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Project Title: Inactivating exotic viruses of livestock for the preparation of standardised reference materials

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Research group: Non-vesicular reference laboratories (NVRL)

Project Summary:

The primary purpose of the Non-Vesicular Reference Laboratory (NVRL) is to provide both a national and international diagnostic service and to characterise outbreaks of livestock diseases caused by Bluetongue virus (BTV), African horse sickness virus, African swine fever virus, Peste des Petits ruminants virus, and Capripox viruses. The NVRL is a World Organisation for Animal Health (OIE) Reference Laboratory for the diseases caused by these viruses and therefore provides a critical resource for developing countries to prevent and control exotic diseases of livestock.

While the NVRL investigates the molecular epidemiology of exotic viruses, the group is involved in applied research such as the development and validation of new diagnostic assays, and their harmonisation across diagnostic laboratories. Crucial to this, is the provision of standardised reference materials and proficiency testing schemes. The viruses handled in the NVRL cause significant disease in livestock and must only be worked within high-containment laboratory facilities. Thus, these viruses cannot be distributed to laboratories which do not meet the required minimum biosecurity level. The provision of inactivated (biologically inert) reference material to laboratories in developing countries is therefore of great importance.

The placement student will be expected to determine the inactivation kinetics for the viruses under the remit of the NVRL for the generation of these reference materials. In addition, the student will support the NVRL in routine duties such as housekeeping, consumable management, sample reception and other duties as required.

Details:

The student will determine the inactivation kinetics of viruses under the remit of the NVRL using molecular and virological techniques. The results will be used to formulate inactivation procedures to be able to send reference materials and proficiency testing panels to laboratories that currently cannot receive them due to insufficient biosecurity measures at their facilities. In order to complete this work the student will be trained in selected virological and molecular methods, including cell culture techniques, plaque assays, nucleic acid extraction and real-time PCR.

The successful student will be expected to work independently in the molecular suite after having obtained the relevant training. The inactivation procedures will primarily aide the NVRL but will also be used institute wide, the student will therefore also liaise with health safety, biosafety (HSBS) to ensure aspects of the work are approved by them. The student will also be a member of the NVRL team and therefore perform day to day activities as a technician, receiving samples, adding information to laboratory information system (LIMS), ELISA, nucleic acid extraction and real-time (RT)PCR. This placement will provide the successful student with a unique opportunity to work in an ISO/IEC 17025-accredited Reference Laboratory within high containment facilities and to gain practical knowledge of a wide range of scientific techniques.

References for Suggested Reading:

- Batten, C. A., K. Bachanek-Bankowska, A. Bin-Tarif, L. Kgosana, A. J. Swain, M. Corteyn, K. Darpel, P. S. Mellor, H. G. Elliott, and C. A. L. Oura. "Bluetongue virus: European Community inter-laboratory comparison tests to evaluate ELISA and RT-PCR detection methods." *Veterinary microbiology* 129, no. 1-2 (2008): 80-88.
- Durán-Ferrer, Manuel, Montserrat Agüero, Stephan Zientara, Shirley Smith, Chirstiaan Potgieter, Paloma Rueda, Patricia Sastre et al. "Assessment of reproducibility of a VP7 Blocking ELISA diagnostic test for African horse sickness." *Transboundary and Emerging Diseases* (2018).
- Baron, M. D., Adama Diallo, Renaud Lancelot, and Geneviève Libeau. "Peste des petits ruminants virus." In *Advances in virus research*, vol. 95, pp. 1-42. Academic Press, 2016.
- Sánchez-Cordón, Pedro J., María Montoya, Ana L. Reis, and Linda K. Dixon. "African swine fever: A re-emerging viral disease threatening the global pig industry." *The Veterinary Journal* (2018).