ACUTE EFFECTS OF DIETARY CLENBUTEROL ON BLOOD FLOW IN HEPATIC PORTAL VEIN, HEPATIC ARTERY AND COMMON ILIAC ARTERY LAMBS

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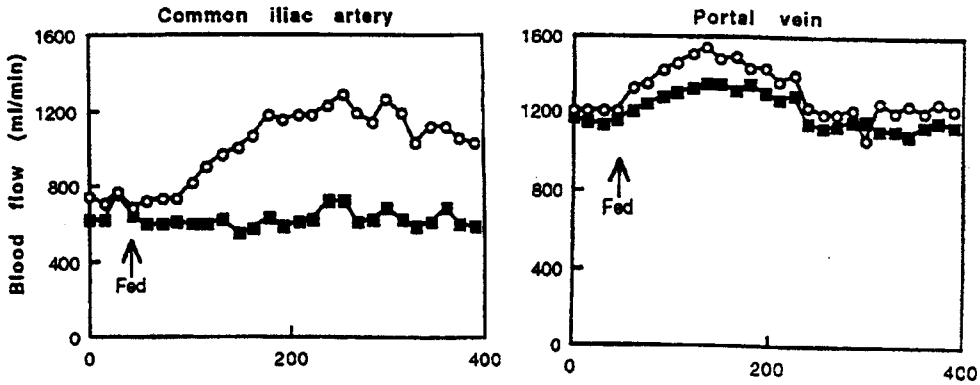
Potent effects of the β adrenergic agonist clenbuterol on partitioning of nutrients towards lean tissue growth are well known (Moloney et al. 1991), but the mechanism by which this occurs is not clear. Previous studies have indicated a direct action on skeletal muscle as well as an increase in blood flow to skeletal muscle tissues (Eisemann et al. 1988). In the latter study the indicator dilution technique was used to measure blood flow in steers. The effects of clenbuterol on real time changes in blood flow to skeletal muscle tissues and portal drained viscera are not known. Therefore, in this study we have made simultaneous measurements of real time blood flow in the hepatic portal vein, hepatic artery and in the common iliac artery in lambs fed clenbuterol.

Six cross-bred ewe lambs (25-30 kg liveweight) were surgically prepared by placement of ultrasonic perivascular flow probes around the portal vein, hepatic artery and common iliac artery. The lambs were fed a mixture of good quality lucerne and rolled barley in the ratio 60:40 (w:w). After a minimum of a seven-day recovery period portal blood flow was monitored continuously for one hour pre-feeding and for seven hours post-feeding for three consecutive days. On day two, clenbuterol was mixed with the feed at a dose of 0.3 mg/kg feed. The mean blood flows are presented in the Figure (day one: solid squares, day two: open circles).



Feeding clenbuterol resulted in a prompt increase in blood flow in the common iliac artery ($P < 0.05$) and the flow remained elevated during the measurement period on day two. No significant changes in the blood flow were observed in either hepatic portal vein or in the hepatic artery. The hepatic arterial blood flow (60-90 ml/min) was only about 5% of the portal blood flow. The results demonstrate a marked increase in blood flow to hindquarters but no change in blood flow to portal drained viscera in response to clenbuterol. This lack of response in the hepatic portal and arterial blood flows are likely due to lack of β adrenergic receptors in these vascular beds.

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