The effect of pegbovigrastim on circulating neutrophil count in dairy cattle

Sabrina Van Schyndel\textsuperscript{a}, Jérôme Carrier\textsuperscript{b}, Osvaldo Bogado Pascottini\textsuperscript{a}, Stephen LeBlanc\textsuperscript{a}
\textsuperscript{a} Department of Population Medicine, Ontario Veterinary College, Guelph ON, Canada
\textsuperscript{b} Elanco Canada, Guelph ON, Canada

\textbf{INTRODUCTION}

- Infection and inflammation trigger cytokines and chemokines to produce and release leukocytes from bone marrow
- Neutrophils are the first line of defense against invading pathogens and their differentiation is stimulated by granulocyte colony-stimulating factor (G-CSF)
- Injection of pegylated recombinant bovine G-CSF (pegbovigrastim) increases neutrophil count and function and decreases the incidence of clinical mastitis in the first 30 DIM

\textbf{OBJECTIVE}

To characterize the response of each treatment of pegbovigrastim on neutrophil counts in peripheral circulation, when administered 7 days before anticipated calving and within 24 hours after calving

\textbf{MATERIALS AND METHODS}

- 34 Holstein cows were administered 2.7 mL of either physiological saline \((n=16)\) or pegbovigrastim (Imrestor, Elanco; \(n=18\)) according to its label, 7 d before anticipated calving date and again within 24 h after calving
- Complete blood count was assessed in samples throughout the study period (Figure 1)
  - Neutrophil counts were \(\log_{10}\) transformed and compared using mixed linear regression

\textbf{RESULTS}

- Neutrophil count was affected by treatment*time and different (\(P < 0.05\)) at d -6, 0, 1, and 7 (Figure 2)
- Control cows had 100% segmented neutrophils; whereas treated cows had an average of 5% (range of 1.3 – 9.6%) band cells

\textbf{CONCLUSIONS}

- Injection of pegbovigrastim one week prior to, and soon after, calving triggers a rapid increase in circulating neutrophil count
- An additive increase follows the second injection at the time of calving
- Most (~95%) additional neutrophils in circulation after treatment were mature segmented cells, indicating that the storage pool of neutrophils is not depleted by the effect of the first injection of pegbovigrastim

- Injection of pegbovigrastim substantially increases the number of mature neutrophils available for immune response in dairy cattle during the transition period
  - Additional trials are required to confirm its effects on the risk of reproductive and infectious disease