

## PhD Studentship (Ref: PhD\_BAC-21\_NIBSC)

A 3-year full-time PhD studentship is available at the Division of Bacteriology, National Institute for Biological Standards and Control (NIBSC), in collaboration with the University of Edinburgh. The studentship is anticipated to commence on 1 October 2021.

### Title

Genetically Engineered Macrophages as a Therapy for Tuberculosis

### Project description

Tuberculosis (TB) remains the world's leading cause of death from an infectious diseases with daily figure of nearly 27,400 fell ill and 4000 people died in 2018. The crisis of TB is exacerbated by co-infection, co-morbidities and the drug-resistant strains of *Mycobacterium tuberculosis* (*Mtb*).

To combat TB and support WHO's set target of The End TB strategy by 2035, a novel interventional idea is urgently needed in parallel to the new TB vaccine and drug research. The Multi/Extensive drug resistant TB has been depicted as one of the concerns in tackling TB globally. The target of our proposal is to develop a cell-based therapy with the aim to be able to treat or to be used as an adjunct to the TB drugs in treating all types of TB infection such as pulmonary, extra pulmonary, TB meningitis and Multi/Extensive drug resistant TB.

Host defence against *Mtb* is complex and there is no component of immune response that does not take part in the response to *Mtb*. The role of macrophages (MQ) and CD4 T cells are considered the pillars of immune defence against *Mtb*. In order to evade innate and adaptive immunities, *Mtb* have developed multiple strategies. One of the strategies is to manipulate MQ death by inducing necrosis thereby, facilitating escape of viable *Mtb* and resulting in the spread of the infection. On the other hand, MQ death by apoptosis can enhance antigen presentation to facilitate protective adaptive response resulting in the successful killing of *Mtb*. Some of the genes in *Mtb* infected MQ have been reported to be modulated by the *Mtb* antigens.

The successful candidate will test the hypothesis of MQ expressing genes that drives apoptosis pathway thereby facilitating an effective *Mtb* clearance. To test the hypothesis, in vitro assays such as Flow Cytometry, In vivo Live Imaging system, gene insertion techniques will be used. Engineered MQ will be tested in *in vivo* in *Mtb* infected mice.

### Key responsibilities

- To undertake the research projects in line with the project aims.
- To communicate effectively, orally and through written reports, undertake presentations at scientific meetings and maintain excellent records.
- To interact regularly and effectively with the supervisors. Interact appropriately and effectively with other staff.
- To fulfil the requirements of the University PhD programme and to undertake specific training as required by the host institutions.

In addition to meeting all the academic, security and residency requirements, you will have:

- an academic background in molecular and cellular biology, bacteriology, advanced therapies or relevant life sciences.
- a demonstrated aptitude in a laboratory setting and motivation to undertake research.
- a demonstrated interest in the field of study and ability to work accurately and precisely.
- a demonstrated excellent oral and written communication, and IT skills.
- a previous experience in one or more of the key interest areas such as tuberculosis, immunotherapy, transduction and genetic modification as an advantage.
- some theoretical knowledge of tuberculosis, advanced therapies and genetics would be advantageous.

NIBSC, the Centre of the Medicines and Healthcare products Regulatory Agency (MHRA), is a global leader in the characterisation, standardisation and control of biological medicines and has a major role in protecting and improving public health worldwide. NIBSC is the leading WHO International Laboratory for Biological Standardisation and is responsible for producing and distributing over 90% of all WHO International Standards introduced for the quality assurance of biological medicines. NIBSC scientists also test products, carry out valuable research and provide advice on a routine basis and in response to emergencies. The importance of the Institute's work is well recognised nationally and internationally.

The Division of Bacteriology has established itself as a leading centre of regulatory research on bacterial vaccines and is recognised internationally for its contributions in this field. The remit of the Division of Bacteriology is to carry out a scientific programme on the control and standardisation of bacterial vaccines and related products and to support this with the relevant research and development. The Division is a major contributor to the regulatory process in the UK and Europe through the Medicines and Healthcare Regulatory Agency (MHRA) and the European Medicines Agency (EMA) respectively. It also has a significant input into the prequalification and regulatory testing of vaccines for the WHO.

The student will be registered with the Centre for Regenerative Medicine (CRM) in the Institute for Regeneration and Repair at the University of Edinburgh. The scientists and clinicians at CRM study stem cells, disease and tissue repair to advance human health. Research at the Centre is aimed at developing new treatments for major diseases including cancer, heart disease, liver failure, and degenerative diseases such as multiple sclerosis and Parkinson's. The Centre is located in the Edinburgh BioQuarter, a site shared by the Royal Infirmary Hospital and the University's Clinical Research facilities. This makes them an ideally placed to translate basic science into clinical therapies.

The student will be supervised by Drs Bhagwati Khatri (NIBSC), Yuan Zhao (NIBSC) and Prof Stuart Forbes (University of Edinburgh). The student will be based primarily at NIBSC with the opportunity for attendance at the University for additional training and work when required.

#### **Qualification requirements for University of Edinburgh**

Minimum entry requirements are 2:1 (or international equivalent) in a relevant subject; or a 2.2 (or international equivalent) and a masters' degree, both in a relevant subject.

#### **Funding**

Tuition fees are covered; there is provision for laboratory consumables and travel to conferences and the University; there is a student stipend of £18,500 p.a.

#### **English language requirements**

Applicants whose first language is not English (and whose undergraduate degree was not taught in English) must fulfil the minimum requirements of an IELTS score of 6.5 with no less than 6.0 in any element.

#### **Visas and immigration**

Applicants will be subject to UK immigration requirements with demonstration of the right to reside and study in the UK.

#### **To apply**

Send (i) your CV including the name and contact details of two academic referees and (ii) a personal statement of no more than 1000 words explaining your interest in this project and aspirations for undertaking a PhD to [studentship@nibsc.org](mailto:studentship@nibsc.org) by 5 pm (UK time) on Wednesday, 17 February 2021.

Please ensure the studentship reference number PhD\_BAC-21\_NIBSC is included in the subject line of the email and your personal statement.

If you have a disability defined by the Equality Act 2010 (<https://www.gov.uk/definition-of-disability-under-equality-act-2010>) you may apply under the UK Civil Service Guaranteed Interview Scheme provided that you meet all of the qualifications, skills, requirements and experience defined as essential for the studentship. You must submit the Guaranteed Interview Scheme Declaration form with your application: this can be found at <https://www.gov.uk/government/publications/guaranteed-interview-scheme> At interview all applicants will be assessed solely on merit.

Any offer of a studentship is conditional upon successful background screening which includes, but is not limited to, checks on identity, qualifications and right to study in the UK.



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