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## BRIEF COMMUNICATION

## The effect of somatostatin infusion on milk yield of goats

S.R. DAVIS, V.C. FARR, K.H. MYUNG<sup>1,2</sup> C G PROSSER AND G.S.G. SPENCER<sup>1</sup>Dairy Science and Growth Physiology<sup>1</sup> Groups, AgResearch, Ruakura Research Centre, Private Bag 3123, Hamilton, New Zealand.**Keywords:** milk production; somatostatin; hormones; goats; bloodflow.

Somatostatin is a hormone widely distributed among tissues which, depending upon species, will inhibit growth hormone release from the pituitary gland and modulate the release of insulin from the pancreas (e.g. Davis, 1975; Maglad *et al.*, 1983).

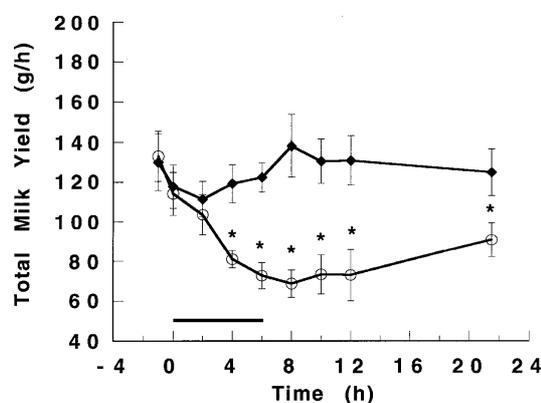
The physiological function of somatostatin in ruminants is largely unknown. Certainly effects of somatostatin on the function of the gastro-intestinal tract have been reported (Barry *et al.*, 1985). However, somatostatin appears not to modulate basal growth hormone release in ruminants (Davis, 1975).

Immunisation of ruminants against somatostatin has a number of effects, including enhancement of growth rate and lactation (Spencer, 1986). However, the direct effect of somatostatin on lactation, to our knowledge, has never been reported apart from a brief abstract suggesting that injection of somatostatin into cattle reduced milk production (Gorewit *et al.*, 1978). The current experiment was designed to investigate the effect of intravascular infusion of somatostatin on milk production of goats.

Five lactating goats were infused with somatostatin (600 µg/h; Sigma Chemical Co., St Louis, MO, USA) via an external pudic (mammary) artery for 6 h during a 14 h period of frequent (2 hourly) milking. Each goat also received a control infusion of saline on a separate occasion within 10 days of the somatostatin infusion. Saline and somatostatin infusions were carried out in random order for each goat. Blood flow through the infused artery was monitored continuously using a transit-time bloodflow probe (Transonic Systems Inc., Ithaca, New York, USA).

Milk production was reduced to 60% of control values within 4h of the start of somatostatin infusion (Fig. 1). The yield reduction was maintained beyond the end of the infusion and the difference in yield was still significant ( $p < 0.05$ ) the following morning. The reduction in milk production was similar for both glands, suggesting an indirect effect of somatostatin. However, the somatostatin infusion resulted in a rapid 30-fold increase in plasma somatostatin concentration (to ca. 2000 pg/ml) which may have been sufficient to preclude distinction between local and systemic effects. Following cessation of infusion, plasma somatostatin concentration returned to control values within 1 h.

**FIGURE 1:** Total milk production during somatostatin (600 µg/h; -o-) or saline infusion (20 ml/h; -♦-) of goats (n = 5) via the external pudic artery. Infusions were given over 0 - 6 h (bar) and milk yield recorded every 2 h. Yield differences were statistically significant ( $p < 0.05$ ) as indicated (\*), when determined by paired "t" test



Blood flow to the infused gland was reduced in similar proportion and time-course to the fall in milk yield and this effect was sustained until the end of the experimental period ( $p < 0.05$ ; data not shown).

Blood plasma glucose, urea, growth hormone and insulin-like growth factor-1 concentrations were unaffected by somatostatin. Plasma insulin concentrations were reduced by around one-third during the infusion ( $p < 0.05$ ) but concentrations had recovered by the end of the experiment.

In conclusion, somatostatin infusion caused a pharmacological elevation of plasma somatostatin concentration and an associated sustained reduction in milk production. The mechanism by which this reduction was achieved is unknown but may be due to secondary endocrine effects, effects on nutrient absorption from the gut or possibly a direct effect of somatostatin on mammary function. These alternatives are currently under investigation.

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