

ABSTRACT

**Evidence for preadipocyte proliferation during culture of subcutaneous and intramuscular adipose tissues from Angus and Wagyu crossbred steers**

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The primary objective of this study was to provide evidence for preadipocyte proliferation during culture of adipose tissue explants; a secondary objective was to compare the lipogenic activity and cellularity of adipose tissues from American Wagyu crossbred steers. Subcutaneous (s.c.) and intramuscular (i.m.) adipose tissues were obtained at slaughter from the 2nd to 6th lumbar region of the loin from Angus (n = 10) and Wagyu crossbred steers (n = 10) that had been fed for 552 d by typical Japanese production standards. Adipose tissue explants were incubated 36 h with [3H]thymidine in the absence and presence of aphidicolin (a specific inhibitor of genomic DNA replication). Adipocytes were liberated by collagenase treatment and [3H]thymidine incorporation into DNA was measured. Whereas there were no significant differences between adipose tissue depots, Wagyu s.c. and i.m. preadipocytes and stromal-vascular cells exhibited greater ( $P < .05$ ) [3H]thymidine incorporation into DNA than adipocytes from Angus steers. Intramuscular adipose tissue from both breeds exhibited lower ( $P < .05$ ) rates of lipogenesis from acetate both before and after long-term (36-h) incubation than s.c. adipose tissue. Furthermore, i.m. adipocytes were smaller ( $P < .05$ ) than s.c. adipocytes. The activities of fatty acid synthetase and glucose-6-phosphate dehydrogenase were greater ( $P < .05$ ) in Wagyu s.c. adipose tissue and less in Wagyu i.m. adipose tissue than in corresponding Angus tissues. There were no differences between breed types ( $P = .17$ ) in rates of lipogenesis from acetate, either before or after explant culture.