

Project Title: Evaluation of the immunogenicity of Nipah virus vaccine candidates in pigs

Supervisors: Dr Rebecca McLean and Dr Simon Graham

Research group: PRRS Immunology

Project Summary:

Nipah virus (NiV) causes a severe and often fatal neurological disease in humans. Whilst fruit bats are considered the natural reservoir, NiV also infects pigs and may cause an unapparent or mild disease. Direct pig-to-human transmission was responsible for the first and still most devastating NiV outbreaks in Malaysia and Singapore in 1998-99, that led to nearly 300 human cases and more than 100 deaths. Despite the importance of NiV as an emerging disease with the potential for pandemic, no vaccines or therapeutics are currently approved for human or livestock use. In collaboration with partners from Australia, Malaysia and India we are developing an inexpensive, safe and efficacious vaccine which could be used to protect pigs against NiV infection and transmission, thereby reducing the risk to public health. We have assembled a panel of recombinant NiV vaccine candidates based on the NiV G or F proteins and delivered either as protein subunits or by viral or mRNA vectors. A series of immunogenicity trials are being conducted in pigs to quantitatively and qualitatively assess immune responses induced by these vaccine candidates. PBMCs and lymphoid tissue samples collected at selected time-points from immunised pigs have been cryopreserved and will be used to study antigen-specific T and B cell responses.

Details:

Previous work suggests that a robust virus-neutralising antibody response is important in protection against NiV. However, little is currently understood about the role of T cells in protection. An extensive characterisation of T cell responses, both in terms of phenotype and function, will be conducted using flow cytometric assays following *in vitro* restimulation with synthetic peptides representing NiV G and F proteins. Responses will be monitored in blood and complemented with analysis of mucosal and lymphoid tissues at selected time-points. The successful applicant will receive support and guidance mainly from Dr Rebecca McLean, a postdoctoral researcher and Dr Simon Graham, leader of the PRRS Immunology group. There are also other postdocs and students in the group which will be willing to help and support.

References for Suggested Reading:

- WHO Nipah Virus: <https://www.who.int/csr/disease/nipah/en/>
- Pirbright Nipah project page: <https://www.pirbright.ac.uk/our-science/development-nipah-virus-vaccine-eliminate-porcine-reservoirs-and-safeguard-human-health>
- Research group webpage: <https://www.pirbright.ac.uk/our-science/livestock-viral-diseases/porcine-reproductive-and-respiratory-syndrome-prrs-immunology>
- Relevant paper: <https://jcm.asm.org/content/56/6/e01875-17>