Funded PhD Project: Myoepithelial and immune cell dynamics in the mammary terminal duct lobular unit during postnatal development

Supervisor: Dr Kate Hughes, Department of Veterinary Medicine, University of Cambridge
Co-Supervisor: Prof Clare Bryant, Department of Veterinary Medicine, University of Cambridge

The Project: Within the bilayered structure of the mammary gland, myoepithelial cells form the basal epithelial layer and have contractile properties necessary for milk expulsion. Myoepithelial cells are recognised to be of significance in the progression of both mammary neoplasms and mastitis. However, in spite of their critical role in milk expulsion, and the importance of myoepithelial cells in mammary pathological processes, very little is known about the contribution of this cellular compartment to the postnatal cycle of mammary development and remodelling associated with puberty, pregnancy, lactation, and post-lactational regression. This project will elucidate the role and cellular interactions of myoepithelial cells in the mammary microenvironment in health.

This research will seek to define the mammary microenvironment in non-traditional model species that are promising alternative models to rodents. Whilst rodents provide highly tractable model systems, the mouse mammary gland is fundamentally different from the human breast. This project will exploit the similarities between the mammary gland of non-traditional model species and the human breast to delineate the replication patterns, cellular interactions, and role of myoepithelial cells in these species.

The student will receive bespoke scientific training in:
- Imaging: Immunohistochemistry (light microscopy), immunofluorescence (confocal microscopy), and CUBIC tissue clearing with immunofluorescence (confocal microscopy)
- Image interpretation: Detailed training in histology and image interpretation including use of scanned slides and software including Fiji and Imaris, automated image analysis including coding
- Tissue culture/organoid culture
- Mammary gland biology
- Immunology
- Scientific communication to non-specialist audiences
- Statistics
- There will be opportunities for the student to participate in teaching and demonstrating

Relevant publications:
Nagy D et al. 2020. Developing mammary terminal duct lobular units have a dynamic mucosal and stromal immune microenvironment. https://www.biorxiv.org/content/10.1101/2020.11.05.369843v1

Funding: Fees (at UK rate) and a stipend of £15,285 per annum for three years will be provided by the Anatomical Society.

How to apply: Contact the Supervisor, Dr Kate Hughes kh387@cam.ac.uk, to discuss suitability before submitting an application via the Applicant Portal. Interviews will be held in early 2021.

More info on application process here: http://www.vet.cam.ac.uk/grad/Prospectivestudents/apply.