

PLASMA INSULIN-LIKE GROWTH FACTOR-I (IGF-I) LEVELS IN PASTURE-FED LACTATING HOLSTEIN-FRIESIAN COWS DURING THE POST-PARTUM PERIOD

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Insulin-like growth factors (IGF-I and IGF-II) regulate cell growth, differentiation and differentiated cell function by interacting with three cell surface receptors (IGF-IR, IGF-IIR, and insulin-R), which is in turn, modulated by six binding proteins (IGFBP-1-6). IGFs are synthesized and secreted by many tissues and act as autocrine, paracrine and/or endocrine factors. IGFs and IGFBPs may be involved in mediating the effects of nutrition on the reproductive system. Research in Europe and North America using intensive feed-lot cattle systems has established a relationship between circulating IGF-I concentration and changes in energy balance in high genetic merit dairy cows fed total mixed rations. This study aims to evaluate the effect of dry matter and/or energy intake on plasma IGF-I concentrations in Australian pasture-fed lactating dairy cows in early lactation.

Thirty-two Holstein-Friesian cows, 4-5 weeks post-partum, were randomly assigned to four treatment groups (2x2 factorial design). Cows in the four groups received daily rations of dry matter (DM) and metabolisable energy (ME) (Low-Low: 16.6kg DM and 174 MJ ME; High-Low: 17.3kg DM and 181 MJ ME; Low-High: 15.4 kg DM and 211.5 MJ ME ; High-High: 17.9 kg DM and 215.9 MJ ME) for five weeks (3-week adaptation period, followed by 2 weeks of data collection). Blood samples were collected from a coccygeal vein of cows and plasma_IGF-I measured using the DSL-10-2800 Active™ Non-extraction IGF-I Enzyme-linked Immunosorbent Assay (ELISA) (Diagnostic Systems Laboratories, Inc, Webster, Texas, USA). The ELISA was validated against IGF-I radio-immunoassay of de-fatted plasma samples extracted by size-exclusion chromatography (HPLC) under acid conditions to separate IGFs and IGFBPs.

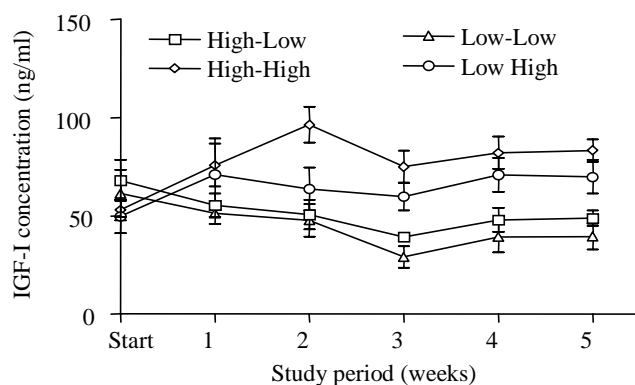


Figure 1. Nutritional effects on plasma IGF-I concentration

al. 1992) and heifers (Armstrong *et al.* 2001) offered high-energy diets compared to counterparts on low energy diets. Therefore, IGF-I concentrations may be used to monitor energy balance and with diet management alleviate the problem of negative energy balance accompanying early lactation in the dairy cow. In conclusion, IGF-I levels in pasture-fed lactating dairy cows reflected nutritional status.

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