Available PhD Project:

**Supervisors:**
Dr Gareth Pearce [https://www.research.vet.cam.ac.uk/research-staff-directory/principal-investigators/systems-pathology/Gareth-Pearce]

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**Project Title:** Developing alternatives to antibiotics in UK pig production – the efficacy and mechanism of action of marine sulphated polysaccharides

**Project Background**
The use of antibiotics has played a major role in improving the health status, welfare and productivity of pig production over the last 50 years. However, it has been suggested that using antibiotics in food producing animals contributes to a reservoir of drug-resistant bacteria capable of transferring anti-microbial resistance (AMR) to pathogenic bacteria in both animals and humans. As a result, many countries have banned or are the process of banning the inclusion of antibiotics in pig diets as a routine means of growth promotion.

This restriction on antibiotic use has led to intensive research efforts to identify alternative in-feed compounds that are able to promote pig health and performance. Unfortunately, the vast majority of these compounds produce inconsistent results that are rarely equivalent to the production enhancing effects of in-feed antibiotics. More recent research has highlighted the potential of in-feed marine sulphated polysaccharides (MSPs) derived from seaweed / algae as viable alternatives to in-feed antibiotics in pig production.

**Rationale for the Project**
Despite the recent research demonstrating the health and production benefits of in-feed MSPs, it is not known whether MSPs improve growth and feed conversion efficiency in pigs through changes in the gut microbiota similar to those see with the use of in-feed antibiotics. Although this is likely to be the case, understanding and defining the exact mechanism through which MSPs enhance productivity would greatly promote their efficient use as alternatives to antibiotics in commercial pig production.

The effects of MSP use on the AMR gene dynamics within the animal gut microbial population is also unclear. If in-feed MSPs are able to enhance growth efficiency without leading to the increased presence of AMR genes that is seen with in-feed antibiotic use, this would provide a major advance in the safety and sustainability of pig production.

Clarifying how MSPs influence the gut microbiome and AMR gene dynamics is thus essential knowledge if these compounds are to be promoted and accepted as viable, safe and efficacious alternatives to antibiotics in food producing animals.

The aim of this PhD project is to quantify the changes in gut microbiota and AMR gene dynamics associated with feeding MSPs in order to better understand the use of these compounds as alternatives to antibiotics in commercial pig production.

**Skills to be learnt by the student**
The project will employ a wide combination of research techniques within the fields of animal science, veterinary medicine and molecular genomics. Expertise and skills will be gained in applied livestock production monitoring, clinical animal disease assessment, high-throughput gene sequencing, metagenomic analysis and bioinformatics.

**Funding:**
Funding available to successful candidate to cover fees at home rate and stipend (starting at £13,740 pa).

**How to apply:**
Contact the Supervisor to discuss before submitting an application.

More details on how to apply here: [https://www.vet.cam.ac.uk/study/postgrad/apply](https://www.vet.cam.ac.uk/study/postgrad/apply)