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Comparison of dry matter intake and somatotropic axis components of Holstein and crossbred dairy cows.

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Objectives of the study were to compare dry matter intake (DMI), somatotropic axis components, plasma cortisol (COR), and leptin (LEP) concentrations of Holstein (HO) and Montbéliarde sired crossbred (MS) cows. Cows were enrolled in the study 45 d before calving (d -45) and followed until d 90. Daily DMI was measured from d -45 to 45. Liver was biopsied on d -14, 7, 14, and 28 to determine mRNA expression of growth hormone receptor (GHR) 1A, insulin-like growth factor-I (L-IGF1), and insulin receptor b (IRB). Plasma concentrations of growth hormone (GH), insulin-like growth factor-I (IGF1), insulin (INS), and LEP were determined on d -7, 1, 7, 14, 21, 42, and 56 and that of COR was determined on d -14, -7, 1, 7, 14, 21, and 42. Data were analyzed by ANOVA for repeated measures. Breed tended ($P=0.08$) to be associated with DMI from d -45 to 45 (HO= 16.5 ± 0.7 kg/d vs MS= 14.9 ± 0.6 kg/d) and DMI expressed as percentage of body weight (DMIBW) tended ($P=0.10$) to be affected by the interaction between breed and day because among HO cows DMIBW on d -15 and -1 were $1.89\pm 0.12\%$ and $1.43\pm 0.14\%$, respectively, and among MS cows DMIBW on d -15 and -1 were $1.51\pm 0.10\%$ and $1.41\pm 0.11\%$, respectively. There were no associations between breed and expression of GHR1A ($P=0.83$), L-IGF1 ($P=0.70$), and IRB ($P=0.68$) mRNA, but the interaction between breed and day was ($P=0.02$) associated with expression of IRB mRNA because there was ($P<0.10$) an increase in the amount of IRB mRNA on d 7 and 14 compared with d -14 and 28 in HO cows but no changes in expression of IRB mRNA were observed among MS cows. There were no associations between breed and concentrations of IGF1 (55.4 ± 1.7 ng/mL; $P=0.81$), INS (65.2 ± 0.7 ng/mL; $P=0.69$) and LEP (2.8 ± 0.2 ng/mL; $P=0.30$), but HO cows had ($P<0.01$) greater concentrations of GH (7.4 ± 0.4 vs 5.1 ± 0.4 ng/mL) and cortisol (9.4 ± 0.8 vs 7.1 ± 0.8 ng/mL) than MS cows. The greater decrease in prepartum DMI for HO cows may have caused the increased levels of GH and COR. The similar IGF1 concentration among HO and MS cows, despite HO cows having greater GH concentration and similar expression of GH1RA mRNA to MS cows, may suggest a more pronounced decoupling of the somatotropic axis in purebred HO cows.