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Effect of the site of infusion of para-aminohippuric acid (PAH) on portal blood flow

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The *in vivo* measurement of nutrient absorption is a necessary step in the characterisation of nutrient requirements of animals. In this context, the determination of portal blood flow is critical. When dilution techniques are used for such measurements, eg using PAH, a homogeneous mixing of the marker in the blood is a prerequisite for the validity of the results. In this respect, Ortigues *et al* (1994, J Agr Sci Camb, 122, 299-308) suggested that mixing of PAH in portal blood could be improved by infusing PAH simultaneously via a ruminal (RV) and a mesenteric (MV) vein, compared to a MV only. These authors, however, studied the influence of the PAH infusion site in different animals such that the infusion site effect may have been biased by an animal or catheter placement effect. The objective of the present work was to compare in the same animals the influence of a MV + RV infusion with that of a MV infusion on portal blood flow determination.

Two dry ewes weighing 39 and 47 kg were fed at maintenance level every 2 hours with a 60 % DM hay and 40 % DM concentrate mixture. They were equipped with indwelling catheters in the portal vein (PV), mesenteric vein (MV), ruminal vein (RV) and mesenteric artery (MA). Two weeks after surgery, portal blood flow was estimated using constant PAH dilution (Ortigues *et al*, 1994, J Agr Sci Camb, 122, 299-308). On 2 different days, and in each

ewe, PAH was infused solely in MV for 2 h and then simultaneously in MV and RV for 2 h so that the global PAH infusion rate was identical in both cases. Blood samples were collected in heparin every 15 min from MA and PV. PAH concentrations were measured colorimetrically (Huntington, 1982, J Dairy Sci, 65, 1155-1162). The results were analysed by ANOVA.

Our results of portal blood flow agreed with those published by Isserty and Ortigues (1994, Reprod Nutr Dev, 34, 399-413) measured under similar conditions and varied significantly between animals ($P < 0.03$) and between days ($P < 0.04$). There was also a significant effect of infusion site ($P < 0.03$). The between day variation was higher in ewe 1 than in ewe 2 but was reduced by MV + RV infusion. Post-mortem examination showed that in ewe 1 the tip of the PV catheter was positioned 4 cm downstream from the junction of the gastroduodenal vein (GDV)-PV while in ewe 2 it was placed 10 cm away from the GDV-PV junction.

Therefore, it seems that a double site perfusion could improve the portal blood flow estimation by reducing the between day variation mainly in the case of a PV catheter positioned too close to the GDV-PV junction. When the catheter is positioned further away from this junction, the mixture of the marker is probably adequate even in the case of a single infusion site (MV).

	Ewe 1		Ewe 2	
	Day 1	Day 2	Day 1	Day 2
<i>Blood flow (l/min)</i>				
Infusion in MV	1.66 ± 0.15	2.14 ± 0.21	2.15 ± 0.34	1.98 ± 0.25
Infusion in MV + RV	2.04 ± 0.18	2.07 ± 0.15	2.12 ± 0.21	2.26 ± 0.31
<i>Coeff. of Variation (%)</i>				
Infusion in MV	8.80	9.81	15.91	12.64
Infusion in MV + RV	8.92	7.43	9.73	13.67