

PULSATILE GROWTH HORMONE SECRETION DURING THE BREEDING SEASON IN MALE REINDEER AND ITS ASSOCIATION WITH HYPOPHAGIA AND WEIGHT LOSS

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Male deer reduce food intake during the breeding season (rut) and consequently lose weight, mainly fat. The physiological mechanism for this is not known. As growth hormone (GH) is known to be lipolytic in ruminants we measured pulsatile GH secretion in three young reindeer bulls during the natural period of weight loss during rut.

Blood samples were withdrawn through a jugular cannula every 20 minutes for 16 hours on five occasions from late summer to early winter in unanaesthetised animals. The deer were group fed *ad libitum* and food intake weight, body weight and testis diameter were recorded. The bulls lost 8% of their body weight during the rut and reduced their food intake. This period was followed by a period of weight gain before weight plateaued. Mean GH (3.5 ng/ml) was significantly ($p < 0.05$) highest at the time of minimum body size and food intake, compared with the periods before and after the rut 1.8 ng/ml and 1.7 ng/ml respectively. Neither amplitude nor frequency of pulses differed significantly ($p > 0.05$) with period but the high mean GH values were associated with significantly ($p < 0.05$) longer pulses with a large area. The total peak area before the rut was 56 area units, during the rut 82 area units and after the rut 50 area units.

Because the natural opioid system is known to increase GH secretion in rodents, this was investigated using naloxone, an opioid antagonist. The bulls were given intravenous injections of naloxone hourly (total dose 125 mg) for four hours and blood sampling was contained for a further seven hours. Overall, naloxone treatment raised GH, that is, endogenous opioids were suppressing GH. This effect was most significant ($p < 0.05$) after the rut during the period of compensatory weight gain. There was no evidence that the elevated levels of GH during rut hypophagia were disproportionately influenced by naloxone.

The rut weight loss and low food intake is associated with high levels of GH, a known lipolytic hormone. It is speculated that GH, by promoting lipolysis, maintains energy balance in rutting stags, but the natural opioid system opposes this, overall, and forms a negative feedback loop. This provides a novel model to study effects of anorexia on reproduction, and the metabolic control of reproduction.