Assessing Hoof Health in Canadian Dairy cattle ranked as High, Average and Low for Immune Response

Description: A study involving immune response phenotyped cattle and their incidence of hoof lesions is currently under way. Preliminary results from this study have shown that cattle classified as high immune responders have significantly lower incidence of infectious hoof lesions compared to average immune responders and significantly lower incidence of the most severe infectious lesion compared to low immune responders.

Project goal: The goal of this project is to determine if cattle with a high breeding value for immune response have lower incidence of hoof lesions. This would provide an alternative strategy for improving hoof health by breeding for enhanced immune response and disease resistance.

Core Team: Shannon Cartwright (Research Assistant) Prof Bonnie Mallard

Funding: NSERC CRD with Semex Alliance

Genome Wide Association Study: The 5000 Cow Project

Description: Immune response phenotype Holstein dairy cattle across Canada to provide a reference population so a genomic test for bovine immunity can be established. Preliminary results indicate increased accuracy of breeding values by adding genomic information to the current phenotypic testing method.

Project goal: The objective of this research is to phenotype and genotype 5000 Holsteins across Canada to establish a genomic test for immune response.

Core Team: Shannon Cartwright (Research Assistant) Mehdi Emam (PhD Candidate) Prof Bonnie Mallard

Funding: NSERC CRD with Semex Alliance

Exosomal microRNA and other factors in cow’s colostrum and milk on Health in the context of the Immunity+™/High Immune Response (HIR) Technology

Description:
• Several studies highlight the role of miRNAs in “fine tuning” the expression of many target proteins. In colostrum/milk these would include antibodies, defensins and other molecules.
• miRNA are abundant in cow’s milk either free or enclosed within exosomes.
• Packaging of miRNAs within exosomes ensures their stability, resistance to degradation under harsh conditions and allows shuttling of miRNA cargo from cell-to-cell.

Better understanding of the molecular regulatory mechanisms mediating host defense-related bioactive protein expression should improve utilization of milk to shape the immune system of newborns and promote human health.

Project goal: 1. Isolate and characterize colostrum and exosomal miRNA from high (H), average (A) and low (L) immune responder cows. 2. Assess the bioactivity of exosomal miRNAs from H, A, and L responders on intestinal epithelial cells and hepatocytes. 3. Evaluate antibody and defensins in colostrum/milk from H, A, and L responders.

Core Team: Dr. Heba Aida Dr. I. Wagner-Lesperance Mikayla Ross Keeley Burnside Prof Bonnie Mallard

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