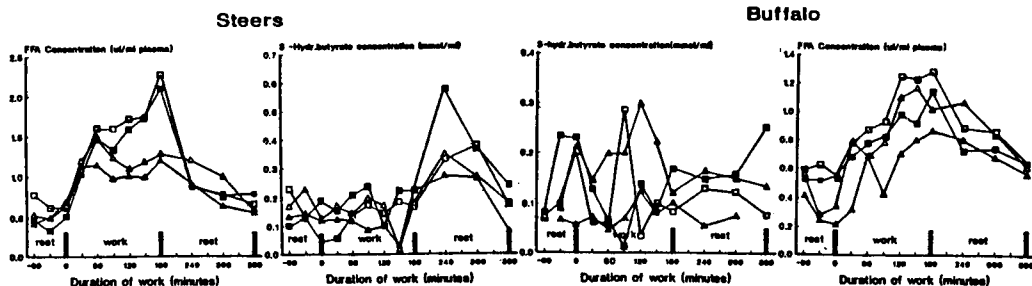


ARTERIO-VEIN CONCENTRATION DIFFERENCES OF PLASMA FREE FATTY ACIDS AND
3-HYDROXYBUTYRATE ACROSS THE HIND-LIMB MUSCLES OF THE WORKING RUMINANT

KARTIARSO and E. TELENI

In a previous study (Kartiarso et al. 1987) it was suggested that free fatty acids (FFA) are important substrates in the working ruminant. This communication reports on the effect of work on the pattern of arterio-venous (A-V) concentration differences of plasma FFA and 3-hydroxybutyrate (3HB) across the hind-limb muscles of thin and fat buffaloes and cattle.

Four steers and four buffaloes were used in a switch-over experimental design in which measurements were made on each animal when it was thin and fat. The animals were each surgically prepared with indwelling catheters in an external jugular vein, lateral saphenous vein and femoral artery to facilitate A-V concentration difference measurement. Measurements were made on each animal in the one-hour pre-work period, during the three-hour work period when the animal was made to walk on a treadmill at 2.5 km/h and pulling a draught load of 33 kg, and during the recovery period which was three hours immediately after work stopped. The patterns of plasma concentrations of FFA and 3HB in the hind-limb artery (\square) and vein (\blacksquare) of thin buffaloes and steers, and in the artery (\triangle) and vein (\blacktriangle) of the same animals when fat are shown in the figures below.



There were increases in A-V FFA concentrations during work; the increases being greater in the thin than in fat animals and greater in cattle than in buffaloes. The A-V concentration differences, however, did not appear to change significantly with change in physiological state, but were greater in fat than in thin animals, and greater in buffaloes than in cattle of corresponding body condition. Concentrations of 3HB were much more variable than those of FFA. The general trend was an increase in concentrations towards the end of the work period and into the recovery period. There was output of 3HB from muscles of thin animals whereas the same metabolite was taken up by muscles of fat animals. The uptake was particularly large in buffaloes relative to that in cattle.

The importance of FFA and 3HB in working muscles has been re-emphasised, particularly by the A-V pattern observed in fat buffaloes.

KARTIARSO, BAKRIE, B., HOUSTON, E., MURRAY, R.M. and TELENI, E. (1987). *Proc. Nutr. Soc. Aust.* 12: 134.

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