Effect of intravenous infusion of recombinant ovine leptin on feed intake and serum concentrations of GH, LH, insulin, IGF-1, cortisol, and thyroxine in growing prepubertal ewe lambs


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In sheep, serum concentrations of leptin change congruently with increases or decreases in nutritional status, while intracerebroventricular infusions of leptin dramatically suppress feed intake in well-fed lambs, and may also increase growth hormone (GH), and/or luteinizing hormone (LH) in undernourished lambs. The objective of the present study was to determine the effects of peripherally delivered ovine leptin, via intravenous infusions, on feed intake and serum concentrations of GH, LH, insulin, IGF-1, cortisol, and thyroxine. Twelve ewe lambs weighing 29.4 ± 0.7 kg were infused intravenously with a linearly increasing dose of leptin or saline (n = 6 per group) for 10 days, reaching a maximum dose delivered of 0.5 mg/h on day 10. Feed intake was assessed twice daily, and blood samples were collected every 10 min for 6 h on days 0, 2, 5, 8, and 10. Serum concentrations of leptin increased in leptin-treated lambs by day 2 (P = 0.05), and continued to increase to concentrations 9-fold greater than saline-infused lambs by day 10 (P < 0.001). Despite the substantial increase in serum leptin, feed intake did not differ between leptin and saline-infused lambs except on day 3.5 (P = 0.01). Furthermore, intravenous infusions of leptin did not significantly influence serum concentrations of insulin, cortisol, IGF-1, thyroxine, LH, or GH. Collectively, these observations contrast with the potent hypophagic effects of leptin when delivered intracerebroventricularly into well-fed lambs. The reasons for the disparate response of lambs treated intravenously with leptin, versus that reported for lambs treated intracerebroventricularly with leptin are not known, but may provide insight into the mechanism(s) of leptin resistance.

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