PhD Studentship: Regulation and function of chicken NKT cells in response to Avian Influenza virus

Closing date: 16 March 2018
Project Ref: 2018/11/SB
Anticipated Start Date: October 2018
Duration: 3.5 years full-time

Eligibility:

- This studentship is open to science graduates (with, or who anticipate obtaining, at least a **2.1 or equivalent, in a relevant biological subject in their undergraduate degree, or a Masters degree - subject to university regulations)**. Other first degrees, e.g. veterinary science, will be considered. You should be looking for a challenging, interdisciplinary research training environment and have an active interest in the control of infectious diseases.
- **This is a fully funded studentship open to UK students and eligible EU students who qualify for home-rated fees**, in line with the RCUK Residential Guidelines for Research Council Studentships.
- Students without English as a first language must also provide evidence that they meet the English language requirement, e.g. with an IELTS score of 7.0 and no less than 6.5 in any of the subsections.

Supervision:

Principal Supervisors: Dr Shahriar Behboudi (The Pirbright Institute); Dr Dan Horton (University of Surrey)
Co-Supervisor: Dr Holly Shelton (The Pirbright Institute); Professor Shayan Sharif (University of Guelph, Canada)

Project Details:

Natural killer T (NKT) cells, an innate-like T cells, are a distinct population of T cells that express aβ T-cell receptor (TCR) and. Unlike conventional T cells, which mainly recognise peptide antigens presented by MHC molecules, NKT cells recognise glycolipid antigens presented by the non-polymorphic MHC class I-like molecule, CD1d. Mammalian NKT cells recognise the prototypical glycolipid, alpha–galactosylceramide (alpha-GalCer), a marine-sponge-derived agent, which also potently activates them and has strong anti-viral activity. Human NKT cells are either CD4+, CD8+ or CD4-CD8- (DN) and express Va24-Ja18 TCRa chain preferentially coupled with a Vβ11 TCRβ chain.

NKT cell-derived cytokines and chemokines can modulate several other cell types, including NK cells, conventional CD4+ and CD8+ T cells, macrophages, neutrophils and B cells as well as recruiting and activating dendritic cells. It has been shown that mammalian NKT cells have an important role in the control of infectious diseases including viral infections. However, NKT cells have not yet been identified in avian species, and avian NKT cells do not recognize alpha-GalCer, perhaps because CD1 molecules have a smaller and more primordial antigen-binding pocket compared to mammalian CD1 molecules.

Our group with collaboration with Dr Dirk Zajonc from La Jolla Institute for Allergy and Immunology in US have recently identified chicken NKT cells and lipid ligands stimulating these innate T cells in avian species.

Aims of the project:

1. Enumeration of chicken NKT cells and their phenotypic characteristics in lungs from non-infected chickens.
2. Examine the differential functional properties and gene profile of lung NKT cells.
3. Examine the role of Avian Influenza Virus infection in activation of lung NKT cells.

The methods for identification and characterisation of functional properties of chicken NKT cells have been established in our laboratory, and the project is a collaboration between The Pirbright Institute in the UK and University of Guelph in Canada. The student's main base will be at The Pirbright Institute but the student will have the opportunity to visit the laboratories at the University of Guelph. This multidisciplinary project will provide training in a range of molecular biology, cellular immunology and virology.

References for Background Reading:

1. Zajonc DM, Girardi E. Recognition of Microbial Glycolipids by Natural Killer T cells. Front Immunol, 2015 Aug, 4; 6:400

2. Zajonc DM et al. The crystal structure of avian CD1 reveals a smaller, more primordial antigen-binding pocket compared to mammalian CD1

3. Godfrey DI, et al. Raising the NKT cell family, Nature Immunology, 2010, 11, 197-206

Registration, Training and Funding:

This is a fully funded project. The student will be based at The Pirbright Institute and registered with the University of Surrey, with visits to the university to meet with their supervisor and undertake training as required. Eligible students will receive a minimum annual stipend of £14,777 (RCUK 2018/19 rate) and £2,200 annual Pirbright cost of living allowance. University registration fees will be paid. A full range of research and transferrable skills training will be made available to the student as appropriate.

To Apply:

Details of how to apply can be found here: How to apply

Essential documents:

- Application Form
- CV
- Two references sent directly by your referees

Please email your application to studentship@pirbright.ac.uk by the closing date noted above