

Cysteamine-induced depletion of somatostatin in sheep: time course of depletion and changes in plasma metabolites, insulin, and growth hormone

K. R. McLeod, D. L. Harmon, K. K. Schillo and G. E. Mitchell, Jr

Abstract: Eight crossbred wethers (51 ± 2 kg BW), surgically fitted with abomasal cannulas, were used to determine the extent and time course of cysteamine (CSH)-induced depletion of somatostatin (SRIF) in abomasal tissue and associated changes in plasma metabolites, insulin, and growth hormone (GH). Cysteamine was administered as a single i.v. bolus ($50 \text{ mg} \cdot \text{kg BW}^{-1} \cdot 10 \text{ min}^{-1}$) on d 0. Abomasal biopsies were obtained on d -7, -3, 0, 1, 3, and 10. On d 0, additional biopsies were taken at 2, 4, and 8 h after CSH administration. Jugular blood samples were collected over 8 h at 15-min intervals on d -2, 0, and 1. Cysteamine administration decreased ($P < .05$) tissue SRIF on d 0 (2, 4, and 8 h), 1, and 3; maximal depletion (42 to 55% of Pre-treatment; Pre-trt) occurred during the initial 24 h, returning to Pre-trt by d 10. Gel chromatography of pooled -7 d abomasal tissue extracts showed five peaks of SRIF immunoreactivity; the predominate peak eluted in the same position as synthetic SRIF-14. Plasma glucose, lactate, and NEFA concentrations increased ($P = .001$) after CSH administration and reached peak at 2 h after treatment and declined to Pre-trt concentrations by 24 h. Insulin increased ($P = .001$) to a maximum at h 4 and returned to Pre-trt by 24 h. Mean and baseline GH were higher ($P < .07$) on day of CSH administration, and pulse amplitude was lower ($P < .10$) on d 0 and 1. These data show that CSH rapidly reduces SRIF in abomasal tissue in a reversible manner; suggesting that CSH-treated sheep may provide a SRIF-deficient model for studying the physiological role of SRIF in ruminants.

Key Words: Sheep, Cysteamine, Somatostatin, Somatotropin, Insulin, Metabolites