

The effects of dietary protein on rat growth, body composition and insulin sensitivity

D Belobrajdic^{1,2}, G McIntosh^{1,2}, J Owens¹

¹ University of Adelaide, School of Molecular and Biomedical Sciences, Discipline of Physiology, Adelaide, SA, 5000

² CSIRO Health Sciences & Nutrition, PO Box 10041, Adelaide, SA, 5000

Background - Recent literature suggests that a high protein diet may reduce body weight and improve insulin sensitivity in people with insulin resistance, non-insulin dependant diabetes mellitus and obesity. The impact of protein type in a high protein diet on body weight, composition and insulin sensitivity has not been investigated.

Objective – To determine whether a high protein diet (32%) containing whey protein will reduce body weight and fat depots and improve insulin sensitivity to a greater extent than red meat in Wistar rats made insulin resistant by a high fat diet.

Design – Mature (9wk old) Wistar rats were fed a high fat diet (30%w/w) for nine weeks to induce insulin resistance. Rats were then randomly allocated to a diet containing either 8 or 32% protein as whey protein concentrate or red meat (barbequed kangaroo muscle meat), for 6 weeks. At autopsy, blood was collected to measure plasma glucose, triglyceride, free fatty acids and insulin concentration. Liver and fat pads were removed and weighed.

Outcomes – The high density protein diets reduced energy intake by 19% ($p<0.001$) and visceral and subcutaneous fat depots by 23 and 26% respectively ($p<0.001$). The 32% whey protein fed animals lost 10% more weight than 32% red meat fed animals ($p<0.01$). Whey protein fed rats had reduced fasting plasma insulin concentration ($p<0.05$) and plasma insulin/glucose ratio ($p<0.05$).

Conclusion - The high protein diet was effective in reducing energy intake and body fat depots. Whey protein (32%) diet was more effective than red meat in improving insulin sensitivity and reducing body weight gain.