed to entail the loss of freedom enjoyed in academia, with little opportunity to explore less obvious research directions or to capitalise on serendipity. An additional, growing, concern is the perception that companies are unwilling to publish negative results from clinical trials on their products with the consequence that the literature record may become biased – tantamount perhaps to research misconduct. It is clear, however, that many academics do not yet understand what is involved in the processes of drug discovery: a recent Forum initiative on

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<sup>1</sup> This negative perception is discussed in the Academy of Medical Sciences Report 'Freedom to Succeed' and current Academy Working Group on 'Careers in Industry' is further analysing this issue.

Drug Discovery is aiming to help create that understanding.<sup>2</sup>

Nonetheless, many researchers in universities are keen to work with industry, recognising that the value of partnership is more than a source of new funding (although that also is important), if it draws on the good science conducted in companies, and that joint activity helps to address the goals to deliver socio-economic benefits. But there are often hurdles to be overcome. In particular, university researchers may fail to understand the determinants of industry R&D prioritisation or to realise that companies are often primarily interested in accessing basic research. Furthermore, the standard measures of academic achievement (RAE) do not encourage collaboration and the Full Economic Cost model, if applied inflexibly, may deter collaboration. The solution to these problems primarily lies in developing better mutual understanding and constructing clear contractual terms with minimisation of bureaucracy. Initiatives at the University of Manchester are now significantly encouraging, rewarding and valuing collaborative activity with Industry in various ways:

- (i) Innovation is regarded as part of the normal academic workload, rewarded and recognised in promotion.
- (ii) Research business development is embedded within the faculty rather than being viewed as a separate function.
- (iii) There is improved flexibility, speed and clarity in contract preparation.
- (iv) Second stage funding is available to support demonstration of proof of concept.

(v) Principal Investigators are able to retain a large proportion of the income that they generate.

#### **Industry sector perspectives of academic collaboration**

Industry perspectives too are sometimes simplistic and ill-informed, failing to appreciate both that academic careers are critically dependent on publications ('publish or perish') and that some academics have become very experienced in commercialisation of research opportunities (for example, Renovo a spin out company from the University of Manchester and Forum member now has a market capitalisation of £280 million).

Industry can often greatly benefit from academic collaboration, in terms of access to research quality, ideas and skills across a broad front and from the opportunity, in consequence, to develop links with Government bodies and, possibly, access to new funding. There is an important case to be made to encourage industry to reward its employees for publishing and engaging in other scholarship and public service, because these activities are valued by the staff, are likely to help attract new collaborations, and can influence the national agenda. More companies need to understand that such work need not distract from core business, can be managed with regard to company confidentiality issues, and is not a prelude to losing the employee to academia.

For both the industry employee and employer, the generic 'highs' of collaboration reside in the culture of teamwork across the sectors, in the encouragement of thinking outside normal limitations, and in the benefits for personal development. The 'lows' can be characterised variously in terms of the energy required to overcome initial

<sup>2</sup> <http://www.acmedsci.ac.uk/p50evid61.html>

suspicion and bureaucracy, the challenges of managing Intellectual Property protection and overheads funding, and the difficulty of matching the different communication styles and expectations.

### **The world outside**

While it is vital for academia and industry to work together, each should not try to duplicate the other's functions. There is for example, rightly, an increasing UK focus on the importance of translational research but some in the academic community are concerned at the tenor of some of the recent Cooksey report (2006) recommendations, which imply that if an increased funding for translational research were to occur it might be to the detriment of basic research. Industry and academia concur absolutely that it remains crucial to grow excellence in fundamental science.

There are many other issues for the R&D environment that are common to both academia and industry: the need for excellence in training and research infrastructure, coherently organised at the regional level; the importance of NHS research culture and clinical facilities; the need to be proactive in considering the impact of UK and EU legislation; and the very great value derived from public support of science. There is an apparent high-level political acknowledgement of the importance of science, 'Scientists are stars too' (Tony Blair, 2007) but mixed messages have been heard, as witnessed by the recent DTI withdrawal of funds from Research Councils.

One issue for soliciting increased support for science is the imperative to provide better measures of the benefits of biomedical research. Industry outcomes, albeit long-term, can routinely be evaluated in terms of new drugs developed, product sales, impact on

mortality and morbidity. Despite the ever-growing pressures to measure them, academic outputs are usually more distant from patient benefit so that various surrogate outputs have been adopted (publications, patents, esteem awards, case studies, peer review, feedback from user communities). Inevitably, all such measures relate to historical performance; the report from the UK Evaluation Forum discusses these issues in more detail and suggests some routes to better evaluation.<sup>3</sup>

Public perceptions of 'the scientist' are an important part of efforts to improve the UK environment for R&D. Observations from public opinion surveys indicate that scientists are often quite popular and well trusted, if working for universities or charities. The same surveys show that industry-funded scientists are not seen as so trustworthy. Subsequent discussion queried whether such surveys portray a false stereotype but, nonetheless, there is an opportunity for academic-industry collaboration to communicate messages about the value of research across both sectors. Such communication is already proving successful in changing public perceptions, notably by demonstrating the value of animals in medical research.

In short, academia-industry interactions are essential not only to engage in excellent science but also to provide better evidence on the socio-economic benefits of research, to shape Government targets and strategy, to address public concerns about science, and to attract children to science. Professor Rothwell encapsulated the characteristics of successful collaboration to deliver this added value across a broad front by concluding with a

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<sup>3</sup> Academy of Medical Sciences, Medical Research Council & Wellcome Trust (2006) *Medical research: assessing the benefits to society: A report by the UK Evaluation Forum.*

quote from Peter Medawar, 'Synergy is the key word in collaboration'.

## Discussion

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The ensuing lively discussion with participants from academia and industry explored many of the points in further detail. For example:

Engaging with the public: academics often underestimate the ability and enthusiasm of their students to communicate, and also underestimate the motivational value of so doing.

Negative perception of industry by academic research Fellows: to an extent this perception is derived from a twin fallacy, which is that academics can control their own destiny whereas industry scientists have no such control. The negative perception seems less prominent in engineering disciplines than in biomedical science, perhaps attributable to a culture of joint appointments and other staff exchange schemes in engineering. There is a need to introduce more joint clinical appointments.

Publications: the RAE emphasis on publications has distorted expectations; if future evaluation moves away from peer review to the use of metrics then it is essential to find measures that reflect collaboration. Industry feels that it is rarely a significant impediment to academics publishing collaborative work but academics reiterate that industry publishing practices (and a lack of transparency about the practices) on clinical trial reporting have biased the literature.

Role of learned societies and Academies: professional societies with their academic and industry memberships have an

important role to communicate the respective responsibilities of the sectors and to show where there are shared issues – in particular for promoting 'blue skies' research and for the use of animals in research – as well as in celebrating successful partnerships. The Academy of Medical Sciences Forum has a continuing key role to stimulate efforts to build academic-industrial collaboration.

## Appendix I: List of Forum members

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| Advent Venture Partners  | Cambridge Antibody Technology (CAT)                        |
| Ardana Bioscience Ltd  | Cancer Research UK   |
| Association of British Health Care Industries (ABHI)           | Engineering and Physical Sciences Research Council (EPSRC) |
| Association of the British Pharmaceutical Industries (ABPI)    | F.Hoffmann.La-Roche Ltd                                    |
| Association of Medical Research Charities (AMRC)               | GE Healthcare  |
| Astellas   | GlaxoSmithKline Plc  |
| Astex Technology Ltd   | Health Protection Agency (HPA)                             |
| AstraZeneca Plc  | Integrated Medicines Limited                               |
| BioIndustry Association (BiA)                                  | Medical Research Council (MRC)                             |
| Biotechnology and Biological Sciences Research Council (BBSRC) | Merck Sharp & Dohme Limited                                |
| British Heart Foundation (BHF)                                 | Pfizer Ltd   |
| British In Vitro Diagnostics Association (BIVDA)               | Renovo Ltd   |
| BUPA   | Veloscient Ltd   |
|  | Wellcome Trust   |
|  | Wyeth Plc  |