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Importance of the portal venous pathway to the transport of intestinal triglyceride-rich lipoproteins in the preruminant calf

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It is generally accepted that intestinal triglycerides are secreted into lymphatics mainly as chylomicrons (CM) but also as very-low density lipoproteins (VLDL). In the preruminant calf, we recently observed the presence of triglyceride-rich particles ($d < 1.018$ g/ml) in portal venous blood (Bauchart *et al*, 1989). In order to evaluate the contribution of the portal vein to the transport of intestinal VLDL and CM, two 3 wk old Friesian male calves (51 ± 4 kg; 650 g/d body weight gain) were equipped with 3 chronic cannulae (portal vein (PV), mesenteric artery (MA) and intestinal lymph duct (ILD)) and an electromagnetic flow probe (PV). The animals were fed a milk substitute (22% tallow, 23% protein) twice daily. On the day of the experiment, the animals were given the morning meal only. Blood and lymph samples were then collected 3, 8 and 16 h after feeding. CM and VLDL were isolated by ultracentrifugal

flotation. Total intestinal production (PV + ILD - MA) of CM amounted to about 4 g/h at peak absorption of lipids (8 h after a meal) but only 1.3 g/h some 8 h later (table I). The same kinetics were observed for VLDL. Under these conditions, we observed an important and significant contribution of the portal vein (PV/(PV + ILD) \times 100) to lipid transport principally at peak absorption for CM (67%) and at the 3 time points for VLDL (50–80%). These results might be partially due to a slow intestinal lipid absorption such as occurs in the preruminant calf fed a milk diet which coagulates in the abomasum. Indeed, as has been previously shown in the rat, a slow infusion of long-chain fatty acids into the duodenum leads to a preferential transport of these acids (60–70%) in the portal vein.

Bauchart D, Durand D, Laplaud PM, Forgez P, Goulinet S, Chapman MJ (1989) *J Lipid Res* 30, 1499-1514

Table I. Contribution of the portal vein to the intestinal production of chylomicrons and VLDL in the calf ($n = 2$).

	Chylomicrons			VLDL		
Hours after meal	3	8	16	3	8	16
Total intestinal production (g/h)	3.6	4.2	1.3	5.1	17.3	2.1
Portal contribution (%)	41	67	20	51	58	80