

Effects of food intake and milk yield on portal and hepatic vein blood flows of high-yielding dairy cows in early lactation. D Durand ¹, J Lefaivre ², Y Chilliard ³, D Bauchart ¹ (¹ INRA, UR Métabolismes Énergétique et Lipidique; ² INRA, UR Digestion; ³ INRA, UR Lactation, Theix, 63122 St-Genès-Champanelle, France)

Hepatic blood flow may vary greatly in cows during lactation (+50–80%), thus influencing hepatic balance. Changes in portal (PBF) and hepatic (HBF) blood flows with intake and milk production were studied in high-yield dairy cows (30–50 kg/d). Previous reports utilised cows yielding 10–30 kg/d.

Three Holstein cows were catheterized for blood flow measurement (between 6–8 h after morning feeding) by dye dilution (PAH) 4–6 d *post-partum* by a modification of the method of Huntington *et al* (1989): the portal vein was catheterized by the mesenteric route and a hepatic vein was catheterized following tactile localization, incision of the Glisson's capsule and expo-

sure of the vessel by manually crushing liver cells above the vein. The location of the tip of these catheters was checked by real time ultrasound. Cows were fed with a 50% corn silage – 50% concentrate diet. The average milk yields were 27, 34 and 46 kg/day for each cow respectively in the 2nd month of lactation.

Our data showed a linear relationship between PBF or HBF and DMI or MEI, similar to previous reports but here extended to cows producing > 30 kg milk daily (table 1). Moreover, in this study the best predictive factor for PBF and HBF was milk production ($r = 0.62$ and 0.98 respectively). Indeed, 28% of the energy necessary for maintenance and milk production did not arise from MEI in these cows, but from body energy mobilization. Consequently, blood flow might be underestimated if predicted on the basis of MEI in cattle during body reserve mobilization.

References

Huntington GB, Reynold CK, Stroud BH (1989) *J Dairy Sci* 72, 1583-1595

Table 1. Linear regression coefficients ($y = a + bx$) between blood flow in the portal vein (20–34 l/min, $n = 15$) or hepatic vein (28–38 l/min, $n = 6$) and dry matter intake (DMI, 12–22 kg/d), metabolizable energy intake (MEI, 29–57 Mcal/d) or milk yield (MY, 24–48 kg/d).

	Portal vein			Hepatic vein		
	DMI	MEI	MY	DMI	MEI	MY
<i>a</i>	13.20	14.40	15.00	14.80	16.60	12.30
<i>b</i>	0.75	0.27	0.31	1.10	0.41	0.62
<i>r</i>	0.45*	0.50*	0.62**	0.71	0.82**	0.98***

* $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$.