



Presidential perspectives

Talking to Dr Geoff Watts FMedSci, Professor Sir John Tooke PMedSci shares his views on biomedical careers, the medical science ecosystem and the role of the Academy

“I’m very keen that the Academy doesn’t become too ‘establishment’. It has to remain fresh and future focussed if it’s going to continue making real contributions.”

Presidents of the Academy of Medical Sciences spend only a small proportion of their time in the organisation's headquarters in London's Portland Place. But when they are there they occupy a small room with floor-to-ceiling glass walls on two sides offering full exposure to anyone passing along the corridor outside. Architectural metaphors can be overplayed – but besides bringing natural light to a room that would otherwise lack it, this literal transparency signals something about communication and its importance within the Academy. The President can see what's going on, and the staff know when he's in the building, what (to a degree) he's doing, and when he can be approached.

To the present incumbent this exposure should present little problem. Several of the tasks Professor Sir John Tooke has undertaken during the past decade or so will surely have immunised him against the glare of public and professional visibility. He's been inaugural dean of the Peninsula Medical School, led the inquiry into the ill-fated Modernising Medical Careers and, since 2010, served as Vice Provost (Health) at University College London (UCL) and head of its School of Life and Medical Sciences and its Medical School. And now, of course, there's the Presidency as well. None of these jobs is calculated to appeal to someone who can't cope with occasional scrutiny.

The scale on which Tooke currently operates is in striking contrast to the literally microscopic level at which much of his research was pitched back in the 1980s. An interest in his principal topic, microvascular physiology, had originally been triggered during an eight week project carried out with an established research group while he was still a student at Oxford. "This was the most engaging part of my undergraduate career," he recalls. It led to a Medical Research Council (MRC) research training fellowship with scientists in that same group. "The work was particularly fascinating because the microscopy techniques we used allowed you not only to see this living system, but to interrogate it." ►

On the Fellows of the Academy...

"They are the key resource, they are the Academy. And they're tremendously supportive when called on to contribute to our foresight and the formulation of our policy and reports." The evidence of a recent survey, he adds, is that the Fellows are broadly content with the direction in which the Academy is moving, and with its emphasis on supporting careers and influencing policy to getting the 'ecosystem' right.

London or southeast domination is a familiar charge in many areas of the UK's cultural and economic life: one the Academy intends to counter by increasing its regional activities. As a physician scientist who spent many years based in Exeter, Tooke is predictably keen to support this intention. "Despite the fact I now work in the 'golden triangle', " he says, "I will not forget that world class early talent is also very evident in our smaller regional centres. It's one reason I am so keen to see the Academy working proactively with such centres. I start from the position that talent is pretty evenly distributed across the country, and we need to be sure we're exploiting it all."

This, he adds, is one reason why the Academy has been keen to promote the concept of regional academic health science networks. "And we already have a number of regional Academy champions to encourage the next generation. We are holding more regional events. The tenth anniversary of the mentoring scheme, for example was launched in Newcastle this March.

On the current career structure in medicine...

"There's still work to be done in ensuring sufficient flexibility in the career pathway to enable people with particular aptitudes to take time out to develop their research skills, and to go abroad and so on."

Tooke led the independent inquiry commissioned by the Secretary of State for Health into Modernising Medical Careers. Aspiring to Excellence, his 2008 report on its findings, was highly critical of the system he'd been asked to investigate.

It's now going in the right direction, he says, "But things haven't moved as fast as I would have liked in terms of implementation.

Inspecting the fine detail of a capillary network is far removed from shifting the blocks around as you design a new medical school or restructure a major research institution: so far removed that you might wonder how a mind attracted to a study of one could be at home grappling with the other. But Tooke himself sees no contradiction. While aware of the transition he's made, he regards what he does now as a natural progression. "What I most enjoyed about science was the formulation of strategies, the generation of ideas, and the analysis. And of course this is still my job. I'm dealing with uncertainties, identifying opportunities and marshalling resources." As Tooke points out, he's predisposed to a fascination with policy and strategy issues: both key elements of the Presidential task. "I could

There's general agreement that the principles we espoused in Aspiring to Excellence are still relevant. So why haven't they been fully implemented?"

He also talks of the Academy's emphasis on mentoring. "The Academy is renowned for the work it has done on the mentoring scheme. We've recently launched a booklet summarising our experiences to encourage other organisations to support mentoring in their institutions. The Academy will also be doing some very exciting work supported by the Wellcome Trust on engaging medical students in research."

see very quickly how the Presidency meshed with what I was already doing. When you're operating at this level you're involved in policy issues, concerned about the next generation of scientists, and facing questions such as whether we're building the right capacity. I learned through my role in the Medical Schools' Council [he chaired it from 2006 to 2009], and through the enquiry into postgraduate medical education and training, about the importance of establishing the right principles on which to make policy."

Tooke did indeed come well-prepared to take on his role at the Academy. Setting up a new medical school had concentrated his mind on training and research, two of the Academy's central preoccupations. It also gave him an

insight into the management of a sizeable organisation. His more recent appointment as a Vice Provost at UCL, an even bigger job, is adding still more to that experience. With Tooke at the helm, UCL's School of Life and Medical Sciences will aim to use inter-institutional collaboration and interdisciplinarity as the key drivers in shaping its future and continuing to make an impact.

Returning to the Presidency, it's self-evident that ambitions of this kind chime with the aims and objectives of the Academy - which is why Tooke speaks of his two posts as meshing together. That said though, slotting a day or more a week of Academy work into the UCL job is not easy. But being based in London close to Portland Place adds a helpful degree of flexibility. And in the nature of the two posts - they both involve attendance at a lot of networking or representational events, for example - there can be an overlap between them. "Though I do have to look out for possible conflicts" he adds.

Reflecting on what the Academy has achieved over the decade or so of its existence gives him encouragement for the future. "It's done spectacularly well given its relative youth. It's developed a status and a capacity for influence far greater than might have been expected in that time. It's produced a number of authoritative reports that have directly influenced policy, particularly the regulation and governance of health research and has become a respected voice on the development of sustainable training and career pathways for academic medicine and the biomedical sciences. This means the Academy is listened to and valued."

Tooke sees no reason for a radical change of direction. "We need to continue our support for the next generation of medical scientists, and be very careful that we're meeting the needs of the fundamental scientists, as well as the clinical scientists. But I'm very keen that the Academy doesn't become too 'establishment'. ▶

On launching a new medical school...

In 1999 Tooke lead the bid for what was to become Peninsula Medical School. "I rather naively thought I'd do it for three months. We'd be making the best stab at it we could, and probably failing." In fact the bid found favour. "Then we were invited to develop the full business case and the curriculum. At the time I was running a full clinical service and a lab, and I ended up devoting more than a year to the bid process. By that time I was sufficiently seduced to apply for the job of Dean." Which he got.

He has no regrets. "It was a fabulous opportunity to think afresh about what medical education should be trying to do. Our focus was on the future: how to devise something that would be right for the patients of tomorrow, and to start with that brief rather than coming at it from a traditional educational standpoint." He also had the excitement of building a research strategy from scratch.

"I think we met our major objectives in that our medical students were and are regarded in recent surveys as the best prepared in the country. And I was pleased, given our standing start, that we achieved a very respectable position in the research assessment exercise, and showed we were capable of international level work."

"The organising principle was that everybody got together behind two ideas: that the new school should benefit the health of the population of the south west, and the economy of the south west. To fulfil both of those meant research as well as education."



It has to remain fresh and future focussed if it's going to continue making real contributions." He adds that care has to be taken about where those contributions are made. He says this because the very fact that the Academy has achieved respect and acquired authority could tempt it to start entering into too many areas, especially those less central to its main purpose. He offers the example of basic medical education. Its importance in the creation of new generations of doctors who may eventually wish to contribute to medical science is self-evident. So the Academy can and does offer opinions about how it might be improved. The danger, he says, would lie in trying to take it on as a major project: in trying to stretch finite resources further than they'll comfortably extend, and in producing a report or policy document that proved to be insufficiently considered. "We can better extend our influence on such matters by working in partnership with high calibre likeminded organisations for which the issue is a more central concern", he says.

Partnership is also the key word when it comes to the Academy's relationship with industry. Relations between academics and industry have not always been perfect. But Tooke is bullish. "Industry is now looking to forge closer and novel partnerships with academia," he insists. "Industry's changed because it's acknowledged

that its old way of working was not productive enough in terms of new drug development. And academia has got itself into a more realistic space where it's looking at its broader social responsibilities." Stepped out of the ivory tower, you might say. "I suspect one of the cultural problems in the past was the business model of pharma with the big emphasis on marketing and blockbuster drugs." Academics, he thinks, are more comfortable with the smaller, more personalised approach to medicines development that's emerging. "We need to encourage people to move seamlessly between the academic preserve and the commercial world. We need to value entrepreneurial experience and achievement as much as we value high quality fundamental science qualifications."

Tooke also believes it essential that the Academy takes care to meet the needs of the Fellowship's fundamental scientists as well as its clinical scientists. There is always the danger of a tension within the Academy between clinical and non-clinical Fellows. The latter may feel that clinical issues - not least, at present, the NHS reforms and the attention that has to be paid to them - tend to predominate. Tooke sees any separation between the two groups as unhelpful and divisive when what needs to be stressed is their interdependency. Indeed, the existence of a body specifically intended to

encompass both groups should be seen as one of the Academy's strengths. "Translation of basic discoveries into health gain needs a close working relationship and a mutual understanding of challenges that those working at either end encounter. I'm going to try and fuse the Fellowship rather than think of them as separate entities," he says.

As Tooke sees it, part of the future success of medical science, and of the Academy, lies in finding answers to several broad questions that encompass the way in which 21st Century research will be conducted. "We have to ask how to promote interdisciplinarity. What are the new interfaces that we need to be exploring? How do we develop the concept of team science? How do we best equip the new generation of medical scientists to engage in those new ways of working?"

To say that Tooke is posing questions about the future is not to suggest that he has no answers. Quite the contrary. For example he gives much thought to what he describes - using the jargon of the topic - as the R&D "ecosystem" in which new drugs and devices are developed. "Much of the focus at the moment is on how best to close the proof-of-concept gap, the first translational gap. We need a new model which avoids the massive investment in time and money now required to get from a concept to a new therapy."

To explain more of his thinking on how the Academy should position itself, Tooke outlines some of the elements of his ecosystem. First, he's a firm believer in the importance of understanding clinical need as a starting point for research. Once a need has been identified it has to be turned into a research question. Then you have to ask yourself whether the question is tractable with the current state of fundamental knowledge. "The cautionary example I use is Nixon's War on Cancer," he says. "Vast sums of money were invested at a time when we simply didn't know enough about how cells replicate." ▶

On learning from patients...

"I do believe that medical science has to be informed by patients' perceptions of need. The example I use in relation to my own interest, diabetes, is that in the 1920s, when insulin was developed, it was initially available only by injection at every meal. In the middle of the last century someone decided this was tough on patients, and why didn't we devise something that delayed insulin's absorption. The legacy of that was 30 years of poor diabetic control, with people having to eat to match the insulin dose they'd taken. Lots of hypoglycaemia."

"What wasn't recognised was that far more irksome to patients than injecting themselves was the loss of control leading to them falling over and looking foolish because they'd got a hypo, or having to break off what they were doing because they had to have something to eat. I was intrigued, as a clinician, when I first realised that many patients would much prefer to take multiple injections if it enabled them to behave more like everyone else."

We also have to become smarter than we are now at estimating the potential value of a new drug or device. "In developed nations we're all aware of burgeoning health care costs. The major cost driver is the adoption of treatments of marginal incremental benefit. We're currently promoting an unsustainable position. So a number of drug companies now are looking to see how they can identify value at an earlier stage, and feed that back into what they choose to focus on.

"Commissioners are getting smarter. NICE is determining, on the basis of perceived value, what gets used. If we knew what was going to be bought, investment at the development stage of a new drug or technology could become more rational. You could also use different models for getting drugs into society; earlier conditional licensing, for example." Under arrangements of this kind, patients get new drugs and devices earlier, and their developers don't have to wait so long to see a return on their investment.

The final element in this innovation ecosystem is implementation: ensuring that people actually use the new drug or whatever it happens to be. For virtually all classes of drugs, he points out, adherence is no better than about 60 per cent. Some of this failure is attributable to side effects; more personalised medicine should help to overcome this deterrent factor. But it also raises the question of whether the drug is hitting the target that matters most to the patient. Back, in other words, to where we began: the correct identification of true clinical need.

So how does he see the Academy slotting into this broad conception of the research enterprise? For a start, he says, it can remind all concerned with research and development in medicine that this is what the process comprises, how important it is, and how it needs to operate. The Academy, he argues, has the authority and the perspective to sketch this blueprint, and do so persuasively. Indeed the

Academy provided valuable input in advance of the Comprehensive Spending Review which resulted in a favourable settlement for the life sciences and was instrumental in influencing the Government's Life Science Strategy published at the end of 2011. Key to repeating this funding success is an emphasis on the role of the life sciences in the UK economy. "We have to promote medical research for this reason as well," Tooke argues. "It's reality." The days when learned bodies like the Academy felt that worrying about the nation's economy was not part of their mandate are long gone.

Tooke himself can't say for certain why he chose to enter medicine. Nobody in his family had studied it. In retrospect though he thinks he can pick out a couple of the factors which shifted his focus from the humanities and towards the sciences. "My mother had a brain tumour when I was about 12 or 13. I was quite appalled by the slowness of the diagnosis and what she had to go through in relationship to that." A further factor, at a slightly later stage of his career, may have been the experience of another close relative. "He was diagnosed with diabetes at the age of 21. Again I was pretty appalled by the early management of his condition." He doesn't assert that these events determined his career choices; he merely cites them as possible influences.

The seeds of Tooke's lifetime preoccupation with diabetes and its academic exploration began to germinate while he was still at Oxford. When he eventually entered clinical practice and started to appreciate the overwhelming impact of morbidity and mortality in vascular disease, he realised the extent of the unmet need. "In those days there was no such specialty as vascular medicine and I began to think how my research interest in the microcirculation might play into clinical practice. That's how I settled on diabetes as a specialty." But it also had other attractions for him. "I'd be dealing with patients of all ages and with prevention and health maintenance as well as therapy and the complications of disease."

Tooke did his specialist training in Leeds, then spent a year at the Karolinska Institute in Stockholm doing vascular studies on patients with diabetes. It was very productive, he says.

"I was working with vascular specialists - angiologists, as they were then called - in a very different health system, which made me question the adequacy of our own. It's enlightening to compare and contrast."

He returned to the UK in 1984, first as a Wellcome Trust Senior Lecturer in Medicine and Physiology at Charing Cross, and then on to Exeter to develop a diabetes service and set up a clinical science division.

He opened a microvascular lab and developed a series of technologies for studying the human circulation. "The best model for diabetic complications is man. There aren't really good models of these complications." It was in 1998 that the opportunity to bid for a new medical school came up, and Tooke began the movement away from hands on research and clinical practice and into academic management, although he remained active in clinical practice until his move to UCL in 2010, and to this day retains research links with Exeter. ►

On international activities...

Although initially bound to focus on domestic issues, the Academy had begun to develop international contacts and policies well before the end of the first decade of its existence. Under Tooke's Presidency, this emphasis will continue and grow. "At a European level," he says, "we must be sure that those policies which directly impact on medical science in the UK are favourably developed and interpreted, whether it be the EU clinical trials directive or data protection legislation. We need to be working with other European academies to ensure that the policy environment is favourable."

The Academy is in regular touch with its European counterparts through its Foreign Secretary, and through the Federation of European Academies of Medicine (FEAM). "Our Academy is relatively well developed

and structured, so inevitably plays quite a lead role. Statements of ours that have an influence by this route help to determine the crafting of EU policy and legislation."

"We also need to be very alert to how UK immigration rules affect medical science because we want to attract talent from wherever it's found. Being able to accommodate people from overseas is very important to British science."

"We also need to recognise the medical science challenges that have a global dimension. We must be alert to issues of global proportion and to emergent threats such as climate change. Our historic links give us a point of contact with many other countries."

On the funding challenge...

Although now fully at home in its splendid 18th Century John Adam townhouse, the product of a successful fundraising venture, the Academy cannot afford to neglect the long term financing of its activities. The conference hire business at 41 Portland Place supports the costs of the new premises and provides a modest income, but any President must be concerned about the future.

"We run a balanced budget, and a very tight one," says Tooke. "Our base funding comes from a very welcome grant in aid by the Department of Health and from Fellowship subscriptions. And there's also commissioned work. But we have very little in the way of freedom to decide for ourselves to finance work that we feel to be important." Reports and meetings generally require a sponsor. "I think we could do far more to influence policy in an inventive way were we to have a relatively modest increase in our uncommitted income."



Work, he claims, is not all consuming. He enjoys being in London, but admits that few evenings are free. He still has his house in Devon, and gets there at weekends when he can, claiming that that's where he tries to put work to one side.

Meanwhile, questions for the Academy keep on coming. "It takes years to develop a skilled workforce; what are the needs going to be in a decade's time? Will we have, for example, enough bioinformatics people? Is there a career pathway for the people who are going to draw all the new data together and synthesise it? What are we doing about regenerative medicine? What is the future for research involving animals? How are we going to get a good understanding of the potential of genetics?"

His experience at Peninsula Medical School and now at UCL, he says again, will stand him in good stead as he leads the Academy through its second decade.

On diabetes...

The workloads of his post at UCL and the Presidency of the Academy have forced Tooke's retreat from lab and clinic; but he's not forgotten the condition that has dominated his career, diabetes.

"It's rightly been described as the 21st Century epidemic. Globally the biggest causes of mortality in the developing as well as the developed world are now chronic conditions, with diabetes and associated vascular diseases being major contributors." The roots of diabetes, he points out, are multi-dimensional and range from lifestyle to biology – or a combination of both. "My colleagues in Exeter were contributors to the discovery of the variant of the FTO gene that predisposes us to obesity, and that one sixth of us possess. Once the function of that gene is understood, it may turn out to be mediating its effects through satiety." Successful treatment will quite likely rely not only on drugs, but on behaviour change.

"One problem with a condition like diabetes," he adds, "is the tendency to group it all together because it's all characterised by high blood sugar. We're increasingly learning that it's actually a heterogeneous disorder, and different variants respond differently to different therapies. So I see a future where careful phenotyping and genotyping will provide more precise treatment for subsets of what is currently viewed as one condition. This offers exciting opportunities for medical science. It can draw on the current emphasis on finding treatments for niche or rare diseases. What we learn here may turn out to be applicable more broadly."

He does believe that the scale of the problem posed by diabetes has now been recognised. Hence, for example, the growing emphasis on childhood obesity. He suggests that the Academy may have to devote some thought to the provision of more academic effort in public health in addition to other branches of medical science.

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About the Academy

Founded in 1998, the Academy of Medical Sciences is the independent body in the UK representing the diversity of medical science. Our elected Fellows over 1000 - are central to our success. They are drawn from the fundamental biological sciences, clinical academic medicine, public and population health, health technology implementation, veterinary science, dentistry, medical and nursing care and other professions allied to medical science as well as the essential underpinning disciplines including mathematics, chemistry, physics, engineering, ethics, social science and the law. It is their knowledge, influence and networks that are the Academy's most powerful assets. We are one of the UK's five National Academies and work closely with them and our sister Academies overseas. We are also an integral part of the UK's strong biomedical research community, working closely with funders, medical research charities, the NHS and the private sector.

At its core the Academy is:

- A champion for excellent research and researchers
- Independent, evidence-based and authoritative in its approach
- Proactive in identifying and responding to developments in health, society, science and policy
- Expert and accessible in the information we provide
- Committed to partnership and interdisciplinary engagement

Our vision is to improve health through research.

Our mission is to promote medical science and its translation into benefits for society.

Underpinning our strategy are six objectives:

- Promoting excellence
- Influencing policy to improve health and wealth
- Nurturing the next generation of medical researchers
- Linking academia, industry and the NHS
- Seizing international opportunities
- Encouraging public and professional dialogue about the medical sciences

The Academy's strategy for 2012-16 is available at www.acmedsci.ac.uk



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