The NUS MBBS-PhD Programme: Nurturing Clinician-Scientists for Tomorrow

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Abstract

The MBBS-PhD programme is a significant milestone in medical education in Singapore. In July 2000, the Faculty of Medicine, National University of Singapore launched this programme in collaboration with the Institute of Molecular and Cell Biology, with support from the Economic Development Board, and the Agency for Science, Technology and Research, Singapore. The objectives of the programme are to nurture and develop the talents of the brightest medical students by integrating clinical and basic biomedical research training, as well as to stimulate advanced basic and applied research in areas of growing importance to clinical medicine. The programme also aims to train clinician-scientists who will interface basic biology and clinical practice to solve biomedical problems and spearhead biomedical research initiatives in Singapore. Successful MBBS-PhD graduates can pursue career tracks in clinical research, basic biomedical research or in the biotechnology industry.

Key words: Clinician-scientist, MBBS-PhD programme, Medical education, Medical research, Medical scientist

Introduction and Rationale

The MBBS-PhD programme is a significant milestone in medical education in Singapore. In July 2000, the Faculty of Medicine, National University of Singapore (NUS) launched this programme in collaboration with the Institute of Molecular and Cell Biology (IMCB), with support from the Economic Development Board (EDB), and the Agency for Science, Technology and Research (A*STAR). The major impetus for initiating the programme is the recognition that clinician-scientists have important roles to play in biomedical research and training. Clinician-scientists have unique and integrated perspectives arising from their dual understanding of disease processes and basic biology. These perspectives are critical in directing translational research and teaching activities in the investigation and solution of biomedical problems in Singapore as it aspires to be a world-class hub for biomedical research and healthcare. In view of the nature of their work and training, clinician-scientists have better access to both clinical and basic science research materials, and to collaborative networks.

Prior to the implementation of the MBBS-PhD programme, clinicians who were interested in research underwent formal research training and pursued a PhD or MD degree after completion of the MBBS degree or specialist training. However, the long period of clinical training and the considerable financial opportunity cost severely restricted the number of clinicians who chose this path. Furthermore, the apparent dichotomisation between clinical training and basic research is an artificial one, and is not conducive to the student in fostering integration of these 2 important components. Hence, the NUS MBBS-PhD programme provides prospective candidates with the alternative opportunity of integrated clinical and research training whilst they are young, energetic and creative.

Nurturing Medical Scientist Leaders for the Future

The objectives of the programme are to nurture and develop the talents of the brightest medical students by integrating clinical and basic biomedical research training, as well as to stimulate advanced basic and applied research in areas of growing importance to clinical medicine. The programme also aims to train clinician-scientists who will interface basic biology and clinical practice to solve biomedical problems and spearhead biomedical research initiatives in Singapore. It is anticipated that these clinician-scientists will assume key leadership positions in academia,
hospitals, research institutes and industry, not unlike the
experience of many other reputable universities offering
similar programmes.1 For example, a survey in 1996 of 109
Harvard University alumni who graduated from its MD-
PhD programme and who had completed post-doctoral
training revealed that 2 were Chiefs in the National Institutes
of Health (NIH), 9 were Professors, 24 Associate Professors
and 50 Assistant Professors, while 9 held senior positions
in industry. This reflects both the calibre of the individuals
who successfully completed this competitive programme,
and the value academic institutions and industry place on
such individuals.

Rigorous Selection of Candidates

The selection criteria for this programme are
understandably highly rigorous. Candidates must have
either excelled in their preclinical subjects as medical
students and have prior laboratory-based research
experience of at least 3 months, or possess at least a 2nd
Upper Honours degree in life science or even engineering
disciplines. Shortlisted candidates attend 2 rounds of
interviews during which they are assessed for their passion,
creativity and interest in medicine and research. Since its
inauguration, the programme has received between 21 and
70 applications every year with only 3 to 4 candidates who
are eventually selected annually. Successful candidates are
awarded prestigious scholarships from A*STAR and NUS,
which will pay full tuition fees and provide generous
stipends. The students are also given an option to pursue
their PhD studies overseas at leading laboratories in the
United Kingdom (UK), including those of Oxford
University, Cambridge University and Imperial College
London.

Structure and Administration of the Intercalated
Programme

The structure of the programme is modeled after the
Cambridge University MBBS-PhD programme in the UK,2
and the highly successful Medical Scientist Training
Programme (MSTP) in the United States, which has been
in operation since the 1960s.3 Staff members from the NUS
Faculty of Medicine visited Cambridge University to learn
how the programme was implemented there. Existing NUS
medical students are selected after they complete their
second year of the medical course. Successful applicants
with a first degree enter the NUS MBBS-PhD programme
by joining the medical first-year class for the first 3 years.
During this time, they also participate in at least 2 out of 3
mandatory research laboratory rotations (each with a
minimum duration of 6 weeks) in either NUS or IMCB.
During the first 2 years, they also attend regular Medical
Research Seminars (MRS) at which principal investigators
from NUS and IMCB highlight their research interests.
The laboratory rotations and MRS expose the students to
the breadth of research opportunities available on campus.
The students are also encouraged to attend and pass
postgraduate level modules offered by the Faculty of
Medicine or IMCB (e.g., Advanced Cell Biology – a partial
requirement in the fulfillment of the NUS PhD degree).4
The PhD research project extends from years 4 to 6 of the
programme. During their doctoral period, the students also
attend weekly clinical and bedside teaching sessions (e.g.,
Medicine and Surgery) in order to keep in touch with
clinical skills. Upon the successful completion of their PhD
project at the end of the 6th year of the programme, students
proceed with the final 2 years of the MBBS clinical
component, culminating in the Final MBBS Professional
Examination at the end of the 8th year of the programme.
Although the average time to complete the MBBS-PhD
programme is 8 years, it may be possible for exceptional
students to complete the programme within 7 years.

In consultation with the senior management of A*STAR,
the programme is administered by the MBBS-PhD
Programme Committee appointed by the Dean, Faculty of
Medicine. This Committee comprises the MBBS-PhD
Coordinator, the Vice-Dean (Education), NUS clinician-
scientists and an IMCB representative, assisted by a
Programme Administrator.

Challenges, Future Directions and Career Paths

An important challenge is to sustain the candidates’
enthusiasm for research after the completion of their PhD
studies and during their clinical years of the MBBS course.
This may be achieved by identifying suitable mentors to
guide and nurture these post-PhD students to sustain their
research mindset.5 A significant number of candidates
desire to pursue postgraduate clinical specialist training in
addition to acquiring their MBBS and PhD degrees. A
sequential programme for the latter group may be more
appropriate, whereby the candidates pursue their PhD and
specialty training after completing the MBBS course,
housemanship, and national service (in the case of male
Singaporean citizens).5,7 Given the quality and development
of biomedical research in Singapore, there is now a critical
mass of excellent biomedical researchers in the Faculty of
Medicine and various research institutes and hospitals.
Together with colleagues from new schools like the NUS
Graduate School for Integrative Sciences and Engineering,
they will be able to help train the next generation of MBBS-
PhD scholars. Successful MBBS-PhD graduates can choose
to pursue one of the following career tracks:1
(a) clinical research track working primarily as clinician-
scientists,
(b) basic research track working primarily as researchers
in the research institutes, research centres or universities,
(c) A*STAR industry track primarily promoting the

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development of biomedical sciences in Singapore or in the biotechnology industry.

In conclusion, the combined efforts and contributions of the MBBS-PhD scholars, mentors and administrators from the various agencies augur well in making it the premier programme for the training of clinician-scientists in Singapore.

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