

# The MB PhD Programme. Training to be a clinician-scientist in the UK

**ABSTRACT**—Rapid changes in the universities and in the organisation of the National Health Service are altering the perception of opportunity for clinical scientists in training. Cambridge University has established an integrated programme that combines training in scientific research and clinical medicine leading to the MB, BChir, and PhD degrees. The need for this and other options in the development of careers for aspiring medical researchers is reviewed here.

Discovery in medical research and its clinical application increasingly requires scientists with an understanding of the needs of patients as well as the complexities of human disease [1,2,3]. To improve recruitment of suitably trained personnel, many medical schools in North America have established combined programmes in clinical medicine and scientific research [4]. These programmes provide training for students who wish to enter careers in teaching and research or who pursue careers in clinical disciplines with a strong investigative component [5].

There is evidence that students who become researchers adopt an unconventional approach to the learning of medicine [6]. This suggests that there is a need to provide a milieu for them which is distinct from the more usual system of medical education [7,8]. In Britain, many university teachers of medicine believe that exposure to research during the undergraduate period critically affects later attitudes. Two recent studies have pointed to the influence of scientific experience at medical school on the choice of career and ultimate performance in research. Not only is it an important career determinant [9], but early experience of research also correlates strongly with later success in raising research grants and with high rates of publication and citation [10].

The undergraduate course in clinical medicine at the University of Cambridge has been established for 17 years. From the outset, the medical school was envisaged by its planners as having a strong orientation towards research [11]. In practice, the intensive nature of the short clinical course (27 months) has,

until now, left undergraduates little time to take advantage of the wealth of research activity in Cambridge—or even to continue research projects carried out during their pre-clinical years. Recent reports indicate that the impact of biological research and the international standing of academic clinical medicine in Britain has diminished. In clinical sciences, such as gastroenterology in particular, the citation impact is rapidly decreasing [13]. Thus, mindful of a general concern about the future of biomedical research [14,15], and especially the reduced opportunities for medical students to secure exposure to scientific work in the form of intercalated degree studentships [16], Cambridge has introduced an integrated programme of research and clinical training. The course leads to the combined MB, BChir, and PhD degrees. It is an alternative to the traditional course of clinical training and, like it, admits suitable graduates in the pre-clinical sciences from Cambridge and elsewhere.

The undoubted needs for new initiatives in post-graduate education in the medical sciences cannot be considered in isolation. Revolutionary changes are afoot simultaneously in our National Health Service and the universities. Any student of medicine who is considering a research career will expect to be given advice. This, depending on its source, will be based on a mixture of perception, prejudice and personal experience; it is also likely to be conflicting. Given the unprecedented scale of changes that now affect academic medicine, how may a coherent view be formulated and what advice may be given to the medical undergraduate who wishes to participate in scientific research?

Rigid implementation of higher professional training programmes in approved posts, and the obvious demands of the competitive career ladder in the main clinical specialties, are powerful factors. They will not encourage any but the most determined medical graduates to combine clinical and research careers, and they discourage long periods of full-time experimental work that would interrupt professional training schemes. The demands of latter-day medical research, especially in the disciplines of molecular and cell biology, usually require long periods in the laboratory and several years of technical training and 'troubleshooting'. There can be few short cuts for the serious worker who wishes to become an independent investigator: the notional 'period of research' after qualification, so much vaunted as a symbol of academic prowess in medicine and alluded to by the committees for higher medical training, can no longer be seen alone as a

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credible training in the medical sciences [17]. The present form and conduct of the higher medical doctorate or MD degree in many universities has a bearing on these issues [18]; it is not further discussed here, but is illustrated in Table 1.

The position of medical research workers in the setting of NHS Trust hospitals awaits clarification but the effects of new funding arrangements for research

based in university departments (with the loss of central resource coupled with mandatory charges for overheads on grant-supported work) are more easily predicted. All in all, the unnerving pace and the breadth of these reforms render it more difficult for the young doctor to plan the appropriate research base that is required for a combined career as clinician-scientist *after* qualification.

**Table 1.** Options for research training for medical undergraduates.

**1. Take PhD immediately after first degree in science/pre-clinical course**

*For:* Student is young—low probability of domestic commitments/financial difficulties.  
Appropriate if interests lie in basic science.  
After intercalated degree or Part II Tripos student may have developed serious interests.

*Against:* May promote premature career decision.  
No clinical perspective or input.  
Peer pressure to join clinical training.

**2. Take PhD immediately after clinical qualification (a rarely pursued option now)**

*For:* Graduate still young—domestic and financial considerations not usually prominent. Now has clinical perspective.

*Against:* Domestic commitments increasingly probable.  
Scientific proposals may already be out-of-date.  
Attractions and peer-group pressure to follow clinical career.

**3. Take PhD studentship after general professional training**

*For:* Mature, wide experience base.

*Against:* Probable loss of youthful enthusiasm and creativity.  
Serious domestic commitments are likely with threat of income loss.  
Up-to-date scientific understanding will be more difficult to acquire.  
Difficulties of leaving clinical career ladder (and returning).

**4. Submit MD after general professional training is completed**

*For:* Wider experience base.  
Little or no interruption of clinical career.  
Income loss usually less significant.

*Against:* MD does not carry same scientific credibility as the PhD.  
Age may have militated against creativity.  
Basic or fundamental scientific work not usually possible.

**5. Enrol on a MD/PhD programme**

*For:* Specially arranged option that minimises financial loss.  
Join a small group of like-minded individuals.  
Youth, creativity, and early scientific training utilised.  
Allows clinical perspective and promotes medically relevant scientific research.

*Against:* No UK experience of such programmes.

### When to obtain scientific training in research

Theoretically at least, several options are open to the aspiring clinician-scientist as to when to embark on research training. Detailed discussion of these options is beyond the scope of this article, but it is perhaps worth questioning how realistic some will remain in the light of the changes affecting universities, the broad reforms of the NHS, and the current economic position of the UK.

Given the need for formal research training on a full-time basis, we believe that many of the *ad hoc* avenues for career development in medical science are fast becoming intractable. While a very few doctors of exceptional ability may continue to achieve their ambition by quite unconventional means, the demands of scientific effort, the pressures of career development, and the clinical accreditation process render autodidacticism or the *ad hoc* approach unrealistic for most. We are reluctant to set out protocols for career advice without considering the particular interests and background of any given individual, but for discussion purposes the general points against or in favour of research training options are summarised in Table 1.

### The Cambridge integrated MB/PhD programme

This programme was established in 1990. It takes advantage of two existing opportunities in Cambridge and allows for the three-year period of research to be fully integrated within the 27-month clinical course. The research period starts after the first year of introductory studies to medicine, surgery, obstetrics and gynaecology, and clinical pathology. Generous support for the programme has been secured by earmarked research studentships from the Wellcome Trust, the Medical Research Council, and several Cambridge Colleges.

The research training for MB/PhD programme students in Cambridge is provided principally by PhD supervisors in the preclinical departments of the university as well as affiliated units and institutes, including the MRC Laboratory of Molecular Biology, the MRC Applied Psychology Unit, and the Wellcome-CRC Institute of Cancer and Developmental Biology. Throughout the research period, regular clinical supervisions (at least three hours weekly) are undertaken to maintain conversancy with medical practice at the bedside and in the outpatient setting. After completing the PhD, the students return to their final year of clinical medicine and sit the final MB, BChir examinations 'in phase' with other Cambridge students of medicine.

To enroll in the MB/PhD programme, undergraduates in the preclinical sciences need to have gained admission to the clinical course at Cambridge and should usually have expressed interest in the programme during admission interviews at the Clinical School or shortly after joining the clinical course. To

be accepted for the programme, candidates are expected to have at least an upper second-class degree; thereafter they undergo a further selection process and interview.

### Future prospects

At the time of writing, 22 students are accepted or enrolled on the Cambridge MB/PhD programme. The first is due to graduate with the combined qualification in 1994. Clearly, firm conclusions about the value of this initiative cannot be reached for many years, but it has nonetheless received an enthusiastic response from students and teachers alike. Considerable interest has also been shown by educators and scientists outside Cambridge. We view the cadre of students who are participating in the programme as a resource of outstanding potential for the development of medical research, and believe that more enterprises of this kind will be required to meet the future needs of the nation.

Many scientists do their best research when young and the opportunities for students to combine clinical training and research should be to the advantage of both. MB/PhD programmes extend the range of disciplines in which a PhD might be undertaken and favour the development of research directed by the many perspectives that result from the experience of clinical practice. The most recent review of the 'physician-scientists' in the USA concluded that MD/PhD programmes in research-intensive medical schools have produced 'highly competent, highly committed individuals who will without doubt contribute enormously to the academic enterprise in the years ahead' [19]. The great majority of these young medical scientists subsequently take up faculty positions in academic institutes or the US National Institutes of Health [20]. The review also concluded that more medical scientists will be needed than existing MD/PhD programmes can produce. Comparable programmes in the UK are now just under way.

### Acknowledgements

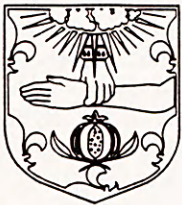
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