

Interaction between lameness, reproduction and the HPA axis

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The hypothalamo-pituitary-adrenal axis (HPA) response to lameness is not as well characterised as responses to acute stimuli such as hypoglycaemia, endotoxaemia or transportation. Although basal cortisol secretion and response to a novel stimulus are similar in lame and non-lame cows, the cortisol response to a subsequent stimulus is not reduced by habituation suggesting subtle modifications to the HPA axis. Adrenal progesterone may block or delay LH surge and uncouple ovulation from oestrus behaviour in models of acute stress but its significance in lameness has yet to be determined.

Lame cows have reduced CL function and lower progesterone concentration reducing progesterone priming of oestrus behaviour. Progesterone supplementation during the previous oestrous cycle reverses the effect of lameness suggesting this may be the primary lesion.

Seventy eight percent of moderately lame animals ovulated at a synchronised oestrous. If animals additionally had a milk somatic cell count over 100,000 cell/ml, that on its own does not affect the likelihood of ovulation, only 48% ovulated. This synergistic effect of two moderate stressors increasing the detrimental impact on fertility has been noted in a further observational study on commercial farms suggesting farmers could underestimate the impact of multiple mild stressors on fertility. Lame cows have reduced mounting activity also exhibiting less secondary oestrus signs such as sniffing the vulva of other cows. Lame cows are also less likely to be detected in oestrus by automated activity systems. These systems could detect lameness early and possibly modify the optimum timing of AI in stressed animals. Lameness is associated with reduced body condition score. The debate as to which comes first has been clarified with the finding that reduction in digital fat pad thickness in thinner cows is a risk factor for lameness and temporal relationship suggest reduced body condition leads to lameness. Fertility is reduced in animals in these studies but the relative importance of body condition score loss and lameness needs verification.

High prevalence of lameness and poor fertility are major challenges to the dairy industry. Their close association suggests that to make progress in both areas they should not be studied in isolation.

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