

## HIGH FLEECE WEIGHT SHEEP HAVE LOWER PLASMA GLUCOSE AND INSULIN

J.R. BRIEGEL<sup>A</sup>, N.R. ADAMS<sup>A</sup> and J.C. GREEFF<sup>B</sup>

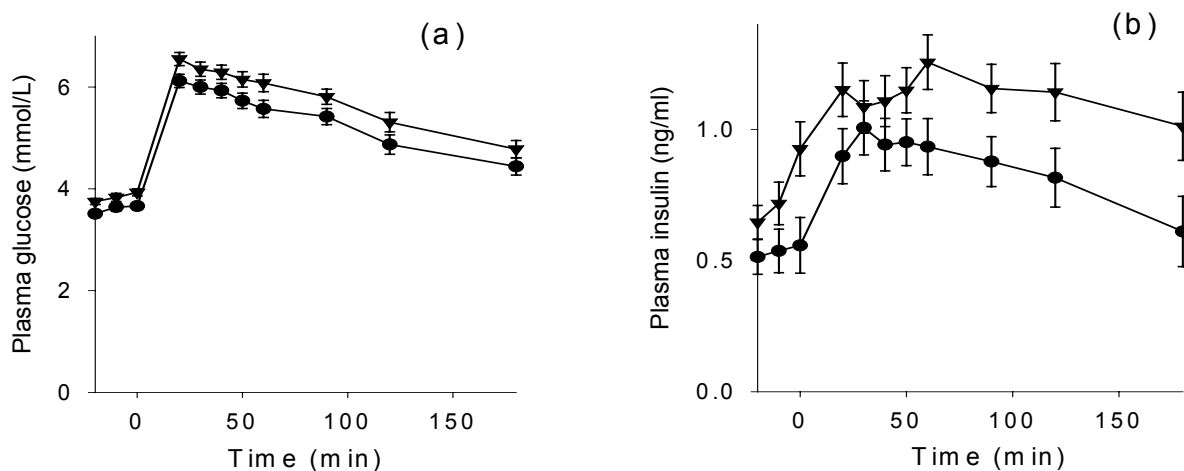
<sup>A</sup> Australian Sheep CRC and CSIRO Livestock Industries, Private Bag 5, Wembley, WA 6913

<sup>B</sup> Australian Sheep CRC and Dept Agriculture Western Australia, Dore St, Katanning, WA 6317

In previous experiments, we had found that plasma insulin concentrations were lower in high fleece weight sheep, but fleece weight was poorly correlated with plasma glucose concentrations. The study reported here tested the glucose/insulin relationship with an adrenaline challenge, since adrenaline is known to affect plasma glucose concentrations.

Four groups each of 10 ewes aged 20 months were selected from the Western Australian Department of Agriculture Katanning Base Flock. Animals were selected primarily on their estimated breeding value for high or low clean fleece weight (CFW) and also for their high or low fibre diameter (FD). The experiment was a 2x2 factorial design. The ewes were fitted with bilateral jugular catheters and 24 hours later were infused with a bolus dose of adrenaline (Adrenaline Injection®, Astra) at 10 µg/kg liveweight. The dose we used (10 µg/kg) was within the physiological range. Three blood samples were collected before the challenge, and then at 10, 20, 30, 40, 50, 60, 90, 120 and 180 min. All infusions and associated blood samplings were carried out before feeding the daily ration.

After the challenge with adrenaline, plasma glucose was lower in the high CFW sheep throughout the experimental period ( $P < 0.05$ ), and there was no interaction with time (Figure 1a). There was no effect of FD on glucose concentration with an adrenaline challenge. Plasma insulin was also lower in the high CFW sheep, both before the challenge ( $P = 0.03$ ), and for the entire experimental period ( $P < 0.05$ ; Figure 1b). Both groups responded similarly, so there was no interaction with time.



**Figure 1. Plasma concentrations of (a) glucose and (b) insulin in the high (●) and low (▼) fleece weight groups injected with adrenaline at time 0.**

In the present experiment, plasma glucose concentrations were lower in the high CFW group. The coordinated nature of the response to adrenaline indicates that high and low CFW sheep are equally sensitive to an adrenaline challenge. The results indicate that the reduced glucose production rate in high fleece weight sheep (Bermingham *et al.* 2004) is sufficient to lower plasma concentrations of glucose and insulin.

BERMINGHAM, E.N., LIU, S.M., BRIEGEL, J.R., GREEFF, J.C. and ADAMS, N.R. (2004) *Anim. Prod. Aust.* 25, (This proceedings).

Email: Jan.Briegel@csiro.au