**OVC Scientist Spotlight: Dr. Brandon Lillie**

**Enhancing disease resistance in farm animals**

An OVC pathologist is taking an innovative approach to studying how proteins and gene defects influence disease resistance in farm animals.

“Infectious respiratory and enteric diseases are a major cause of economic losses and animal suffering in the Canadian livestock industry,” says Dr. Brandon Lillie, an assistant professor in the Department of Pathobiology. “The long-term goal of my research program is to develop novel genetic markers that will help producers breed animals that are more broadly resistant to disease.”

Lillie’s research is focused on identifying proteins involved in innate disease resistance in pigs, cattle and horses. He’s also assessing the role that defects in the genes involved in immune function play in the wide variation in resistance to infectious diseases observed in livestock.

Concerns about rising levels of antibiotic resistance have led policymakers and producers to look for ways to curb the use of antibiotics on farms. So there may be economic value in selecting animals that are more robust — in terms of resistance to disease — rather than those that are simply the most ‘productive’ in terms of meat or dairy production or reproductive capacity, he says.

Using leading-edge gene sequencing equipment, Lillie aims to identify and characterize proteins that recognize common patterns on the surfaces of infectious pathogens. These proteins, including collagenous lectins, play a key role in innate disease resistance in humans and animals, and deficiencies have been shown to increase the risk and severity of infections.

In previous work with pigs, Lillie identified some of these proteins and found genetic variations that are more frequent in animals that became ill with diseases such as pneumonia and enteritis. But little is known about these proteins in other domesticated large animals, he says.

“These comparative studies will benefit the livestock industry and maybe humans as well since they will improve our understanding of the complex molecular pathways involved and the genetic mechanisms regulating innate disease resistance that are common to humans and production animals.”

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