Department of Veterinary Medicine

Available PhD Project:

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Project Title: Pathophysiology of red cell membrane permeability

Description: Our project investigates how red cell membrane permeability is altered in pathophysiological states. A major model system is red cells from human patients with sickle cell disease, but other areas of study include the effect of oxygen tension, oxidant damage and the normal physiological differences found in red cells from different species. We look at the mechanism and regulation of key membrane transport proteins including cation transporters like the KCl cotransporter and the Ca^{2+}-activated K^+ channel (or Gardos channel), lipid transporters such as the aminophospholipid translocase (flippase) and the scramblase, and the main amino acid transporters. Ion and water balance is important as it is a major determinant of rheology. Amino acids are used for substrates such as provision of the main non-enzymatic antioxidant reduced glutathione. Key techniques include radioactive tracer methodology, FACS with fluorochromes for different ions and lipids (like phosphatidylserine) and patch clamp electrophysiology. We collaborate extensively with colleagues in Oxford (Prof Ellory and Dr Wilkins) and KCH London (Prof Rees). The work would be of interest to those interested in water and solute transport across biological membranes, or key diseases caused by red cell mutations, or in comparative red cell physiology. Techniques acquired are readily transferable to other transport situations and/or tissues.

Funding:
This project is not funded. Prospective students would be expected to apply for funding opportunities either through the University (http://www.vet.cam.ac.uk/grad/Prospectivestudents/funding) or other sources.

How to apply:
Contact the Supervisor to discuss before submitting an application.
More details on how to apply here: http://www.vet.cam.ac.uk/grad/Prospectivestudents/apply