TRANSLATIONAL CASE STUDY

Using trained immunity to reduce antibiotic use in food-producing animals

Consumers are placing growing pressure on Australia's animal agriculture sector to reduce its use of antimicrobials due to concerns that antimicrobial-resistant bacteria can move between animals and people sharing the same environment, potentially contributing to the global problem of antimicrobial resistance.

The challenge

In response to this challenge, farmers are seeking methods to reduce the likelihood of infection and, subsequently, reduce the need to use antimicrobials to treat disease while, at the same time, making sure that animal welfare is not compromised. Reducing antimicrobial use by improving livestock health will also deliver lower production costs.

The response

There's evidence to suggest that stimulating an animal's innate immune system prior to a time of greater stress (such as transition to a feedlot, or weaning) can reduce their susceptibility to infection and therefore reduce the need for subsequent antimicrobial treatment.

CSIRO is working with a company that manufactures innate immune stimulant formulations – which can activate an animal's immune system to provide short term protection against a variety of infections.

However, these injectable products can be difficult to administer to large numbers of animals in intensive production systems and the handling required for injection itself can be stressful for the animal.

This project will test the viability of oral delivery of immune stimulant therapies, assessing if these compounds remain active following passage through the gut. If successful, the research will progress to undertake efficacy-based registration trials with the ultimate aim of delivering products to industry that can reduce the reliance on antibiotics to treat disease.

The engagement

CSIRO has partnered with NovaVive (www.NovaVive.ca), a manufacturer of immune stimulant compounds and performs ongoing industry consultation with farmers, industry bodies and potential product distributors. The project team will also consult with the Australian Pesticides and Veterinary Medicines Authority (APVMA) to ensure future registration trial work is designed appropriately.

Dr Brad Hine is a Senior Research Scientist in CSIRO's Livestock Phenomics Team, where he investigates immune competence and stress-coping ability in livestock species. "This project aims to make it easier and more cost-effective for farmers to use innate immune stimulants to spark up an animal's own immune defences before a challenging situation – such as when cattle first arrive at a feedlot," he says.

"We believe these products have the potential to provide production animals with short-term protection against a broad range of pathogens such as those which cause bovine respiratory disease in feedlot cattle. Maintaining high animal welfare standards and reducing antibiotic use is a key priority of all production animal industries and products like these can help achieve that goal."

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