

## 2B: Gut Innate Immunity Across Microbiome Differences During Infectious Colitis and Immunomodulatory Therapeutics in Pigs

Pillar: Treatment Optimization

Theme: Innovation and Commercialization

Keywords: Swine Dysentery; Free-Antibiotic Therapies; Gut Immunity



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### AIM

Our aim is to develop immunomodulatory antimicrobials to alleviate and reduce gut pathogen colonization in swine dysentery (SD). Such approach is of interest in Canadian agriculture (livestock productivity and animal welfare) to reduce the use of antibiotics in food producing animals.

### WHY IS THIS IMPORTANT?

Diarrheic colitis by *Brachyspira hyodysenteriae* is a devastating disease in growing pigs. SD reduces pork productivity and is an animal welfare issue. There is emergence of antimicrobial-resistant SD bacteria.

### OUTCOMES

- 1 Discover immunomodulatory antimicrobials for controlling SD.
- 2 Explore the use of diet/probiotics to promote intestinal microbiome associated with disease resistance.

### RESEARCH QUESTIONS

- 1 How is the microbiome in the colon of pigs infected with *B. hyodysenteriae* affected and what is the impact on the associated immune factors?
- 2 Can novel immunomodulatory antimicrobials (e.g., IDRs) function as gut health promoters against SD?

### OUR APPROACH

- 1 **SD Model.** *B. hyodysenteriae* colitis in (5 wk. old) pigs (UofC) cathelicidin and derived peptides (e.g., bovine neutrophil batenecin, IDR-1018) (different routes/times).
- 2 **Grade colitis.** Histology, neutrophil/macrophage accumulation, cytokines, host defense peptides, gut permeability.
- 3 **Gut microbiome.** To assess gut microbiota-driven immune functions in relating to pathogen challenge (diarrheic colitis and therapeutics). Microbial profiling (diversity & content).

### ALIGNMENT WITH THE AMR - ONE HEALTH CONSORTIUM

### LEVERAGED SOURCES OF SUPPORT

UofC Department of Microbiology, Immunology and Infectious Diseases • UofC Veterinary Science Research Station

### KNOWLEDGE & TECHNOLOGY EXCHANGE AND EXPLOITATION

- A multidisciplinary program with the industry and producers to develop novel therapeutic alternatives to reduce antibiotic use in the pork industry

### HIGHLY QUALIFIED PERSONNEL

- 1 Postdoctoral Fellow
- 1 PhD
- 2 Undergraduate Students
- DVM Students are involved in pig SD experiments and data analysis

### AFFILIATIONS:

