

S. McDougall,^{*1} S. J. LeBlanc,[†] and A. Heiser[‡]

^{*} Cognosco, AnexaFVC, Morrinsville, New Zealand, 3300

[†] Ontario Veterinary College, University of Guelph, Guelph, ON, Canada N1G 2W1

[‡] AgResearch, Hopkirk Research Institute, Palmerston North, 4442, New Zealand

Effect of prepartum energy balance on neutrophil function following Pegbovigrastim treatment in periparturient cows

Treatment with granulocyte colony stimulating factor (G-CSF) increases neutrophil (PMN) count and enhances PMN function in the periparturient cow. It was hypothesized that prepartum undernutrition may reduce the effect of a commercial recombinant bovine G-CSF product (pegbovigrastim; IMR) on PMN count and function. Hence this study was undertaken to test the effect of undernutrition for one month prior to calving on the response to IMR.

Cows (n=99) on pasture in a research herd in New Zealand were blocked by expected calving date and BCS and randomly assigned in a 2×2 factorial design to be fed to exceed energy requirements prepartum (FULL), or restricted to approximately 85% of prepartum energy requirements (RES). At approximately 7 d before expected calving and on the day of calving, half the cows in each feed group were injected with IMR while the remaining half were injected with saline. Blood samples were collected pre-and post-calving for complete blood count, biochemistry and in vitro assessment of PMN function including phagocytosis, myeloperoxidase (MPO) release and oxidative burst.

Energy restriction prepartum resulted in lower body weight ($96.1 \pm 0.4\%$ vs $101.0 \pm$ of initial body weight for RES vs FULL cows at calving; $P < 0.001$), and a higher proportion of cows with elevated concentrations (i.e. > 0.4 mmol/L) of fatty acids (35/41 (85.4%) vs 23/41 (56.1%)) elevated for RES vs FULL cows at 7 days before calving; $P < 0.001$).

Treatment with IMR increased PMN count ($(9.8 \pm 0.2$ vs $3.9 \pm 0.2 \times 10^9/\text{mL}$; $P < 0.001$). There was a time x IMR interaction ($P < 0.001$) for proportional release of MPO by PMN, with higher release at 4 days post-calving in IMR cows (0.80 (95%CI=0.72-0.88) vs 0.59 (95%CI=0.53-0.64)). There was no effect of prepartum energy restriction, nor energy restriction x IMR interactions for any of the white cell counts or functional tests.

It is concluded that IMR treatment results in significant increases in PMN count, and enhances PMN function as indicated by increased MPO release. The response to IMR was not affected by restricted pre-partum energy intake.

Key words: pegbovigrastim, energy balance, neutrophil function

¹ Author for correspondence: Scott McDougall, Phone: +64 7 8895159, Fax: +64 7 8893681, email: smcdougall@anexafvc.co.nz,