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### Academy of Medical Sciences Forum Annual Lecture: "UK life sciences: ensuring a healthy future"

"Britain needs to make a significant shift in its economic structure. Life sciences could set the standard for how this can be done"

Royal Society, London  
03 March 2009

#### CHECK AGAINST DELIVERY

Good afternoon, everyone. It really is an honour for me to be invited to give the Forum lecture this evening. A huge part of my working life has been spent at the intersection where academia and business meet – and a big chunk of that in the life sciences industry. It's that experience which informs what I'm going to say this evening as much as my perspective as a Government minister.

But I'm particularly pleased actually to have this opportunity to talk to you tonight so soon after Gordon Brown used the Romanes Lecture at Oxford on Friday to dispel any doubt about the Government's commitment to science. In addition to raising the bar in education with a new target to double the number of state school pupils taking triple science at GCSE, in addition to highlighting the importance of public dialogue in science in all its forms, the Prime Minister made it clear "that we will continue our path of raising investment in science across the board".

The science budget is safe, so is the ring-fence and, as Gordon stated, "we will not allow science to become a victim of the recession but rather focus on developing it as a key element of our path to recovery."

Now I really hope that this will silence any remaining doubt within the scientific community about this government's commitment to science, because I believe that doubt has been getting in the way of the critical task which is now ahead of us.

That task, I believe, is to focus, as the Prime Minister has urged, on how science and technology can help us steal a march on our international rivals despite this global economic downturn and ensure that we're really well positioned when the upswing comes – as it will – and make sure that our research base supports the UK to be a world leader in the growth sectors 20 years from now.

Now that's the same message that I conveyed in a lecture at the Royal Society last month about the need for this country to make, as a matter of urgency, strategic choices about the overall balance of research funding. It's also what I've been discussing with the Research Councils, the learned societies and the university vice-chancellors. All of them now are actively thinking about the areas of focus, about the choices which we need to take in order to build on what's happened over the last ten years, 10 years in which UK science and innovation has gone through a real renaissance. I was a practitioner during that time. I saw the change not just in terms of the effect of investment but also the change that took place in the attitude – the culture – towards the commercialisation of science which took place in our universities.

In that period the science base has enjoyed more than a double real-term spending increase, rising to almost £6 billion a year by 2010, and it has seen also a dramatic shift in the relationship between the university sector and business. The quality and the number of science innovations coming out of our universities now, I am told by the venture capital community, is stronger than at any time over the last 30 years; the number and the quality, they say, of the recent spin-out companies is better than they've ever seen. So it's absolutely vital that we do not allow that progress which has been achieved to be halted.

There is no escaping the impact of this downturn, nor the need for a new industrial activism by which we gear up our economy in those sectors showing the greatest potential for long-term growth, and implement a strategic framework which gives businesses and investors confidence about the future.

Now, I've set out three criteria that the science community, business leaders and

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Government together could use in deciding where that investment might be refocused. First, where the growth opportunities over the next two decades will be significant. Secondly, where the United Kingdom has a realistic prospect of being number one or number two in the world. And thirdly, where the United Kingdom has a real competitive advantage.

Before I elaborate on the example of life sciences I should also mention, given the tendency of some commentators to overlook or completely misinterpret them, that I was also very clear on certain other points.

To give you the latest example, I did not suggest, contrary to the editor of *Chemistry World*, "that blue skies research could be cut to free up cash for the research areas that will most benefit the UK economy", nor did I imply that the "hands-off tradition" of non-governmental interference in decision making over funding was coming to an end. It is very important for you to hear exactly what I did say.

I said there will be no retreat from pure science. We're all in agreement that science is serendipitous; you cannot predict where the most important breakthroughs are going to come. More than that, our commitment to fundamental research is often what most attracts foreign investment into this country in science and is the bedrock of our international reputation. Without the fundamental science you don't get the opportunity to do applied science. And when it comes to setting our research priorities, I insisted that the Haldane principle is non-negotiable. It is not for ministers to make judgments about which projects are to be backed; it's for the scientific community and the research councils to do that job.

There are two things which I also want to stress. There will be no abandoning our emphasis on excellence. That is what has got the UK science base to the position where it is one of the most productive in the world. And there'll be no retreat either from a diverse science base. We need that broad base in science to enable us to have the opportunities for interdisciplinary work which are again increasingly fundamental to the big breakthroughs.

Now what was more important I believe in that speech, and in this one tonight, is that we need to move from a discussion about the vision to a discussion about action, so that investors, researchers and businesses can have confidence that we really are on the way to developing a digital Britain, a green Britain, a healthy Britain by playing to our strengths in those sectors where the UK really has advantage.

I believe that life sciences – medical research, pharmaceuticals, biotech, medical devices – fulfil my three criteria.

The demand for medical research to deliver improved healthcare is both global and infinite, not least when challenges over longevity and obesity are such an enormous strain on global resources. In the UK alone, for example, there are already more pensioners than under-16s, and by mid-century, 40% of the population will be over 50, 25% over 65. That's why ageing is one of the multidisciplinary programmes on which the Research Councils are working together with a public investment worth £485m.

I think we could already make a claim for global leadership in certain aspects of life sciences. We have a rich history of Nobel laureates, a long track record of enormously important scientific breakthroughs. If you look just since the turn of the century alone our track record has been truly impressive: sequencing the human genome, the world's largest trial into the effects of statins, establishing the virology of Spanish flu and how it jumped from birds to humans, the modelling of Downs Syndrome in mice through genetic modification, and, only a few months ago, something which really I think captured the imagination of people – helping to generate a replacement trachea using stem cells derived from the patient's own bone marrow.

Now, despite the current challenges of the global economic downturn, we have an enormously strong pharmaceutical and life science industry in this country, second only to the United States. We have, too, enormous support from the British public for medical research. Their sustained giving to medical charities is something which is an important strength of this particular area of science, and I know from my own experience in fundraising for medical purposes the huge support that this community has from the wider population.

The Government has also accorded medicine the highest priority. Funding for health research will exceed £1.5bn by 2009/10, an increase of around £300m. In addition we have approved the £212m rebuild of the Laboratory of Molecular Biology in Cambridge so it can forge ahead in such areas as the experimental determination of genome sequences and synthetic biology, and we have given Government backing to the UK Centre for Medical Research and Innovation in St Pancras, a unique opportunity to build one of Europe's premier research facilities.

So that just leaves the third criteria which I mentioned: our unique competitive advantage. I believe that the NHS is that and should be that. A resource that no other country has for fostering research innovation in patient care, it offers well-documented patient databases going back to 1948; the ability to track cohorts, to track families, through the generations – a boon for researchers investigating the genetic basis for disease. And with all patients in the country registered with the NHS, the potential is there, of course, to organise large-scale clinical trials more effectively than is possible in other parts of the world.

We can look at cancer as an example where we can now argue fairly that we already lead the world in cancer trials. We have more patients enrolled in cancer clinical trials than any other country, including the United States, which has five times our population. So the NHS gives us the potential to steal a march in medical research – we've talked about this for a number of years – which in turn can provide the basis for a world lead in life sciences. Do that and the wealth and the jobs created from a successful world-class life science industry can help pay for the public services which we wish to enjoy as a nation, including within that a strong and significant science base.

I believe we can take the formula for success that we've seen in cancer and apply it elsewhere. Stem cells is another area where we are at the forefront of research. We have been able to put in place a uniquely strong legislative framework with real support from the general public because of the way in which that debate was conducted. That has put us in a position to remain at the forefront of this important field.

At the same time, changes which have been made in government. For example, the Office for Strategic Coordination of Health Research has been established to improve the translation of medical research into economic and health-related benefits. The Government supports the idea of a stratified disease strategy as a key component in the coordination and delivery of new and innovative medicines for the future. We have said that we want to make this country the best place to carry out life science research and to develop a life science company.

So that's the ambition. We now need to fulfil it. I'm not going to pretend that the prospects for this are rosy, that we've achieved everything which we said we would. But the recession, I believe, gives us an opportunity. The pressure of the recession releases additional energy to accelerate some of the things which many of us have been trying to do for some time and to make them happen. It still remains the case that our share of biopharmaceutical manufacturing in R&D is disproportionately large as a country, but we cannot afford to lose one iota of that share.

President Obama recently apportioned \$21 billion for R&D as part of his total stimulus package, and I think it was particularly important in terms of the specificity with which the scientific community in America was able to interact with the Obama campaign and now administration to deliver such a detailed and comprehensive package so quickly. He's committed to doubling US funding for basic science.

France, meanwhile, has upgraded its research tax credit making it, in the words of President Sarkozy, "the most attractive financial incentive for research in the world". And let's not forget that other countries harbour major ambitions to attract investment and research; China, India and Singapore.

It is no secret that the pharmaceutical industry has experienced declining R&D productivity over recent years and, as a result, many firms are actively rethinking their operations, removing some of their R&D divisions overseas with the consequent loss of high-level skills and expertise in a number of markets. We know the high costs of conducting clinical trials in the United Kingdom, which make up approximately 40% of the total expenditure of bringing a drug to market. These costs are too high. It's an issue that really does need to be addressed, as is the issue of patient recruitment. And the biotechnology sector, the early stage companies within life sciences are going through a severe capital funding drought at present.

Which brings me to the Office of Life Sciences, which I am leading. The challenge is about bringing real change in the operating environment for life science companies. Not against some vague unspoken timetable but within the next six months. I'm very clear that we have got to act now. This is a crisis situation. Pharma companies are telling me that they're already taking decisions to relocate R&D activities from the UK. Some biotechnology companies have already gone out of business. So time is a luxury we don't have, and from the meeting at Number 10 which recently took place between the life sciences industry and government, including all departments involved in this agenda, we have a clear to-do list, covering areas from intellectual property to procurement.

Now let me highlight four of the most urgent priorities; tax, finance for SMEs, hanging on to IP and the most highly skilled people, and driving innovation in the National Health Service. If we are really serious about the UK becoming the most attractive place for life sciences business, then we've got to address these points.

Now industry leaders are telling me they need two main things on tax. First, they want an intellectual property royalty box – a tax relief, in other words, as an incentive to locate their intellectual property here. And second, they want an extension to R&D tax credits.

Today let me just speak for a moment about tax relief. The UK has one of the most competitive tax regimes among major economies. Over the last 10 years the government has transformed the tax regime for IP. Last month the CBI Report on R&D tax credits concluded that the overwhelming message from businesses is positive and that the UK R&D tax credit is well established and effective.

But we cannot be complacent. Overseas, the Belgians, for example, have introduced a favourable tax regime for IP which is set to benefit life science firms and is already having an impact in attracting life science investment into Belgium. Other countries are beginning to reform too. The Netherlands, Luxemburg and

Singapore have all introduced favourable tax regimes benefiting life science companies.

So frankly, it's not enough for the UK to keep up. We have to stay ahead of the game if we are going to retain the strength we have in this country. So we need to strengthen the competitiveness of the UK's tax treatment of intellectual property, and I'll be working with the Chancellor on this over the coming months, and we are keen to work with you to explore how this issue can be developed.

The second key area is finance. Capital is essential, as Gordon Brown acknowledged last Friday, for companies at this time so that the new technologies, the new ideas, the medical breakthroughs which have come from the science investment that we've made are able to be translated into clinical practice and don't wither on the vine due to a lack of investment.

Now I've acknowledged already that these are very difficult times. We're experiencing a severe capital funding drought. That's why I'm urgently looking at how we can remove the barriers faced by early stage high-tech companies in obtaining venture capital, identifying the role for Government in this and identifying the areas for action. We also need to explore ways in which we can leverage investment from the big pharmaceutical companies in this area, so that we get the multiplier effect around investment from venture capitalists and investors together with investment from the pharmaceutical industry to achieve the critical mass which will give investors confidence.

And where pharmaceutical companies have intellectual property on a product which it cannot develop in-house it should think about spinning it out to a biotechnology firm.

This isn't just about building confidence, though building confidence is an important component of it. It's also about driving innovation and developing clusters through the co-location of pharmaceuticals and biotech with the academic expertise which exists within our universities, which are tremendously strong in this area, as well as the NHS trusts which are motivated to support innovation and the adoption of new practice.

This process of building sustainable and successful clusters integrated with those elements of the life science sector must be at the heart of what we do over the months to come.

I've seen a great example of this in Runcorn, which really had clear resonance for me in the current economic crisis - where ICI Chemicals some years ago allowed its research lab, which was otherwise going to shut down, to be taken over by a company, SOG Ltd, to become a successful innovation hub. The glass blowers within this enormous chemical laboratory - employing hundreds if not over a thousand people - were kept in employment because there was a process of transition managed whereby new companies were attracted to take over space which ICI Chemicals no longer needed. As a result, that facility today employs more scientists than it did under ICI Chemicals' management.

Companies need to be thinking hard about this model. It's a sensible option for those assets that large pharmaceutical companies are looking at divesting right now, and I have a strong interest in identifying the measures which will incentivise those companies to take this approach. We need to avoid firms selling off assets and losing talented people with expertise that's hard to replace. If they go now during these difficult times the skills, the expertise will be lost. We won't get them back and they won't be there when the upturn comes.

The broader value of this model is integration. At every level, in fact, the future of medicine lies in integration: examining the synergies between pharmaceuticals, biotech, medical devices, which I believe to date we haven't been good enough at doing. As a chairman of the Bioindustry Association I remember myself how difficult it was sometimes to get a consistent view across biotech, pharmaceuticals and medical devices. One of the things which I hope the Office for Life Science will achieve will be that alignment, because it is absolutely key to delivering the real potential of modern life science.

On the final priority, boosting innovation within the National Health Service, I've already mentioned the task of building closer links between the universities, trusts and companies and, despite what I've said already, the task of dealing with the issues around clinical trials. As we speak, large companies are making decisions about where to locate their clinical trials. I've been told that we've effectively lost the potential to carry out Phase III clinical trials competitively, but we do have the potential to leverage our expertise in Phase I and Phase II trials. And so we need to address the fact that trials are costing too much here and that companies are finding it hard to access the right kind of patients through the National Health Service.

On top of that, the data shows us that the regulation and approval process for clinical trials is too slow, so we have to make changes to ensure that companies have the ability to access patient data in a timely fashion, and, of course, we have to do this in a way which respects the privacy and data protection laws and pays due attention to some complex ethical issues. In this country we have the ability to do that, but we're not doing so at the moment and that needs to change. So we'll be looking, as David Cooksey in his review has recommended, at how the National Institute for Clinical Excellence can be more effective as a driver of innovation through the uptake of new technologies and medicines.

So I've set out a pretty clear to-do list, and, I know, a pretty difficult to-do list. So how are we going to achieve these changes which are necessary? From an industry point of view I know that the Government needs to be working as one on this agenda – at the Treasury, at Health, at Business and in my own department, DIUS. The Office of Life Sciences has representation from all of those departments, and has representation from across the life sciences industry. It also has, through an advisory board, expert advice from the likes of Ara Darzi, John Bell and Leszek Borysiewicz.

I hope that it's clear from what I've said to you this evening that the Government needs to show its support for the life science sector through concrete action. Providing we can do that quickly enough, I believe we have a real prospect of reversing some of the decisions being taken in board rooms right now. But it's not just about government taking action.

There is a quid pro quo from industry here: agreement that action taken by the government will be mirrored by action on operating decisions and financing, location of clinical trials and R&D activity by the industry.

Now, I recognise that we're not tackling these issues from a standing start. I want to pay tribute to some of the great work which has been done and progress which has been made, for example by the Medical Research Council. The MRC has long been promoting UK excellence. I've been very impressed by the way that they, along with other Research Councils, are really contributing to the way in which we attack this recession from the point of view of our science base. I think the way in which we're beginning to have discussions about the role of the scientific community and, in particular, the life sciences community, in managing this downturn is productive.

There are two things which I want to highlight and really encourage you to develop in discussions between the MRC, the academic sector and government. We need more routes for academics to be able to spend a couple of years out of a university to work in a spin-out or a large pharmaceutical company and then be able to return to the academic environment without it having a negative impact on their careers – and we need the support of universities and grant-giving bodies to do that.



Second, we need to do more so that universities can act as safe harbours in these times of economic turmoil to develop the scientific gestation process – particularly in the case of medical science where the time it takes to reach an inflection point in terms of the risk/return balance speaks to a greater role for the academic sector. It's very important that we are flexible in responding to the downturn environment, which is why I announced on Friday that I've raised the limit on university challenge seed funds from £250,000 to £500,000, directly in response to a request from universities.

I've set a six-month timeframe in which to achieve a real step-change in the environment for the UK life sciences industry. We then need to get out and market that globally, encouraging understanding of that change in the board rooms of global pharmaceutical companies.

And getting this collaborative process right within the life sciences sector sets an effective model for other sectors too. As I said right at the beginning of my remarks this evening, Britain needs to make a significant shift in its economic structure. Life sciences could set the standard for how this can be done in, say, the emerging energy sector – showing a very effective path for the country's future development.

That's the agenda I'm working on. It's a difficult one, and I look forward to your support in trying to achieve it. This evening I'd be very grateful for any direct feedback which you can give me on what I've said this evening.

Thank you very much.

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