

PhD studentship (SCI05W)

A 3-year full-time PhD studentship is available at the Division of Virology, National Institute for Biological Standards and Control (NIBSC), in collaboration with the University of Nottingham. The studentship is anticipated to commence on 1 October 2019.

Title

What are the implications of genetic variation for the control of Japanese encephalitis virus?

Project description

Japanese encephalitis virus (JEV) is a mosquito-borne flavivirus and is the prototype member of the Japanese encephalitis serogroup, which includes West Nile virus (WNV). The JEV life cycle has a maintenance enzootic cycle involving birds as reservoir hosts with humans and horses being 'dead-end' hosts. In addition, pigs are amplifying hosts for JEV, leading to epidemics in rural settings. Infection of dead-end hosts is usually asymptomatic, however, some infected individuals develop disease ranging in severity from flu-like symptoms to fatal encephalitis. There is a range of human JEV vaccines available but no specific veterinary vaccines. Similarities in immune response (e.g. to viruses such as JEV, WNV and influenza) have led to the horse being proposed as a good model for human immune responses. A 'one-health' approach is increasingly being taken for the development of vaccines against zoonotic viruses with the potential for submitting protective efficacy data from livestock challenge studies with immunogenicity and safety data from human studies to licensing authorities.

There is no onward transmission of JEV from dead-end hosts as viral replication is limited. This hampers diagnosis by detection of viral genetic material, leading to a reliance on serological tests, however, limitations of these include high levels of cross-reactivity between flaviviruses in ELISA. Serum neutralisation tests are more specific, but assays are time-consuming and require high containment levels to handle infectious virus. These issues of diagnostic specificity complicate assessment of vaccine effectiveness in the field. Unless the aetiological agent is specifically identified, outbreaks of encephalitic disease in regions where mass vaccine campaigns against JEV have been conducted can lead to the belief that the vaccine has failed. Conversely, if it is wrongly assumed that encephalitic disease in JEV-vaccinated individuals must be due to another causative agent, cases of vaccine failure may be overlooked. Complicating this situation still further, the cross-reactivity among flaviviruses may afford a degree of cross-protection.

There are five known genotypes (G) of JEV but human infections are predominantly caused by GI and GIII strains; all JEV vaccines contain GIII strains. GIII spread throughout Asia after its emergence in the 1930s; GI emerged in the 1980s and has since become the dominant genotype in most endemic regions. However, GI replicates more efficiently in the vector and reservoir hosts than in other hosts. Recently, there have been reports of GV strains being isolated from mosquitoes leading to speculation that this genotype is re-emerging. It is unclear whether the 12% nucleotide diversity that defines the genotypes is sufficient to have an impact on vaccine effectiveness. Similarly, it is debated whether recombination between vaccine and field strains may occur and, if it did, what risk it might pose.

The successful candidate will conduct a study to test the hypothesis that emerging genotypes of Japanese encephalitis viruses result in antigen variation that has a negative impact on vaccine effectiveness. The student will receive broad technical training in virology, vector construction, molecular biology, bioinformatics and serology.

Key responsibilities

- To undertake the research projects in line with the project aims
- To communicate effectively, orally and through written media, undertake presentations at scientific meetings and maintain excellent records
- To interact regularly and effectively with the supervisors and 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, virology 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 as an advantage
- some theoretical knowledge of flaviviruses and antigenic variation

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 Virology delivers a wide range of internationally competitive activities in standardization, control and underpinning research for virological matters relevant to biologicals for human use. The scope of work includes vaccines (particularly influenza, polio and childhood vaccines), where a great deal of cutting-edge research effort is directed; emerging infections, including those identified as Priority Pathogens by the WHO; enteric viruses and neurovirology

The student will be registered with the School of Veterinary Medicine and Science (SVMS) in the Faculty of Medicine and Health Sciences at the University of Nottingham. The student will be affiliated with One Virology, which acts as a focus for virologists from across the University of Nottingham. This group enhances our ability to understand the fundamental mechanisms underlying disease pathogenesis and the transmission of infection. The generation of this information is focussed at improving diagnosis, treatment and control of viral infections affecting people and animals.

The student will be supervised by Drs Nicola Rose (NIBSC), Janet Daly and Kevin Gough (University of Nottingham). 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 Nottingham

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

Applications are open to UK and EU students only, with demonstration of a right to reside 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 by 5 pm (UK time) on Monday 4 March 2019

Please ensure the studentship reference number 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.

