Infection and Immunity research in pigs

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Infectious diseases and vaccination

The Research Animal Building provides containment facilities to carry out studies with aerosol or faecal-orally transmitted infectious diseases.

- Swine influenza studies using H1N1, which has largely replaced other types after the pandemic of 2009/2010
    - Long-term infection studies
    - Acute vaccination and challenge studies
- *Salmonella enterica* Typhimurium in conventional and inbred pigs
    - Acute, clinical infection
    - Subclinical infections
- *Cryptosporidium parvum* in weaned piglets
    - Factorial designs with feed restriction

Development of the mucosal immune system

- The mucosal immunology group at Langford have led the field in studies of the immune system of neonatal piglets.
- We have extended these studies to examine the effects of
    - Rearing environment (germ-free, indoor housed, outdoor housed)
    - Piglet and/or maternal diet (antigens, feed additives, formulations)
    - Probiotics and prebiotics
- We are now focusing on early-life establishment of microbiomes and their interaction with metabolic and immune systems
    - Manipulation of the microbiome by diet
    - Direct manipulation by administration of specific organisms

Laboratory techniques

- Immunology
    - Multiple-colour immunofluorescence and flow cytometry
    - Targeted, quantitative PCR and untargeted transcriptomics
    - Development and marketing of novel reagents
- Microbiology
    - Conventional and molecular microbiology
    - Microbiome analysis by 16S rRNA, metagenomics or microarray
- Metabolomics, proteomics using UoB facilities.

Pig welfare and behaviour studies at Bristol Vet School

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1) Developing welfare assessment methods in pigs

Helena Telkanranta (Helena.telkanranta@bris.ac.uk)

We have a long-standing interest in developing new indicators of welfare in pigs. These include:
- On-farm implementation of computer vision methods to assess behavioural responses (e.g. startle) as valid indicators of affective state and welfare
- Using thermography to assess affective state and welfare in pigs
- Developing new behavioural indicators of affective state and welfare

2) Predicting welfare and behaviour problems in pigs

Dr Poppy Statham (poppy.statham@bris.ac.uk)

We are interested in identifying individual characteristics or real-time changes in group behaviour and that may be reliable predictors of the onset of welfare problems, or which individuals are particularly likely to initiate or receive problem behaviour. Examples include:
- Predicting tail-biting outbreaks by behaviour monitoring
- Identifying individual differences in propensity to tail-bite and behave aggressively and how these predict damaging behaviour
- Identifying behaviour change linked to sub-clinical disease
- Identifying individual differences in maternal care and their links to productivity
- Understanding links between fundamental behavioural and cognitive abilities (social behaviour, learning and memory, impulsivity) and the occurrence and prevention of welfare problems

3) Identifying risk factors for pig welfare problems, and implementing solutions

Dr Siobhan Mullan (siobhan.mullan@bris.ac.uk)

We have expertise in identifying risk factors for pig welfare problems on farm and in developing and implementing solutions in collaboration with farmers and industry.
- Identifying risk factors for pre-weaning mortality and tail-biting
- Development of Husbandry Advisory Tools to help tackle tail-biting and other welfare problems