PhD Studentship: How does the lung protect itself against influenza?

Project Ref: 2022/06/ET/CR
Anticipated Start Date: April 2022  Duration: 3.5 years full-time
Closing date to apply: 16.01.22

Eligibility:

- This studentship is open to science graduates with, or who anticipate obtaining, at least a 2:1 or equivalent, in a relevant biological subject in their undergraduate degree, or a Masters degree - subject to university regulations. Other first degrees, e.g. veterinary science, will be considered. You should be looking for a challenging, interdisciplinary research training environment and have an active interest in the control of infectious diseases.
- This is a 3.5-year fully funded studentship open to UK nationals. EU and international applicants are welcome to apply, however international university tuition fees will apply, and these are not included in the funding – please see funding information below.
- Students without English as a first language must provide evidence that they meet the English language requirement, e.g. with an average IELTS score of 7.0, with no lower than 7.0 in listening/reading and no lower than 6.5 in speaking/writing.

Supervision:

Principal Supervisors: Dr Elma Tchilian (The Pirbright Institute), Professor Christine Rollier (University of Surrey)
Co-Supervisor: Dr Eleni Vatzia (The Pirbright Institute)

Project Details:

Respiratory diseases, including influenza and COVID-19 coronavirus, kill large numbers of humans, and animal viruses that can jump to humans (zoonoses) are a serious threat to human health. Although current vaccines to many of these viruses are available, they are often strain specific and immunity wanes rapidly. Therefore, vaccines that provide broad, long-lasting protection and decrease the need for annual immunisation are desperately needed. We have established powerful animal models to study immunity to influenza and coronaviruses. Contrary to the mouse model, pigs are a natural host for the same subtypes of influenza virus as humans, and pig influenza viruses cause epidemics in humans. Humans and pigs are very similar in terms of tissue/organ anatomy, physiology, and importantly their immune responses to influenza viruses. Pigs are also approximately the same size as humans, and hence they represent a much more suitable model than the mouse, acting as a vital stepping-stone in the translation of experimental results into human clinical applications.

In recent years it has become clear that local immune responses mediated by lymphocytes that remain in the lungs, called lung tissue-resident memory T and B cells (TRM and BRM), are critical for protective immunity to influenza and other respiratory pathogens. We know that TRM and BRM are most effectively induced by delivery of vaccines to the lungs or by natural infection, but we do not know how to optimise this stimulation of generation, nor do we know how to ensure that they are maintained over long periods of time. In this project we shall investigate the generation and maintenance of TRM and BRM induced either by pandemic H1N1pdm09 influenza infection or by respiratory immunisation with adenoviral vectored vaccines expressing influenza internal (nucleoprotein) and external (hemagglutinin) proteins.

This novel project will provide the student with the unique opportunity to investigate the mechanisms of induction of TRM and BRM in a large, natural-host animal model and to establish their role in immunity to influenza. The proposed studies will determine whether alterations in the mode of priming affect the nature of the TRM and BRM response. This will be a crucial step in the more rational development of novel vaccine strategies for influenza and other respiratory diseases including coronaviruses. The student will:

1. Define the phenotype and function of TRM and BRM following infection or immunisation.
2. Characterise the inductive microenvironment in the lung following infection or immunisation.
3. Adopt an unbiased, data-driven transcriptomic approach to identify the properties of TRM and BRM from well protected or poorly protected animals.
The student will have access to the internationally renowned scientific environment at The Pirbright Institute, state of the art equipment and technologies, and to the University of Surrey which offers complementary skills and facilities. The student will also have the opportunity to collaborate with human immunologists from the University of Oxford and Imperial College London.

References for Background Reading:


Registration, Training and Funding:

This is a Pirbright Institute/University of Surrey fully funded studentship. All students are eligible for the full award (stipend and home rated university tuition fees). **EU and International students will be liable for tuition fees at the international rate and must be able to fund the difference between “Home” and “Overseas” tuition fees themselves. For Home student eligibility guidelines, please refer to the UKRI Full Eligibility Criteria (Annex One).**

The student will be based primarily at The Pirbright Institute and registered with the University of Surrey. The student will visit the university to meet with their supervisors and undertake training or complete specific project tasks as required. Eligible students will receive the minimum UK annual stipend of £15,609, plus a cost-of-living top-up allowance of £2,200 per annum. Home-rated university registration fees will be paid. Highly subsidised student housing will be offered. A full range of research and transferrable skills training will be made available to the student as appropriate.

APPLICATIONS:

Please visit our website for details of How to Apply: Closing date 16.01.22.

Essential documents:
- Application Form
- CV
- Two references sent directly from your referees

Please email your application to studentship@pirbright.ac.uk by the closing date.