# The Inhibitory Effects of Coagulase-Negative Staphylococci on Major Mastitis Pathogens

Domonique Carson, Jeroen De Buck, Herman W. Barkema

Department of Production Animal Health, Faculty of Veterinary Medicine, University of Calgary. 3330 Hospital Dr NW Calgary AB T2N 4N1
Email: domonique.carson@ucalgary.ca

Mastitis results in decreased milk production and quality, increased bulk tank somatic cell count (SCC), and costs Canadian dairy producers an estimated $300 million per year. Currently, the most commonly isolated bacteria from the udder are coagulase-negative staphylococci (CNS), a group of approx. 50 species. Several studies have observed that CNS have a protective effect against infection of the udder by major mastitis pathogens, while other studies have reported no protective properties. This inconsistency is likely due to contrasting effects by different CNS species and genotypes that were earlier undifferentiated. The aims of this study are to determine which species and genotypes inhibit major pathogens 1) in the lab; and 2) in the cow. We hypothesize that some species and genotypes will demonstrate a protective effect against major pathogens.

Materials and Methods: The laboratory study will include the 10 CNS species and genotypes most frequently isolated from samples collected in the Canadian Bovine Mastitis and Milk Quality Research Network (CBMQRN) cohort study and 10 major pathogens. They will be grown together on agar plates and the inhibition of the major pathogen will be measured. For the cow trial we will perform a 15-cow split-udder infection trial using the three CNS species or genotypes demonstrating the strongest inhibition in the laboratory study. Each of the cows will receive a randomized challenge of CNS species (or genotypes) in three of their four quarters of the udder, followed by a challenge a week later in all four quarters with either *S. aureus*, *Strep. dysgalactiae*, *Strep. uberis*, *E. coli* or *Klebsiella* spp. isolates. Clinical symptoms and inflammation parameters (rectal temperature, heart rate, general impression, rumen motility, quarter symmetry, and firmness) will be measured and milk samples frequently collected to determine bacterial counts and extent of colonization.

**Implications:** The results of this study will help characterization of CNS species-specific inhibitory effects and possible mechanisms of inhibition. This knowledge may assist in the discovery of novel products to improve udder health, decreasing the economic impact of mastitis in the dairy industry, and increasing animal health.