Portal-drained viscera (PDV) and hepatic balance of energy metabolites in high-yielding cows. Effects of a fat supplement on PDV rates. Y Chilliard [1], JM Vacelet [1], D Durand [2], D Bauchart [2] *([1] INRA, UR Lactation; [2] INRA, UR Métabolismes Énergétique et Lipidique, Theix 63122, Saint-Genès-Champanelle, France)*

Blood flow measured in portal and hepatic veins (Durand *et al*, 1992) has been used to calculate post-prandial metabolite balance of PDV and liver in 3 Holstein cows (2nd month of lactation) which received *ad libitum* corn silage (50% dry matter intake, DMI) and concentrates (control period, C) and thereafter a supplement of calcium soaps composed of palm oil fatty acids (680 g/d for 12 d, fat period, F). Milk yield (kg/d), DMI (kg/d) and net energy balance (Mcal/d) were 35.7, 17.7 and –10.7 during the C period, and 37.9, 18.0 and –9.6 during the F period, respectively.

During the control period, net hepatic utilization of lactate corresponded, on a carbon basis, to 33% lactate entry rate (portal + arterial) and to 33% hepatic glucose production rate. Acetate and 3-OH-butyrate production corresponded to ≈ 30% of the net utilization of carbons from NEFA and triglyceride (TG) fatty acids.

Intake of calcium soap fatty acids tended to increase lactate and slightly decrease TG arterial concentrations. PDV acetate production rate tended to increase (+22%). TG production also tended to increase (+112%), suggesting that a significant proportion of dietary fat is drained by the portal vein (simultaneously to the lymphatic system) in ruminants, as previously suggested by Durand *et al* (1990) in preruminant calves.

References

Durand D, Bauchart D, Laplaud PM, Lefaivre J, Chapman MJ (1990) *Reprod Nutr Dev* (suppl) 2, 228s

Durand D, Lefaivre J, Chilliard Y, Bauchart D (1992) 28e Réunion AFN Dijon, Octobre 1991. *Reprod Nutr Dev* 32 (this issue)

	Art conc [1] *(mM)* (n = 3, 3 cows)		*PDV balance* [2] *(mmol/min)* (n = 3, 3 cows)		*Hepatic balance* [2,3] *(mmol/min)* (n = 6, 2 cows)
Metabolites	*C*	*F*	*C*	*F*	*C*
Glucose	3.66	3.56	+ 0.63	– 0.68	+8.82
Lactate	0.50	0.91*	+ 1.69	– 3.84	–5.87
Triglycerides	0.088	0.084*	+ 0.41	+ 0.87*	–0.42
NEFA	0.38	0.33	+ 1.36	– 0.16	–3.82
3-OH-Butyrate	0.90	0.70	+ 7.11#	+ 7.60#	+5.07
Acetate	1.97	2.18	+37.34#	+45.40*#	+3.03

[1] Arterial concentration; C = control; F : fat supplementation; * = F different from C, $P < 0.125$; NEFA = non-esterified fatty acids; # = value different from 0, $P < 0.125$; [2] +, apparent production; –, apparent captation; [3] milk yield, DMI and net energy balance were 29.1 kg/d, 15.7 kg/d and –9.3 Mcal/d, respectively for these 2 cows.