Pathogen-pathogen interactions in the setting of host immunity

Dr Robin Flynn
School of Veterinary Medicine & Science
Robin.flynn@nottingham.ac.uk

Pathogens and Host Immunity

Major pathogens
- Fungi Th1/Th2
- Parasites
  - Intracellular Th1
  - Extracellular Th2
- Bacteria Th1
- Viral Th1

Veterinary Significance

- These diseases are not mutually exclusive - representative
- Domestic livestock are hosts for multiple pathogen types
- What happens when pathogen-activated immune responses overlap?

How do we explore this?

- Using bovine hosts we co-infect with parasitic helminth Fasciola hepatica and bacteria Mycobacterium bovis
- Both have extremely polarised immune responses
- Zoonotic or economically significant or both
- Lacking commercial vaccination

Failure of putative bTB vaccine

Flynn et al., 2007
Infect. Immun.

Misdiagnosis of bTB

Flynn, Mulcahy, Welsh, McNair Unpublished.
Immune parameters are altered

Specific cytokines protective, pathological, and regulatory are altered in co-infected animals.
Presence of different macrophages in co-infected animals.
Bacteria levels changed and location with lungs different.

Flynn et al., 2007
Infect. Immun.
Flynn et al., 2009

The future of this work

- Examining these interactions in the field
- Pinpointing the immune mechanisms behind the negative effects identified
- Developing a model where a level of helminth infection becomes “dangerous” or proxy of infection indicates a problem for secondary infection; e.g IL-4 or helminth-macrophages

Collaborators

University College Dublin
Grace Mulcahy
Olwen Golden

Dept. Agriculture Belfast
Jim McNair
Mike Welsh
Sam Strain

University of Liverpool
Diana Williams