

AN INVESTIGATION OF THE PHYSIOLOGICAL BASIS FOR FEED INTAKE DEPRESSION IN LAMBS INFECTED BY GASTROINTESTINAL PARASITES

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A reduction in voluntary feed intake is one of the major factors in the reduced productivity of grazing sheep exposed to nematode parasites and is associated with elevated cholecystokinin (CCK) (Symons and Hennessy 1981). Reported here are 2 studies, both using the principle of antagonising a particular pathway to identify the mechanism involved in intake depression. The potent antagonist to peripheral CCK receptors, loxiglumide, was used to examine the effect on intake and abomasal emptying. Secondly, brotizolam was used. This is a compound which interacts with the diazepam receptor of the ventromedial hypothalamus (VMH) to increase intake in satiated animals. The role of these pathways was elucidated by monitoring eating patterns.

Twelve lambs were infected orally with *T.colubriformis* (4000 larvae/head.day) for approximately 10 weeks while 12 non-infected lambs were controls. Following the onset of feed intake depression in the infected groups, (5–7 weeks from start of infection) lambs in the CCK trial were fitted with jugular catheters and infused with either saline (0.3 mL/min for 130 min) or the CCK antagonist, loxiglumide, (30 mg/kg.h for 10 min prior to feeding then 10 mg/kg.h for the remaining 2 h). Loxiglumide was administered on 4 days and the saline on 2 days to all animals (6 parasitized, P, and 6 control, C), the days being allocated randomly. Abomasal volume and flow was estimated by reference to a single injection of ⁵¹CrEDTA, 45 min after food was offered. Brotizolam (0.1, 2 or 4 mg) was injected into the jugular vein immediately prior to feeding the second group of 6 P and 6 C animals. In both trials feed intake was recorded at 10, 20, 30, 40, 50, 60, 75, 90, 105 and 120 min post feeding, then hourly for 8 h and finally 22 h post feeding. Food was then removed and the next day's allocation offered 2 h later.

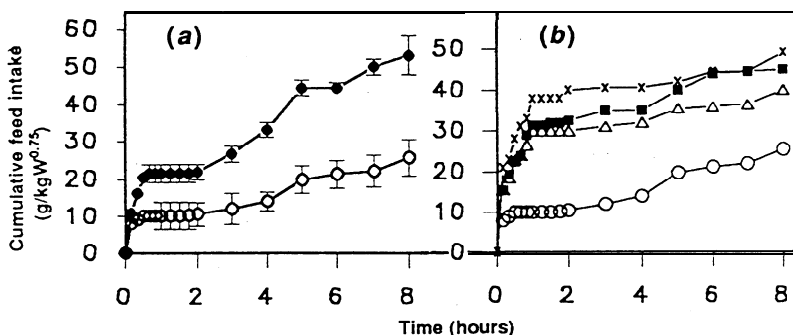


Fig. 1. Cumulative feed intake (g/kg W^{0.75}) for (a) infected (O) and non-infected (●) lambs ($n = 6$) and (b) infected lambs treated with 0 (○), 1 (▲), 2 (■), or 4 mL (X) of brotizolam (maximum s.e.m. = 2.8; $n = 6$).

Food intake was reduced in parasitized animals (Fig. 1a) as was abomasal volume (74.8 ± 15.02 v. 163.2 ± 15.14 mL, mean \pm s.e.m.) and digesta flow rate (2.5 ± 0.55 v. 4.6 ± 0.58 mL/min). However, the latter were highly correlated ($r = 0.6$, $P < 0.001$) with feed intake. Loxiglumide had no effect on short term or daily feed intake, nor on abomasal volume or emptying. All 3 levels of brotizolam increased short term intake of infected animals (Fig. 1b).

These findings demonstrate a peripheral action of CCK is unlikely to be responsible for the depression in feed intake in parasite infected animals. Interaction of brotizolam with the diazepam receptor of the VMH elevated intake, indicating that intake depression of parasitised animals can be overcome by a central mechanism.

SYMONS, L. E. A. and HENNESSEY, D. R. (1981). *Int. J. Paras.* **11**: 55–8.