Plasma leptin and body fat in grazing Merinos fed protected canola meal or methionine

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Leptin modulates feed intake and energy balance by signalling the amount of energy available to the hypothalamus (1). Supplementing sheep with methionine (Met) or canola meal (CM) protected from degredation in the rumen increases wool growth and liveweight and may increase feed intake (2). These dietary and production effects could be associated with changes in leptin secretion. We tested this hypothesis in 2 genotypes of young Merinos supplemented with protected CM (PCM), protected Met (RPM) or lupins for 7 months.

Fine-wool (n=80) and medium-wool (n=80) grazing Merino weaner wethers were allocated to 1 of 4 treatments. The control group received 50 g/d of lupins (increased to 100 g/d after February). The other 3 groups received the same lupin supplement plus either 100 g/d lupins or 2.5 g/d RPM (Smartamine, Rhone Poulenc) or 100 g/d formaldehyde-treated CM. The supplements were fed 3 times per week from November to June. Blood was collected monthly from 20 sheep per treatment (10 per genotype) for determination of leptin in plasma (4). Body composition of 10 sheep per treatment was estimated using D_2O in March and September.

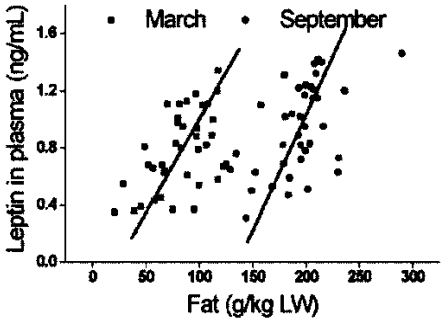

Figure 1: Plasma leptin and body fat.

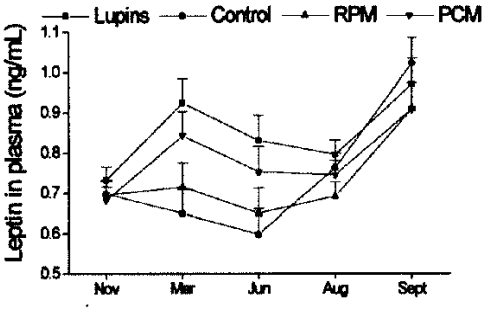

Figure 2: Plasma leptin in sheep fed 4 supplements

Fine-wool sheep had a higher plasma leptin concentration and body fat in March (leptin:0.85 vs 0.71 ng/mL $P<0.05$, fat: 99.9 vs 71.9 g/kg liveweight, $P<0.01$) and September (leptin:1.08 vs 0.82 ng/mL, $P<0.001$, fat: 206 vx 175 g/kg liveweight, $P<0.01$) than the medium-wool sheep. In both genotypes, the relationship between fat and leptin was similar but the amount of leptin produced per unit of body fat was lower in September than in March (figure 1). Lupin and PCM fed sheep had higher leptin concentrations during the treatment period (figure 2, $P<0.01$) but the fat content was not affected by nutritional treatment. We conclude that changes in plasma leptin are associated with changes in body fat, energy supply and possibly genotype.

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