

EFFECT OF NUTRITIONAL STATUS ON PLASMA CONCENTRATIONS OF INSULIN-LIKE GROWTH FACTOR BINDING PROTEIN-3 AND INSULIN-LIKE GROWTH FACTOR-I IN PASTURE-FED HOLSTEIN-FRIESIAN COWS

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Insulin-like growth factor binding protein-3 (IGFBP-3) is the predominant IGFBP in biological fluids including blood and milk (Baumrucker and Erondy 2000). The IGFBP-3 is bound to the insulin-like growth factors (IGFs) in most body fluids, and modulates their biological activity by controlling their availability to target tissues (Rechler and Clemmons 1998). Nutritional status plays a major role in regulating circulating levels of IGF-I and its respective binding proteins and cell membrane receptors (Thissen *et al.* 1994). There is limited information on the effects of level of nutrition on the concentrations of IGFBP-3 in plasma or milk, especially in pasture-based dairy herds. In this study, the effects of dry matter (DM) intake and metabolisable energy (ME) density on the concentrations of IGFBP-3 and IGF-I in the plasma samples of individual cows belonging to 2 dietary groups were evaluated. The association between the concentrations of IGFBP-3 and IGF-I in the plasma samples from these cows was also investigated.

Sixteen cows from 2 dietary groups (LL - low DM (16.6 kg) and low ME (174 MJ)) and (HH - high DM (17.9 kg) and high ME (213 MJ)) were monitored for variations in blood variables. Blood samples were taken weekly from a coccygeal vein at 0700 h after morning milking during the 5-week study. Each sample was centrifuged at 3000 rpm for 15 mins at 4°C. Plasma was collected and stored at -20°C until assayed for IGFBP-3 and IGF-I. The concentrations of IGFBP-3 in the plasma were measured using Western Ligand Blot Analysis (Hossenlopp *et al.* 1986). Plasma concentrations of IGF-I were measured using an ELISA (Diagnostic Systems Laboratories, Webster, Texas, USA).

Results from an independent samples test (t-test) indicated no significant difference in the mean intensity of IGFBP-3 in the HH and LL dietary groups (64140 ± 5413 v. 72716 ± 6490 pixels; $P = 0.33$) although there appeared to be some variations in the intensities from individual cows. In contrast, the mean concentrations of IGF-I in plasma were significantly higher in the HH dietary group than the LL dietary group (83.2 ± 5.8 v. 39.5 ± 6.6 ng/mL; $P < 0.001$). The association between IGFBP-3 and IGF-I concentrations in the plasma samples from individual cows was, therefore, weak ($r^2 = 0.002$; $P = 0.85$).

The results suggest that changes in plasma IGF-I concentrations due to dietary influence are unlikely to be related to the concurrent changes in IGFBP-3 concentration in pasture-fed dairy cows under the conditions operating during this study.

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