British cardiology

Crisis in cardiovascular research in Britain

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The central theme of this commentary is that in Britain over the past ten years progressively fewer committed research graduates, medical and non-medical, have been attracted to a career in cardiovascular science and that those of us who ought to be able to provide opportunities commensurate with the aspirations of these graduates are failing to do so. Many will find my analysis depressing.

Medical science today

There is a dearth of clinical scientists both in the United Kingdom and in North America. Why should this be?

Is it possible that fewer people are graduating from our medical schools with a sustained sense of inquiry and excitement in medical science? The examination grades demanded by most medical schools for entry into medicine have remained very high or have increased over the past two or three decades and there can be no doubt about the potential of most students. But their purpose in choosing medicine may be different now from 10 and more years ago and relate more to the security and social acceptability of being a doctor than to the less easily identifiable aim of asking and pursuing questions relating to disease. Alternatively, more of those who are stimulated by the unknown may be opting during school years for a career in the biological, molecular, or physical sciences, where the rapidity of advances and opportunities to participate in them may appear to those in their teens to be greater. Or perhaps science as a whole and its technology have become more suspect and are trusted less—with softer social issues appearing ideologically more attractive.

The weight of facts to be learned in medical school and the continuing rigidity of their teaching may so

concuss many students that they find it hard to develop any independent or personally original ideas. The decreasing enthusiasm for intercalated courses in basic or paraclinical sciences is a measure of this. Whether an MB/PhD programme, currently being favoured by some in academic medicine, is an answer remains to be seen. In the future these courses are bound to provide a better scientific background than many young doctors currently have, but this may not attract them into clinical science. The American experience suggests that a larger proportion of those who complete their MD/PhD programmes may go on to pursue a career in basic science or join the pharmaceutical and other industries than those who remain in clinical medicine.

Then there are powerful competing forces. Newly qualified doctors are understandably seduced away from clinical science by the security and higher salaries offered by the National Health Service¹: extra units of medical time for on-service rotas may increase the income of a registrar in his or her late twenties to double that of a university clinical lecturer. The enticement of private practice is an increasingly strong negative force. Industry, where research is mostly prescribed, has captured a few imaginative people but probably does not present a big challenge to the more academically minded. Then there are important areas in our profession, such as general practice, that take others away from scientific medicine.

The very demanding and heavy clinical service load is of course the most potent influence that thwarts the development of investigative interests. The busy registrar or young consultant who is inspired to ask "why" needs to have considerable passion to pursue their question in the face of this load. And too many flirt with academic medicine to improve their curriculum vitae as a means of furthering a future service career.

Added to all this, government funding of research

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in Britain is declining in real terms and looks set to decline further.² Successive government reports, including the recent White Paper, indicate that many politicians are either ignorant or dismissive of the needs of academic medicine and of clinical science. Hence the recent formation of the Academic Medicine Group.³

Cardiovascular science

A seduction factor that is less well recognised and that operates particularly against research into cardiovascular science is the demand of diagnostic and therapeutic technology. As Krikler recently pointed out⁴ the early technical advances were crucial in starting to separate cardiology as a subspecialty in medicine. Many young graduates become interested in and expert in complex instrumentation solely because of the need to provide an up to date service. Excellent though this may be, the use of new technology should not be allowed to become a purpose on its own—or the tail that wags the dog. While there are some impressive examples of productive and innovative clinical studies based on cardiac catheterisation, angiography, echocardiography and Doppler echocardiography, and radionuclides, most of these techniques are necessary routines that take up an inordinate amount of the time and distract young doctors from developing their research interests. Sir Thomas Lewis, who described the role of clinical science,⁵ knew this and wrote in 1920 “Let the knowledge of disease be built up by means of such instruments”.⁶ He also wrote “the special method is for the investigator into pathological processes; it is not for the pure clinician”. There is an even greater need now to heed these views of nearly seventy years ago. Clinical diagnostic technology should be used more to formulate and explore new ideas.

The number of really able young cardiac scientists—men and women formally trained in cardiology and also in basic or applied science—seeking senior lectureships and chairs in cardiovascular disease has fallen in the past decade.⁷ While this probably results from the seduction factors already described, the paucity of science based fellowships and of funds to support programme grants must share the blame. Senior cardiologists may also be at fault in not providing an appropriate atmosphere for innovative investigation. Some who read this article will rightly deny this charge, but many cardiologists in teaching hospitals are and have been too taken up with administration or their clinical service to encourage their younger colleagues into cardiac scientific inquiry. A broader range of senior positions should attract more people into an academic career and this relates to the need for a career structure (see later).

In the postwar years, the strength of academic cardiology in Britain lay in the fine training available in physiology and electrophysiology and, to a lesser extent, in pharmacology. A training in biochemistry was rare. For all its earlier strengths this emphasis on physiology has been one of the weaknesses of cardiac science in the 1970s and 1980s. The cardiac catheter laboratory became and remains too dominant. As a consequence, many have failed to recognise and embrace the revolutions occurring in the biochemical understanding of disease and the opportunities offered by cell biology, molecular medicine, and the new genetics. These have outpaced and are outpacing academic cardiology, but their integration into cardiovascular science is essential if we are to reduce and treat heart disease successfully. For cardiovascular science to advance, there must be new generations of enthusiastic investigators trained and skilled in these topics and willing and able to overcome traditional barriers between research and clinical specialties. Cardiology may not be an academic subject, but there must be some who are excited enough to span the increasing gap between the new biological sciences and routine patient care. It is to such investigators that we already owe the dramatic advances of identifying adrenergic receptors and of developing antagonist and agonist drugs, of recognising the functions of endothelium in vasomotor control, of devising genetically derived thrombolytic agents, of characterising lipoprotein receptors and their pharmacological manipulation, of recognising the role of the endothelium and macrophages in the development of atheroma, and of peroxidation and free radical activity in myocardial injury.

More training opportunities

A new initiative is badly needed. Resolution of the crisis will not result from infusions of soft money: these are too temporary and usually related to a specific interest of a pharmaceutical company. The British Heart Foundation has made the most outstanding and imaginative contribution to academic cardiology ever seen in Britain, with the establishment of twelve endowed professorships and university departments and seven personal chairs. It should consolidate these by helping to plan the future. The recent establishment of three non-clinical research fellowships is a start. But what is also urgently needed is the creation of more training fellowships to expose young doctors to research in cardiovascular science. The provision of about 20 fellowships with a three year tenure for those between the ages of 27 and 33 (or thereabouts) should give cardiac science the fillip it needs. Such posts should be identified by

universities through the granting of honorary lectureship status and by the Joint Planning Advisory Committee. Some posts might be created in conjunction with the new Medical Research Council initiative. Programmes for training fellowships in cardiac science should be moulded to suit the aspiring interests of the holder, so that he or she may spend a year in a "research hotel" in molecular biology, cell biology, or biochemistry; in a metabolic unit; in clinical genetics; in pharmacology; in epidemiology and so on—whichever combination is appropriate to the individual. The Joint Committee on Higher Medical Training, of which I am currently chairman, has a flexible and positive policy towards unusual training programmes. The Wellcome Clinical Research Fellowships are a good model on which to build, but cardiovascular science needs dedicated training fellowships if it is to survive and contribute nationally and internationally.

A career structure is urgently needed for clinical scientists and at last—I first wrote about this in 1977⁸—the essentiality of this is being recognised and has recently been spelt out by the House of Lords Select Committee on priorities in medical research⁹ and by the Academic Medicine Group.³ Indeed, this is regarded as "the most urgent requirement for revitalising British academic medicine".¹⁰ A career structure for clinical scientists and an expansion of posts comparable to "new blood lecturers" is a national need, and cardiac science is crying out for its share. The British Heart Foundation could also do much to advance this cause by establishing a few more tenured senior lectureships or more permanent senior research fellowships. These would act as the goal for those in training.

The future of cardiovascular science is no less exciting than it was 40 years ago. Think of the great innovations in cardiovascular disease that have taken place over the past 20 years largely by breaking orthodox boundaries of clinical research. Think of the richness of current and future questions to be addressed in atherosclerosis, the formation of and dissolution of intravascular thrombi, cardiac hypertrophy, myocardial metabolism, myocardial ischaemia, hypertension, and so on. There is no lack of questions for cardiac science. But we have to have the will to provide for future generations to invest their intellects and resources in it. All these questions need a positive and imaginative approach and require the participation of cardiovascular scientists—particularly of medically trained individuals who can pose and develop the questions along with basic scientists.

The future of cardiovascular research

We must sustain the enthusiasm of talented post-graduates for embarking on such ventures, provide them with appropriate training opportunities, and pay them commensurately with other branches of medicine. I do not believe that there will be only a few takers. If I am wrong, the next generations of cardiologists will comprise skilled service physicians and superb graduate technicians. This will not be enough to reduce the toll of heart diseases. Nor will it be enough to provide the necessary education in developing areas of cardiovascular science. Nor will excellence in clinical service be maintained. My appeal is for more to take up cardiovascular science as part of their training, for greater opportunities to be provided to gain scientific learning in subjects related to heart diseases, and for academic cardiology to be re-established as a keystone for advancing knowledge. If it is not, British cardiology will no longer be innovative.

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