

PhD Studentship: Characterisation of the infectious bronchitis virus E protein for rational vaccine design

Closing date: 16.03.18
Project Ref: 2018/01/EB
Anticipated Start Date: October 2018
Duration: 4 years full-time

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 **fully-funded studentship open to British nationals (in accordance with funding source)**.
- Students without English as a first language must also provide evidence that they meet the English language requirement, e.g. with an IELTS score of 7.0 and no less than 6.5 in any of the subsections.

Supervision:

Principal Supervisors: Dr Erica Bickerton (The Pirbright Institute); Dr Andrew Davidson (University of Bristol)
Co-Supervisor: Dr Helena Maier (The Pirbright Institute)

Project Details:

Infectious bronchitis is the most economically important infectious disease affecting chickens in the UK and affects not only the production of meat-type birds but also the quality and production levels of eggs from layer and breeder birds. The causative agent, infectious bronchitis virus (IBV), is a coronavirus prevalent in all types of poultry flocks globally and continues to be responsible for economic losses and welfare problems in chickens.

The IBV Envelope (E) protein is a small structural protein located within the virion membrane containing a single hydrophobic domain that has been shown to be important for the release of infectious virus from cells and a cytoplasmic tail with Golgi targeting information. The E protein, while only a minor component of the virus envelope, has been shown to possess ion channel activity and the ability to disrupt protein trafficking *in vitro*. A recent paper demonstrated that the E protein of the related coronavirus SARS-CoV is important in promoting virus fitness and pathogenesis.

This project has two main aims; 1) to investigate the function and activity of the IBV E protein *in vitro* and 2) to generate recombinant IBVs to investigate whether modification of the E protein is able to attenuate the virus. In order to characterise the IBV E protein for rational vaccine design, a combination of molecular virology techniques, reverse genetics and *in vivo* pathogenicity experiments will be used.

References for Background Reading:

1. Casais *et al.* 2001. Reverse Genetics System for the Avian Coronavirus Infectious Bronchitis Virus. *Journal of Virology* **75**: 12359 – 12369.
2. Ruch and Machamer 2012. A Single Polar Residue and Distinct Membrane Topologies Impact the Function of the Infectious Bronchitis Coronavirus E Protein. *PLoS Pathogens* **8**: e1002674.
3. Nieto-Torres *et al.* 2014. Severe Acute Respiratory Syndrome Coronavirus Envelope Protein Ion Channel Activity Promotes Virus Fitness and Pathogenesis. *PLoS Pathogens* **10(5)**: e1004077.

Registration, Training and Funding:

This is a Pirbright Institute/University of Bristol project, funded by the British Egg Marketing Board. The student will be based at The Pirbright Institute and registered with the University of Bristol, with visits to the university

to meet with their supervisor and undertake training as required. Eligible students will receive a minimum annual stipend of £14,777 (RCUK 2018/19 rate) and £2,200 annual Pirbright cost of living allowance. University registration fees will be paid. A full range of research and transferrable skills training will be made available to the student as appropriate.

Applications:

Details of how to apply can be found here: [How to apply](#)

Essential documents:

- Application Form
- CV
- Two references sent directly by your referees

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

