Vaccination with an Insulin-like Growth Factor Binding Protein-1 (IGFBP-1)-Based Vaccine Improves Growth in Feed-Restricted Brahman Steers.

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Dry-season weight loss in grazing cattle in northern Australia has been attenuated using a number of strategies (Hunter and Vercoe, 1987, Sillence et al. 1993, Gazzola and Hunter, 1999). Furthermore, the potential to improve efficiency of feed utilisation (and thus, dry-season performance) in ruminants through conventional modulation of the insulin-like growth factor (IGF) axis (Oddy and Owens, 1997, Hill et al., 1999) and through immunomodulation of the IGF axis (Hill et al., 1998a,b) has been demonstrated. The present study investigated the use of a vaccine directed against IGFBP-1 in Brahman steers which underwent a period of nutritional restriction followed by a return to wet-season grazing.

Twenty-four steers (273 ± 13 kg) were allocated on feed intake (FI) and body weight (BW) to one of 3 treatments in a randomised complete block design. Steers were in individual pens and fed low quality Rhodes grass hay for two weeks prior to treatment, and then for ten weeks of the treatment period. Although 3 treatments were used in the study, only results from 2 of these are reported here. Steers were given IGFBP-1 vaccine (80 μg per dose) in BioAdjuvant (Vet BioSearch, Mt Eliza, Victoria), or no vaccine during weeks 1, 4 and 7. Immediately prior to vaccination and during week 10, steers were bled from the tail vein. Steers were weighed weekly for the ten weeks of treatment. Individual steers were monitored daily for FI and faecal output, and dry matter digestibility (DMD) was calculated weekly. Plasma was analysed for antibody titre, IGF-1 and urea. Following this period of restricted nutrition in pens, steers were returned to positive growth, showing a period of compensatory gain and increased variability in BW. During this period there was little difference in BW between the groups but by week 50 the IGFBP-1 vaccinated group were heavier (P<0.05) than the control group (353 vs 342 kg respectively).

Vaccination with IGFBP-1 vaccine reduced BW loss during restricted feeding, however, the mechanism is not well understood. Steers developed only low specific antibody titres in plasma, thus, the mechanism of action may not be humoral. An alternative hypothesis is that antibody secretion is directed into the gut, having a direct action on absorption. The small improvement in BW preservation may not have been detected in DMD due to a lack of sensitivity of the technique.

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