

## Hepatic and portal drained viscera response to intramesenteric infusion of propionate in lactating dairy cows

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An experiment was conducted to study the effects of a chronic physiological infusion of sodium propionate, in the mesenteric vein, on liver and portal drained viscera (PDV) metabolisms of dairy cows.

Four multicatheterized (Huntington *et al.*, 1989), high producing ( $32 \pm 2$  kg milk/d), first lactating dairy cows ( $520 \pm 11$  kg of body weight) were used during their 5th and 6th month of lactation. They were milked twice a day and fed *ad libitum* a diet of 50% alfalfa hay and 50% concentrate ( $21 \pm 1$  kg DM/d,  $55 \pm 2$  Mcal ME/d, 538 g N/d). Each animal received both control (NaCl) and propionate treatment, for 72 h (NaC<sub>3</sub>: 1 ml/min of a 2.5 M solution), in a reversal design. Simultaneous blood samples (10 samples/cow, every 20 min, 3 h after the morning meal) were withdrawn from artery, hepatic vein and portal vein. Blood flow was determined with dye dilution (Huntington, 1984).

No variation in intake, milk yield and composition was observed during the

infusion of propionate. It resulted in an increase ( $P < 0.05$ ) in arterial concentration of propionate (+ 25%) and an astonishing slight decrease ( $P < 0.1$ ) in glucose production (- 11%) by the splanchnic tissues. This loss in carbon source for the peripheral tissues is partially filled (55%) by the greater release of lactate, alanine and other sources to these tissues. Part of the decrease in urea production could be explained by the lesser amino acid desamination (hepatic alanine/urea = - 60%). Glucose and urea metabolisms are energy users; the decrease of these activities in the liver could account for the overall decrease in splanchnic oxygen consumption.

Huntington GB (1984) *J Dairy Sci* 67, 1919-1927

Huntington GB, Reynolds C, Stroud B (1989) *J Dairy Sci* 72, 1583-1595

**Table 1.** Liver and portal drained viscera responses to infusion.

Net flux in	Liver			PDV		
	NaCl	NaC <sub>3</sub>	SD	NaCl	NaC <sub>3</sub>	SD
Propionate (mmol/h)	- 1 350	- 1 330	113	1 433	1 425	147
Glucose (mmol/h)	767	708	29	51*	22*	41*
Lactate (mmol/h)	- 94 <sup>a</sup>	- 45 <sup>b</sup>	7	187	169	10
Alanine (mmol/h)	- 98	- 28	63	49	112	37
Urea (mmol/h)	1 007	961	100	- 398	- 481	162
Oxygen (mmol/h)	- 3 848 <sup>a</sup>	- 3 264 <sup>b</sup>	161	- 2 247	- 2 394	433

Means with different subscripts differ at least at  $P < 0.1$ , \*: means not different from 0 ( $P < 0.05$ ).