

Spontaneous secretion of lipoprotein lipase by bovine and ovine adipose tissue incubated for 7 days with or without insulin and dexamethasone

Y Faulconnier, Y Chilliard

INRA, Laboratoire Sous-Nutrition des Ruminants, 63122 St-Genès-Champanelle, France

The secretion of lipoprotein lipase (LPL) by adipose cells into the incubation medium differs with *in vivo* nutritional conditions, duration of incubation, and *in vitro* factors such as insulin, serum, heparin (Garfinkel *et al*, 1976, *Bioch Biophys Acta*, 424, 147-156 ; Pradines-Figuères *et al*, 1988, *Biochem Biophys Res Commun*, 154, 982-990). The first objective of the present study was to measure the secretion of LPL activity by bovine and ovine adipose tissue (AT) explants incubated for 7 days (d) and to compare it to tissue LPL activity during the same duration of incubation. Moreover, the addition of insulin (INS) plus dexamethasone (DEX) to the incubation medium increased the tissue LPL activity (Faulconnier and Chilliard, 1995, *Proc Nutr Soc*, 54 (1), in press). So, the second objective was to study the effect of these two hormones on secreted LPL activity.

The LPL activities were studied on perirenal AT from non-lactating non-pregnant Holstein cows (n = 5) and ewes of the synthetic INRA-401 breed (n = 5), as described by Faulconnier and Chilliard (1995).

Explants of AT were taken at the time of slaughter, placed immediately at 37°C and cultured in sterile conditions with or without INS (2 mU/ml) and/or DEX (100 nM) for 1, 2, 4 and 7 d. The culture medium was changed once daily. The daily secretion of LPL and the total tissue LPL extractable in detergent (tissue LPL) activities were measured at 37°C with an artificial emulsion

containing [³H] triolein (Faulconnier *et al*, 1994, *J Anim Sci*, 72, 184-191).

In basal conditions the secreted LPL activity, at 24 h of incubation, tended to be greater in bovine than in ovine (38 vs 16 nmol/min per 10⁶ adipocytes) AT, whereas initial tissue LPL activity was higher (P<0.10) in ewes than in cows. This relatively important secretion of LPL into the medium can partly explain the decrease in LPL activity observed between fresh AT (day 0) and explants after 24 h *in vitro* (Faulconnier *et al*, 1994).

Then secreted LPL activity decreased (-82 and -69 % in cows and ewes, respectively) between d 1 and 2 and remained low and stable from d 2 to d 7 in the two species.

The addition of INS plus DEX to the medium had no significant effect on secreted LPL activity whatever the incubation duration, whereas it significantly increased tissue LPL in the two species. INS or DEX alone did not change secreted LPL.

In conclusion, our results show that the general profile of secreted LPL by ruminant AT explants during 7 d of incubation in basal conditions was approximatively similar to that observed in tissue LPL during the same period, although secreted LPL activity was lower than tissue LPL. Moreover, the addition of INS plus DEX to the incubation medium did not change the rate of LPL secretion, whereas these hormones stimulated markedly tissue LPL activity.

Day	Cows ^a				Ewes ^a			
	Secreted LPL		Tissue LPL		Secreted LPL		Tissue LPL	
	Control	INS + DEX	Control	INS + DEX	Control	INS + DEX	Control	INS + DEX
1	38	51	nd	nd	16	19 ^b	nd	nd
2	7	14	34	70*	5	5 ^b	36	86**
4	4	3	24	44*	2	4	23	63**
7	7	3	18	39	5	2	18	69*

^a Initial (fresh AT, day 0) bovine and ovine LPL activity = 241 and 331 nmoles/min per 10⁶ adipocytes, respectively ; * , ** : significant difference between control and INS + DEX, P<0.05, 0.01, respectively ; ^b : value significantly lower (P<0.10) in ewes than in cows ; nd: not determined.