

# **Inhibition of Intramammary Infection with Major Pathogens by Coagulase-Negative Staphylococci**

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Mastitis is the most common disease in dairy herds and causes substantial economic losses in the dairy industry. During the last few decades, as a result of programs for mastitis control, there was a reduction in the percentage of udder infections caused by major pathogens and simultaneous increase in prevalence of minor pathogens. In this regard, coagulase-negative staphylococci (CNS) are currently the most prevalent group of bacteria cultured from milk samples; however, their role in udder health is not clear. Some researchers have suggested a protective effect of CNS against udder infection by major pathogens, whereas others reported a negative or no effect. Because CNS comprise of different species and genotypes, it is likely that their role in udder health differs among them. Thus, we hypothesize that certain CNS strains are able to prevent udder infection caused by major pathogens. Specifically, this study aims to investigate whether this protective effect is due to growth inhibition, activation of the immune system, or both.

To test our hypothesis, a split-udder trial will be performed in 15 Holstein-Friesian cows. Prior to the animal trial, a laboratory study was performed in which 9 CNS strains inhibited growth of major pathogens. The three CNS strains with the greatest inhibition ability will be selected for the cow trial. All cows will be infected in 3 of 4 quarters with the selected CNS strains. Seven days after the CNS challenge, all quarters will be super-infected with a suspension of a specific major pathogen whose growth was inhibited by CNS during the previous experiment *in vitro*. Clinical symptoms and inflammation parameters will be assessed and milk samples will be collected for determination of bacteria counts. The results of this study will help to characterize the protective mechanisms of minor pathogens.

The possible inhibitory effects of certain CNS strains on udder infection with major pathogens represent a novel opportunity in the prevention and treatment of mastitis. If a new strategy is implemented, it would not only improve milk production and milk quality, but also decrease antimicrobial use, which is of major importance for the Canadian and global dairy industry.