

20. DAILY VARIATION IN PLASMA GLUCOSE LEVELS OF DAIRY COWS

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The insulin-IGF-1 axis has been implicated in the control of reproductive function in dairy cattle, especially in the control of ovarian function. These results describe differences in plasma glucose concentrations in lactating dairy cows. Holstein-Friesian (HF) cows, of New Zealand (NZ) (>87.5% NZ genetics) and North American (100% NA genetics; NA) ancestry, were fed either high quality pasture (pasture) or a total mixed ration (TMR) throughout lactation (1). All animals were synchronised and allowed to have an uninterrupted oestrous cycle. Daily transrectal ultrasound identified the timing of luteal regression. When luteum size had decreased in size by 5 mm from one day to the next, a jugular catheter was inserted and 4-hourly blood sampling initiated, continuing until ovulation. Plasma glucose concentrations were analysed during a 76-hour period around the time of the pre-ovulatory surge in luteinising hormone. Cows calved between 29 June and 11 September 2001, with intensive blood sampling occurring between September and November 2001. The average interval from calving to the start of the sampling period was 81.6 ± 1.2 days for the 29 animals enrolled. Data were analysed using REML with ARI covariance structure for repeated measurements and with diet, genotype, time and their interactions as fixed effects. Plasma glucose showed time ($P < 0.001$), diet ($P < 0.001$), genotype ($P = 0.037$), and time by diet effects ($P = 0.05$). Cows fed pasture had lower and more variable plasma glucose concentrations when compared to cows fed TMR (3.04 mmol/L v. 3.54 mmol/L, s.e.d. = 0.048). NAHF had lower plasma glucose compared to NZHF (3.34 mmol/L v. 3.25 mmol/L, s.e.d. = 0.048). Other genotype and diet differences in the insulin-IGF-1 axis are now being investigated with data for plasma IGF-1 and insulin being analysed. This will provide important insights into differences between cows of differing genotype fed widely differing diets.

(1) Kolver *et al.* (2002). *Proc.NZ Soc. Anim. Prod.* **62**: 246–251.