Effects of granulocyte colony stimulating factor on the peripheral leukocyte function in postpartum dairy cows

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Recombinant bovine granulocyte colony stimulation factor (GCSF) causes migration of myeloid cells, mostly neutrophils, into peripheral circulation. It is unknown whether this systemic neutrophilia is also accompanied by an increase in peripheral neutrophil function, namely phagocytic capability. We hypothesized that GCSF treatment enhances phagocytic capabilities of peripheral neutrophils in postpartum cows. Holstein cows were injected with either saline (n = 7) or GCSF (n = 8) at ~ 21 (+/-3) days postpartum. Blood samples were collected on the day of injection and on 3, 6, 10, and 21 days. Blood samples were incubated with fluorescein isothiocyanate (FITC) labeled Staphylococcus aureus, neutrophils were stained with primary then secondary antibodies and analyzed by flow cytometry. Normally distributed data were compared using Student's t test and nonnormally distributed data were compared using the Wilcoxon rank sum test (Stata 13.1 software). Phagocytosis capability was compared between the 2 groups using FLOWJO software (Tree Star, USA). On the recruitment day, cows from control and treatment groups did not differ with regards to median body condition score, lactation number, body weight and leukocyte count. Control and treatment group cows had similar (p > 0.41) total and differential leukocyte counts on day 0. However, cows treated with GCSF had increased (p < 0.01) total peripheral leukocyte and neutrophil counts on days 3, 6, and 10 compared to control group cows. Treatment also increased (p < 0.03) phagocytosis of FITC labelled *Staphylococcus aureus* on day 6 after treatment. In conclusion, GCSF increased phagocytic activity of blood neutrophils in treated cows.

Keywords: Pegbovigrastim, immunomodulation, neutrophil function, postpartum cattle

Acknowledgement

Funded by ADF Summer Research Fund and Faculty Startup Fund, University of Saskatchewan