



Sir Richard Sykes contemplates the future of the pharma industry

Interview by Rebecca N. Lawrence

Sir Richard Sykes, Rector of Imperial College of Science, Technology and Medicine, London, UK

Sir Richard Sykes became Rector of Imperial College of Science, Technology and Medicine in January 2001. His first job was as a pathology lab technician, which he did before A-levels and university. Sir Richard was awarded his PhD in Microbial Biochemistry from Bristol University. In 1972, he joined Glaxo Research Ltd as Head of the Antibiotic Research Unit, before moving to The Squibb Institute for Medical Research (Princeton, NJ, USA) in 1979. He rejoined Glaxo in the UK in 1986 as Deputy Chief Executive of Glaxo Group Research Ltd and was appointed Group Research and Development Director, Glaxo plc and Chairman & Chief Executive of Glaxo Group Research Limited in 1987. Sir Richard was appointed Deputy Chairman & Chief Executive of Glaxo plc in March 1993, and he engineered the merger with Wellcome in 1995. From May 1997, he was Chairman & Chief Executive of Glaxo Wellcome plc, and was succeeded as Chief Executive in October of that year. Glaxo Wellcome merged with SmithKline Beecham to form GlaxoSmithKline plc in 2000. Sir Richard, a Fellow of the Royal Society, was knighted in 1994 for services to the pharmaceutical industry. He stands down as Chairman of GlaxoSmithKline plc at their AGM on 20 May 2002 and will thereafter concentrate on his role as Rector of Imperial College London.

What are your aims in your role of Rector at Imperial College?

Imperial College was formed in 1907 by bringing together three institutions: the Royal School of Mines; the Royal College of Science; and the City and Guilds College. As you can tell by their names, they were doing science for industry. Imperial has developed from this standpoint and, today, it also encompasses medicine, making it a College of Science, Technology and

Medicine. There is nothing like it elsewhere because it solely covers engineering, science and medicine. Bringing together these disciplines brings together the pieces that are crucially important to solving many of today's problems such as quality of life and quality of the environment.

Imperial College is an establishment of global Research and Teaching excellence in these areas, and we are trying to capitalize on our knowledge by continuously breaking the boundaries of science. We particularly focus on interdisciplinary research, which is crucial for the future economy of the nation. My goals are really to make sure Imperial continues to compete on an international stage with the top universities in the world and attracts the best students and staff. At the same time, we need to continue to contribute to the economy as well as get money back from these activities to help develop the College further and build its infrastructure.

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Can you tell me a bit about how such a strong entrepreneurial spirit is fostered at Imperial College.

Going back to some of that history gives you a feel for the culture: there has always been a strong relationship between the College, commerce and industry. Up until about 1987, the intellectual property (IP) that came out of universities actually went to the Government's National Research and Development Council. Margaret Thatcher changed this in 1987 to allow

universities to retain their own IP. Hence, Imperial College set up a system to ensure that we capture that IP and make the most of it for the benefit of both the College and the nation. That has therefore led to the development of a strong entrepreneurial culture at the College and has meant we have moved from being a reactive technology transfer organization to being a proactive technology transfer organization, seeking to add maximum value to the products of our innovation.

Can you tell me about some of the key hurdles and exciting advances that have been made during your time involved in the development of new start-up companies from Imperial College.

Today there are about 50 start-up companies from Imperial College, 30 of which have financial backing and two of which are listed companies. There is a lot of activity in this area in the sense that we produce 1–2 of these companies every month from our activities. The difficult part is turning what is nothing more than an idea in somebody's mind, based on a few experiments, into something that will lead to technology transfer and a spin-out company. We have a company called Imperial College Innovations Ltd, which is responsible for educating our researchers to ensure that they make the best of their inventions. Innovations has about 15 executives plus another 10–12 support staff – they run courses in collaboration with the Entrepreneurship Centre in the Business School to educate people about IP, writing business plans, how to access seed funding, how to bring in investors, etc. This, in itself, sets a culture of entrepreneurship. The next step is, of course, finding space for these companies, getting them running, getting the project funded, creating a good business plan and, most importantly, finding good people to run these companies. They need a Chairman and a Chief Executive with experience of the commercial world. Our ability to bring all these pieces together, in my opinion, makes Imperial unique and makes sure that this technology transfer takes place in a smooth and productive manner.

There are, of course, many potential conflicts of interest because the academic is still working for the university, teaching students and doing basic research. Although we try to encourage academics to get involved in entrepreneurial activity,

at some point, they have to make a decision as to whether they are a College employee or a company employee. We often allow people to take a year off as a sabbatical to work in the company and then, at the end of this period, they have the option to come back to the College if they feel they have done all they can for the company. I think this is important as, sometimes, the academic does not want to be in the company; they would rather stay in the College and just be a consultant to the company. We clearly do not want to spin out our best academics!

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What do you think are the key mistakes made by other big academic sites that mean they are not as effective at producing innovative new companies as Imperial has been?

I think universities have great difficulty in this area because, to make money, you have to spend money: this whole area of spin-out companies and technology transfer can bring money back into the university, but you first have to spend money to set up the system that allows the technology transfer to happen. Most universities are not willing to commit to spending the money up-front or to building a substantial organization that educates their academic community about the issues of IP and all the needs of technology transfer and spin-outs. A conservative estimate of the total value of the companies we have spun out over the past five years would be at about £60 million: that is £60 million of potential generated funding for the College but we have spent nothing like that to get to this position.

The other point is that we do not expect quick returns on this business. Universities do want to get involved but they tend to get very depressed and discouraged if they do not see quick returns. At the moment, we are spending a lot of money every year through Imperial College Innovations spinning out these companies, educating people, and developing the groundwork to build an impressive portfolio that will be extremely valuable to the College in the future.

What do you think needs to be done to expand the UK and European biotech industry to get it close to how it is in the US?

We always compare ourselves to the US but the US is a very different environment to what we find in Europe. The UK has done extremely well because it has a good science base, it has the entrepreneurs, the investors and the government, who have been very enabling in this regard. The universities in the UK have changed dramatically over the past decade in recognising that their research base will develop IP that has the potential to generate money. In the US, it has been a culture embedded in their society for many years.

I also still believe that it is much easier to get venture capital funding in the US as there are many more people willing to support spin-out companies and new technologies and new ideas: it is a culture that pervades American society. I guess the UK is one of the closest examples in Europe of a similar culture. Funding is crucial – the company needs to get seeded early and government initiatives in the UK have helped us do this here. Traditionally, when we look for £500,000–1 million funding in the UK, people in the US go for £5–10 million, so it is on a totally different scale. However, I would suggest that at Imperial, we have a record that is just as good as any US institution.

Is there anything else the UK Government could do to help new start-up companies?

Not really. The Government support the University Challenge Seed Fund, which is very good as it provides the necessary seeding money to get companies started – the sums of money are not large as it is up to a maximum £250,000, but this is adequate. What I think one must not do is what happened in Germany, where the Government funded their start-up companies, because this creates an artificial market situation. If the government allows the market to operate properly, then it ensures that those companies which do survive are excellent and have a real chance of continued growth because they have had to fight for it.

What roles do you think biotech, big pharma and universities should each play to maximise each others' potential?

The pharma industry came out of the chemical industry and many of the discoveries of drugs have been serendipitous. As we understand more

about the underlying causes and mechanisms of disease, then of course knowledge-based businesses are becoming crucially important. Much of this knowledge base is in academia and that is where it should be – research institutions and departments should be driving the boundaries of knowledge and should be coming up with the new ideas.

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Then we have the spin-out companies that later become biotech companies and so the technology transfer takes the knowledge base into new small enterprises that hopefully will grow into medium-sized enterprises. It is these companies that are going to feed the big pharma companies with lots of new ideas and new technologies and, potentially, new drugs, or, at least, drug targets. Hence, the crucial components of a strong industry, are a strong base of small-to-medium enterprises that are feeding that industry and, underneath, a strong science and technology base.

Whatever happens, pharma will always have to have large research operations. If you look at GlaxoSmithKline (GSK), in 2001, we spent £2.4 billion on R&D, but if you look at research, we probably only did about 1–2% of the research necessary to feed our business. There is a need for research in-house as there has to be people who can receive the ideas and technologies from the small companies, to understand it and to be able to evaluate it. However, increasingly, the research that the pharma industry needs is being carried out outside of the business and much of the funding is now going to support what is going on in the universities, research institutes and biotech companies. The pharma industry can then take new molecules, targets or technologies and exploit them fully. There is a place for everyone here and it is important that we recognise that. We went through a period where the biotech companies said 'We are going to be a GlaxoWellcome' in five years but this is meaningless – pharma companies have got tremendous development capability and tremendous marketing potential on a global scale.

Some people have criticised the move to break GlaxoSmithKline into 7 separate competing research groups, because they say it will create bad blood between the groups. What is your response to this?

I think that is a wrong interpretation. These centres of development excellence are focusing on different therapeutic areas so they are not competing in the real sense of the word at all. They have very targeted areas with all the supporting technologies around them. The basic research is feeding molecules into these groups and then these groups are responsible for turning these molecules into potential products. Hence, it is like having seven biotech companies that are operating hopefully as biotech companies. Scientists like to have freedom of decision-making without feeling that they are part of some big bureaucratic empire and so the whole idea is to give them that feeling. They are therefore not really competing with each other but they are competing with themselves.

Do they not compete in the sense that they get less in return if they do not come up with the goods?

Absolutely, just like everybody else. If they produce the goods, they are fine; if they produce nothing then they will find funding very difficult. But that is a free market.

Are there any signs yet that this method has shown any improvement in productivity?

We are looking at long time-scales. It is very early but you can see the right sort of cultural changes; you can see the enthusiasm and the commitment, the same that you see in small biotech companies. This is something that needs to be infused back into big pharma and this is very important.

How do you think large pharma can significantly increase the productivity of their pipelines to match the investments made in new technologies?

I think there has been a big misunderstanding of drug discovery. As we said, the old game was very much a game driven by serendipity. An infectious disease was somewhat different as it was very easy to identify the cause of the disease because it was an invader that could be killed and then you were cured. However, if you talk about other types of disease, they are

frequently related to inborn errors and have a large genetic component. Much drug discovery in the past has gone on in the dark by people making assumptions and having hypotheses and that has led to a situation where you start off with 10,000 molecules and probably one gets to the market – they are horrendous statistics and it is a highly inefficient process.

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We are now changing that paradigm and are trying to understand the underlying mechanisms of diseases through the sequencing of various genomes, using technologies such as genomics and proteomics. All these technologies are helping us improve our understanding of the underlying mechanisms of disease. However, this is a new and different process. It is like playing tennis by natural instinct where you can play a reasonable game of tennis. However, if a professional player comes along and makes you unlearn everything and teaches you how to play tennis properly, your game deteriorates for a period of time, but then you will eventually far surpass your original abilities and be able to go somewhere where you could never have gone before because it is a completely different approach. What we are doing today is building the foundations for that in drug discovery and I believe it is something that will produce medicines of great utility, not just to palliate disease but actually to start altering the process of disease, preventing and curing it.

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However, we cannot get there until we have gone through this process. I find it frightening when people say: 'Genetics will never solve anything; genomics is

meaningless; we need to go back to the old ways' – it is back to the Luddites. We need to invest lots of money because the field is moving at an incredible rate but the complexity of biological systems is such that you will not solve the problems overnight. However, at least we are moving in the right direction and we are going to produce better drugs than we have ever seen in the past.

Having been one of the 39 pharma companies that had to back down from the action brought against the South African government on the supply of AIDS drugs, how do you think the pharma industry should best ensure it retains adequate return on investments from its products whilst ensuring that the poorest countries in the world still have access to necessary life-saving treatments?

This is certainly a big issue for not just the pharma industry but for lots of people. What has really opened it up for good debate is that if you go back prior to the AIDS epidemic, 95% of the drugs that were used by developing countries, that are on the WHO list, are generic drugs. What happened with AIDS is that it was a new disease and pharma companies attacked it, produced patent-protected molecules because it also affected people in the Western world, and spent an enormous amount of money developing those drugs. The speed of this whole process was actually very fast; the disease was not identified until the early 1980s and there were drugs on the market by the 1990s.

However, the great majority of people who suffer from HIV and AIDS are in the developing world and most of them are in sub-Saharan Africa. This therefore raised the issue of why can they not have access to these drugs. The simplistic solution is always to blame an enemy and to say that they cannot have access because of pharma companies and their monopolies and their IP. However, nothing could be further from the truth because we know that, even with the WHO recommended drugs list that contains mostly generic and very cheap drugs, there are still 50% of the people that need them that never get access to them. It has nothing to do in many ways with whether the drugs are patent-protected or not. It is to do with the infrastructure and the priorities of the government, and to do with education. Many of these countries still only spend

US\$1–10 per head on the healthcare of their people and these figures are meaningless in terms of effectiveness.

In South Africa, that was nothing more than a showcase because GSK was already offering drugs for AIDS to the South African government at differential prices and even, in some cases, as donations. However, they would not accept them because they would not accept that the virus was the cause of the disease. Hence, even after the showcase, there is still a big program for getting antiretrovirals into South Africa and getting them to the people that need them. In fact, there are now lawsuits by people in South Africa against the government because they have not given access to the necessary drugs. By contrast, there are countries such as Uganda that are serious about providing access and are putting the necessary infrastructure in place.

All countries are now recognising that this problem cannot be solved by the pharma industry or by the UN agencies alone. It requires a real partnership between the governments of these countries, the UN agencies, the pharma industry, the NGOs, and now of course this global fund that is being put together to make sure that there is money available to put the infrastructure into these countries and then to pay for the drugs. I believe there is a desire now by all the parties (I can, of course, only speak for the UN agencies, the European community, the UK government, and the pharma industry) to work in partnership to attack this problem and stop blaming each other.

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What is your personal opinion of tobacco companies funding research into new cancer therapies?

I do think we have to be very careful because we know that smoking has a detrimental effect on health, not just on cancer but also on the respiratory and cardiovascular systems. But then you could argue that eating bacon and eggs or eating chocolate is detrimental to health. Where do you stop? I therefore think we

have to be very careful in this regard as people have a choice with their lifestyle. Even if we can genetically determine those who are likely to develop say type II diabetes and you tell them they need to change their lifestyle to avoid developing the disease, there are still many who would not change. Is it then also seen as a problem if confectioners want to fund diabetes research? I do think one has to be careful of isolating groups of people and giving them all the blame for this. It would be a slippery slope so I do not think we should be identifying different groups and saying that we will not accept money from them or they cannot contribute to funding certain types of research. They run a business for which there is a market and, at the same time, they might wish to support research to help the process.

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What are your main concerns for the industry?

My main concerns for the biopharmaceutical industry as a whole would be that the industry deals with emotive issues (that of health), and so they are producing products for which people feel they have a right. It is almost as though they have an entitlement to have that product and that is not true: it should be no different from anything else. One of the major impacts on health is food and that is not regulated in the same sense as medicines. So why are drugs separated out as some special category?

I think there is an issue for the industry because everybody feels that drugs are too expensive. But how can they be too expensive? A course of penicillin for 7 days saves your life. Many people who benefit from other medicines often have a completely different quality of life. Hence, in real terms compared with smoking 40 cigarettes a day, they are fairly cheap. I think people have to be educated better in a sense that if they want that quality of life, then they are going to have to recognise that they pay for it. Otherwise, the industry is going to go out of business and new

drugs will not be developed. There is constant pressure being put on the industry because it just happens to be in a field that people think they have an entitlement to where they should not have to pay for it and I think they are totally wrong.

Where do you think the industry will be in say 10 years time?

Providing we overcome some of these issues, I think the industry is going to be seen in a very different light. Much of what we are doing now and much of the investment will drive us to a completely different position where I think the pharma industry will be seen very clearly as a part of a solution to many of these issues that we have been talking about. Using modern science and modern technology, I think that the way we practise and deliver medicine will change quite dramatically.

As you leave your position at GSK, do you intend to replace that part of your work through another job elsewhere, or are you content to just focus on working at Imperial College?

Being Rector of an outstanding place like Imperial is equivalent to being the chief executive of a major company, and I intend to devote all my time, energy and expertise to the College now.

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What would you like to have achieved by the end of your career?

When I leave Imperial College, I would like to feel that I have had an impact in helping the university become much more business-like so that it can run itself efficiently. I also hope it will be financially independent in the sense that it can build up an endowment that gives it financial flexibility to support new programs, scholarships and to attract the best people from all over the world, and remain competitive on an international stage. At GSK, I think I achieved my ambitions in creating what I now believe is going to be, and already is, one of the premier pharma companies in the world, and it will continue that way.