

ABSTRACT

Breed differences in growth hormone and insulin secretion between lactating Japanese Black cows (beef type) and Holstein cows (dairy type)

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This study was performed to clarify the levels of growth hormone (GH) and insulin (INS) secretions and the glucose response to INS during lactation in a representative beef breed in Japan, Japanese Black cows, and to compare them with their counterparts in a dairy breed, Holstein cows. Six Japanese Black and seven Holstein primiparous cows received a single intravenous injection of GH-releasing factor (GRF; 0.25 µg/kg), glucose (112.5 mg/kg), or INS (0.2 U/kg) from late pregnancy (2 weeks antepartum) to mid-lactation (6 months postpartum). Japanese Black cows had one-tenth of the total milk yield of Holstein cows during lactation, and significantly lower GRF-induced GH and higher glucose-induced INS secretions than Holstein cows at all stages. In Japanese Black cows, even with lactation, these secretions remained essentially unchanged, whilst Holstein cows showed higher GH and lower INS secretions after the onset of lactation as compared with cows in late pregnancy. Both breeds had similar glucose response to INS at the respective stages. These results suggest that, during lactation, Japanese Black cows may minimize the catabolic effects of GH and sustain the anabolic effects of INS, in contrast with Holstein cows, but have similar ability to inhibit INS-mediated glucose utilization in peripheral tissues to Holstein cows.