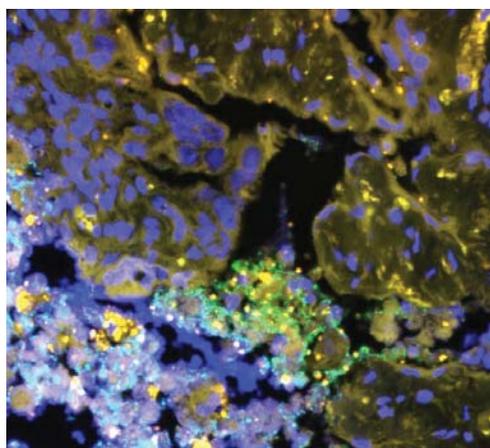


# RESEARCH GRANTS HIGHLIGHTS



## Fighting uterine infection

Professor Martin Sheldon was awarded a BBSRC Research Development Fellowship to study the integration of innate and reproductive endocrinology. Infection of the uterus with bacteria is common in animals such as cattle, sheep, pigs and horses, and even in humans. These uterine infections occur during sexual intercourse, in pregnancy or after parturition, and they cause infertility, abortion, pain and suffering. Uterine disease in animals is also difficult to prevent and costly to treat.

The infertility is caused by damage to the lining of the uterus, by disrupting the development of the eggs within the ovary, and by altering the concentrations of the sex steroid hormones (progesterone and oestrogen) secreted by the ovary, which normally orchestrate the function of the uterus so that it is ready to nurture the fertilised egg. However, in an intriguing twist, the risk of infection depends on these sex steroids; progesterone suppresses immunity while oestrogen enhances it. Why this should be the case remains unclear, yet may be vital when developing treatment and prevention strategies.

Over the next three years the research will work out which cells are the key players for the immune response in the uterus and ovary, and how infection causes infertility. Finally, the research aims to understand the mechanisms by which steroids influence immunity in the uterus. These studies should lead to methods to avoid disease or to exploit the hormone status to resolve uterine infections, as well as improving the treatment of uterine disease and infertility.

Photograph courtesy of Martin Sheldon



## Improving the health of pigs

Dr Andrew Rycroft's laboratory continues to pursue research into respiratory and other infectious diseases in the pig. A recent research grant from the BBSRC has been awarded to support an investigation of gene transfer in *Mycoplasma hyopneumoniae*, the delicate micro-organism that causes enzootic pneumonia in the pig. Another BBSRC award has been made to investigate the persistence of *Actinobacillus pleuropneumoniae* in the respiratory lymphoid tissues. This organism is carried in the pig tonsil for many weeks or months. From there it can be passed to other pigs via nasal secretion or invade the respiratory tract and cause disease. The bacterial factors needed for it to persist at this site have not previously been investigated.

Funding also continues to support the development of defined attenuated strains of *A. pleuropneumoniae* as live vaccines in the pig and, in co-operation with Imperial College, to develop a multi-locus sequence typing scheme for understanding the taxonomy and evolution of this pathogen. With Professor Peter Lees in pharmacology, the laboratory is conducting DEFRA-funded work towards improving the means of determining dosage of antimicrobial drugs to minimise the development of antibiotic resistance.

Finally, a Bloomsbury Consortium studentship has been awarded to investigate the therapeutic value of enzymatic depolymerisation of capsular polysaccharide of *Streptococcus suis*. This pathogen is a common cause of meningitis and infective arthritis in piglets, which usually fails to respond to conventional antibiotic therapy. Such investigations in animals may also lead the way to novel therapy of meningitis in human children.

Photograph courtesy of Andrew Rycroft



## Foetal programming of appetite and obesity

Professor Neil Stickland and Dr Stephanie Bayol have now concluded the first phase of their ongoing research into the effects of eating junk food during pregnancy and lactation. Their findings show that offspring have a significantly higher chance of becoming obese and developing Type 2 diabetes.

In the study, rat offspring whose mothers consumed junk food during pregnancy and lactation were inclined to over-eat and to choose junk food when offered a healthy option. They were also much more likely to become obese and choose junk food than rats fed the same junk food diet, but not until after they had been weaned.

In the offspring of the junk food-eating mothers there was also evidence of metabolic alterations such as insulin resistance, which can lead to the development of Type 2 diabetes much earlier in life.

When linked to the human model, this research reveals that junk food consumed during pregnancy and lactation could be having a similar effect. Therefore future mothers need to be aware that pregnancy is not the time to over-indulge on sugary and fat-filled treats, because it could cause irreversible damage to their unborn children.

The research team will now look at the longer-term effects of a maternal junk food diet on the development and health of offspring – and at the possibility that it causes or contributes to hyperactive behaviour in offspring.

Photograph courtesy of Neil Stickland and Stephanie Bayol