

Project: Using advanced microscopy techniques to image virus infection in cells (Ref: PIR5)

Supervisor: Pippa Hawes

Co-Supervisor: Jennifer Simpson

Research Group: Bioimaging

Project Summary:

Bioimaging is a well-established tool used across the life sciences to address fundamental research questions. Within the field of virology, microscopy is used extensively to investigate basic questions of virus and host biology. Microscopy is recognised by Universities, Institutions and funding bodies as an underpinning technique so core Bioimaging facilities are now common-place. At The Pirbright Institute we have a Bioimaging core facility which houses state-of-the-art advanced light and electron microscopes. These microscopes are located within a high containment environment and are run by experts in the field of imaging pathogens.

We are looking for a highly motivated individual to join our team to create a database of images of virally infected cells for use within the Institute, on our website and externally. You will learn how to prepare and image samples for confocal microscopy, live cell microscopy, superresolution (STED) microscopy and possibly electron microscopy. These are readily transferable skills which can be applied, in one form or another, to all areas of life science research today.

Details:

This is a rare and exciting opportunity to learn how to use some of the most advanced microscopes currently available. You will be working with economically important animal pathogens, for example foot-and-mouth disease virus, bluetongue virus and African swine fever virus, in a high containment environment unique in the UK. You will be immersed in a vibrant environment and will learn how a core facility within one of the UK's leading research institutes operates.

You will be required to produce a database of high quality stock images of virus infected cells labelled with antibodies against the virus and host cell organelle compartments. By the end of the project you will have built a comprehensive database containing high quality images of cells infected with viruses spanning the range of the Institute's remit. These images will form a central resource for use by Institute staff in presentations, for marketing purposes and to enhance our website.

You will interact with most of the science groups within the Institute to acquire samples which you will then learn to prepare for a range of different microscopy techniques. The Bioimaging team will provide guidance and expert tuition in specimen preparation and microscope operation.

Once you have experience in the intricacies of specimen preparation and microscope operation you will have the opportunity to choose an area to concentrate on, for example learn how to use one particular microscope to a more advanced level or investigate a particular virus-host pathway in more detail. At the end of the project you will have acquired excellent technical skills and a good understanding of cell biology and veterinary virology.

This project will suit you if you are interested in the latest technology, cell biology and virology, and have an artistic flare.

References for Suggested Reading:

- Berryman S, Brooks E, et al. Foot-and-mouth disease virus induces autophagosomes during cell entry via a class III phosphatidylinositol 3-kinase-independent pathway. *J Virol.* 2012 Dec;86(23):12940-53
- Windsor M, Hawes P, et al. Mechanism of collapse of endoplasmic reticulum cisternae during African swine fever virus infection. *Traffic.* 2012 Jan;13(1):30-42.
- Maier HJ, Hawes PC, et al. Infectious bronchitis virus generates spherules from zippered endoplasmic reticulum membranes. *MBio.* 2013 Oct 22;4(5):e00801-13.