

PhD Studentship: Antigenic Evolution of Neuraminidase in H5Nx Clade 2.3.4.4b Avian Influenza Viruses and its Impact on Viral Fitness in Avian and Mammalian Species



Project Ref: 2025/02

Anticipated Start Date: October 2025 **Duration:** 3.5 years full-time

Closing date to apply: 10 February 2025

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 an undergraduate degree, or with 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. International applicants may apply, however funding for this studentship includes university tuition fees at the Home rate only - 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: [Prof Munir Iqbal](#) (The Pirbright Institute), [Prof Wendy Barclay](#) (Imperial College London)

Co-Supervisors: [Dr Rebecca Daines](#), [Dr Jean-Remy Sadeyen](#) (The Pirbright Institute)

Research Group: [Avian Influenza and Newcastle Disease](#)

Project Details:

This project tackles the global threat of highly pathogenic avian influenza (HPAI) H5Nx viruses, which continue to pose significant risks to domestic and wild birds while raising serious pandemic concerns due to increasing spillover into mammals. The dominant H5Nx clade 2.3.4.4b has undergone multiple genetic changes in the haemagglutinin (HA) and neuraminidase (NA) along with the genetic reassortment with different NA subtypes complicating control efforts.

The research focuses on unravelling the role of molecular changes in the HA and NA glycoproteins on viral evolution, antigenic diversity, fitness and adaptation across avian and mammalian species. Compared to the hemagglutinin (HA) glycoprotein, NA evolves more slowly but plays a critical role in the viral lifecycle, making it a promising target for next-generation vaccines. By integrating advanced techniques in molecular virology, immunology, vaccinology, bioinformatics, and modelling, the project aims to:

- Identify molecular factors of NA driving viral evolution and adaptation.
- Develop improved NA-based vaccines that offer longer-lasting and more effective protection.

This research will pave the way for innovative strategies to control influenza viruses, safeguarding both animal and human health.

References for Background Reading:

1. Carter, Toby, and Munir Iqbal. "The Influenza A Virus Replication Cycle: A Comprehensive Review." *Viruses* 16.2 (2024): 316.
2. Bodman-Harris, O., Rollier, C.S. and Iqbal, M., 2024. Approaches to Enhance the Potency of Vaccines in Chickens. *Vaccines*, 12(12), p.1337.
3. Giurgea, Luca T et al. "Influenza Neuraminidase: A Neglected Protein and Its Potential for a Better Influenza Vaccine." *Vaccines* 8.3 (2020): 409
4. Couch RB, Atmar RL, Franco LM, Quarles JM, Wells J, Arden N, Niño D, Belmont JW. Antibody correlates and predictors of immunity to naturally occurring influenza in humans and the importance of antibody to the neuraminidase. *J Infect Dis.* 2013;207(6):974-81. doi: 10.1093/infdis/jis935.
5. Maier HE, Nachbagauer R, Kuan G, et al. Pre-existing Antineuraminidase Antibodies Are Associated With Shortened Duration of Influenza A(H1N1)pdm Virus Shedding and Illness in Naturally Infected Adults. *Clinical Infectious Diseases: an Official Publication of the Infectious Diseases Society of America.* 2020;70(11):2290-2297.

Registration, Training and Funding:

This is a Pirbright Institute/Imperial College London fully funded studentship. The studentship covers stipend and Home rated university tuition fees. International students will attract tuition fees at the overseas rate and must show evidence of their ability to cover the difference between Home fees and Overseas fees for the duration of study.

The student will be based primarily at The Pirbright Institute and registered with Imperial College London. 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 a UKRI-aligned stipend (£19,237 for 2024/25) plus a cost of living allowance of £2,200 per annum. Home rated university tuition fees will be paid. Highly subsidised Pirbright Institute 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: Closing date 10 February 2025

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.