

## Dr David Lammas PhD

Senior Lecturer

School of Immunity and Infection

### Contact details

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### About

David Lammas is a senior lecturer in the Division of Immunity and Infection.

David has published over 60 research papers in scientific journals as well as reviews in the fields of Immunology and mycobacteriology. He has received major grants from the Wellcome Trust, BBSRC and the Medical Research Council.

### Qualifications

- PhD Veterinary Immunology 1986
- MSc Animal Parasitology 1980
- BSc (Hons) Biological Sciences 1977

### Biography

David Lammas qualified with a BSc (Hons) in Biological Sciences from the University of Birmingham in 1977. He went on to study for a Masters in Animal Parasitology and then a PhD in Veterinary Immunology at Bangor University. He then joined the Department of Zoology at Nottingham University in 1984 where he worked for several years on the host response to various helminth infections. David then moved to the Department of Immunology at Birmingham University in 1990 and has continued to work in Birmingham studying host immunity to mycobacterial infections.

### Teaching

#### TEACHING PROGRAMMES

- BMedSci 3
- MBChB
- GEC1
- BMedSci Cell Path

### Postgraduate supervision

David is interested in supervising doctoral research students in the following areas:

- Host immunity to mycobacterial infection
- Invariant NK T-cell activation and immune functions

If you are interesting in studying any of these subject areas please contact David on the contact details above, or for any general doctoral research enquiries, please email: [dr@contacts.bham.ac.uk \(mailto:dr@contacts.bham.ac.uk\)](mailto:dr@contacts.bham.ac.uk) or call +44 (0)121 414 5005.

For a full list of available Doctoral Research opportunities, please visit our Doctoral Research programme listings.

### Research

#### RESEARCH THEMES

- Host immunity to mycobacterial infection
- Invariant NK T-cell activation and immune functions

#### RESEARCH ACTIVITY

## Host immunity to mycobacteria

The main emphasis of his work over the last 30 years has been on the role of host immunity to infection. Currently this involves investigating host immune deficiencies and strain-specific virulence factors that influence disease outcome to infection with *M tuberculosis*. Previously this work has ranged from an examination of the type-1 cytokine (IFN $\gamma$ /IL-12) pathway in host immunity, to the role of macrophage apoptosis and autophagy in containing mycobacterial infections. The role of Vitamin D deficiency in human immunity to mycobacteria has also been examined.

Key discoveries include: (i) the existence of individuals with genetic mutations in various components of the type-1 cytokine (IFN $\gamma$ /IL-12) pathway which predisposes them to mycobacterial infection, (ii) the role of apoptosis, autophagy and Vitamin D in the containment of intracellular mycobacterial infection.

**Modulation of the immune response by differential activation of CD1d-restricted NK T cells.** Another research theme of the lab is in determining whether it is possible to pharmacologically modulate the innate functional activities of CD1d-restricted NKT (iNKT) cells. iNKT cells are an important component of the innate immune system and have the capacity to both augment beneficial host immunity and to prevent harmful autoimmunity. Administration of the synthetic glycolipid, alpha-galactosyl ceramide (aGalCer), is known to selectively activate CD1d-restricted NK T cells, which has made this compound and its analogues attractive candidates for achieving such beneficial immunomodulatory effects.

Using various biological assays, synthetic analogues of aGalCer are screened for their potential to differentially promote adaptive immune responses. Assay models include assessment of their effects in such disease states as cancer, microbial infection, and autoimmune diseases.

## Publications

Montamat-Sicotte DJ, Millington KA, Willcox CR, Hingley-Wilson S, Hackforth S, Innes J, Kon OM, Lammas DA, Minnikin DE, Besra GS, Willcox BE, Lalvani A.(2011) A mycolic acid-specific CD1-restricted T cell population contributes to acute and memory immune responses in human tuberculosis infection. *J Clin Invest.* 121:2493-503.

Sarkar D, Sidhu M, Singh A, Chen J, Lammas DA, van der Saar A, Besra GS, Bhatt A.(2011) Identification of a glycosyltransferase from *Mycobacterium marinum* involved in addition of a caryophyllose moiety in lipooligosaccharides *J Bacteriol* Mar 4. [Epub ahead of print]

de Beaucoudrey L,et al (2010). Revisiting human IL-12R $\beta$ 1 deficiency: a survey of 141 patients from 30 countries. *Medicine* 89:381-402

Jeffery LE, Burke F, Mura M, Zheng Y, Qureshi OS, Hewison M, Walker LS, Lammas DA, Raza K, Sansom DM.(2009) 1,25-DihydroxyvitaminD3 and IL-2 combine to inhibit T cell production of inflammatory cytokines and promote development of regulatory T cells expressing CTLA-4 and FoxP3. *J Immunol.*183:5458-67.

Voelz K, Lammas DA, May RC.(2009). Cytokine signalling regulates the outcome of intracellular macrophage parasitism by *Cryptococcus neoformans*. *Infection & Immunity.*77:3450-7.

Croudace JE, Curbishley SM, Mura M, Willcox CR, Illarionov PA, Besra GS, Adams DH, and Lammas DA (2008). Identification of distinct human invariant natural killer T-cell response phenotypes to alpha-galactosylceramide. *BMC Immunol.* 9: 71-81.

Biswas D, Qureshi OS, Lee WY, Croudace JE, Mura M, Lammas DA.(2008) ATP-induced autophagy is associated with rapid killing of intracellular mycobacteria within human monocytes/macrophages. *BMC Immunol.* 9:35.

Pulickal AS, Hambleton S, Callaghan MJ, Moore CE, Goulding J, Goodsall A, Baretto R, Lammas DA, Anderson ST, Levin M, Pollard AJ.(2008). Biliary Cirrhosis in a Child with Inherited Interleukin-12 Deficiency. *J Trop Pediatr.* 54; 269-71.

Ma H, Croudace JE, Lammas DA, May RC.(2007) Direct cell-to-cell spread of a pathogenic yeast. *BMC Immunol.*8:15.

