

PhD Studentship: Coronavirus regulation of cellular antiviral responses and cross species transmission

Project Ref: 2022/05/HM/NL

Anticipated Start Date: October 2022

Duration: 3.5 years full-time

Closing date to apply: 20.02.22



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 Helena Maier](#) (The Pirbright Institute), [Prof Nicolas Locker](#) (University of Surrey)

Co-Supervisors: [Dr Erica Bickerton](#) (The Pirbright Institute), [Dr Hannah Burgess](#) (University of Surrey)

Research Group: Coronavirus Cellular Biology

Project Details:

Coronaviruses (CoV) can cross the species barrier to generate highly pathogenic viruses. Recently, SARS-CoV, MERS-CoV and SARS-CoV-2 emerged following jumps from bats, via an intermediate host into humans, while SADS-CoV jumped from bats into pigs. Despite this, there is little understanding of species transmission barriers and how CoV adapt to infect new hosts. It is likely that barriers exist at several levels from ecological to molecular. We hypothesise that **changes in viral regulation of host cell interferon and stress responses play a role in CoV cross species transmission**. The type I Interferon (IFN) response is one of the first lines of cellular defence against invading pathogens and is a significant barrier to virus replication. Furthermore, the Integrated Stress Response helps cells respond to the accumulation of viral RNA and proteins by inducing a global reduction of protein synthesis and activating a stress-resolving transcriptional programme.

Bats coexist with numerous highly pathogenic viruses and display distinct innate immune responses. Differences in signalling pathways between species can impact the ability of a virus to regulate antiviral responses, inhibiting its replication in non-natural hosts and preventing cross species transmission. In this project, we will compare SADS-CoV and SARS-CoV-2 with their respective related bat viruses. This will provide molecular insights into the ability of these viruses to evade cellular defences and adapt to a new host and advance our understanding of how pathogenic CoV emerge. We will:

1. Compare the ability of CoV proteins to regulate IFN and stress signalling in cells from bats and the emerging host.
2. Characterise stress signalling in bat cells.
3. Characterise the role of differential regulation of cellular signalling in virus ability to replicate in cells from the emerging host.

To execute this research, the successful applicant will make use of a wide range of techniques from cell biology to molecular virology, and advanced imaging under guidance of the supervisory teams.

References for Background Reading:

[Dance with the Devil: Stress Granules and Signaling in Antiviral Responses \(mdpi.com\)](#)

[Ten Strategies of Interferon Evasion by Viruses \(pubmed.ncbi.nlm.nih.gov\)](#)

[Novel Insights Into Immune Systems of Bats \(frontiersin.org\)](#)

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). **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, with research experiments conducted depending on the specific tasks both at The Pirbright Institute and the University of Surrey, where the student will be registered. In addition, the student will visit the university to meet with their supervisors and undertake training as required. Eligible students will receive a minimum annual stipend of £15,609 plus a cost of living top-up allowance of £2,200 per annum. The two host institutions will contribute to the research expenses (covering equipment, consumables and travel to conferences/training). 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:

How to Apply: Please visit our [website to apply](#). Closing date: 20.02.22

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.