

Effect of Environment and Diet on Endocrine Responses in Calves

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Experiments are currently underway at the Southwestern Livestock and Forage Research Station to evaluate the effects of common management practices on hormones in blood of cattle. Endocrinologists have found that changes in hormones often precede changes in body growth, and they have proposed that hormone data can be used to pinpoint management practices that minimize stress and maximize growth rates in beef cattle. Therefore, the principle objective of these studies is to determine if thyroid, pituitary and/or adrenal hormones are changed by weaning, transporting, changing feed composition or changing time of day of feeding cattle.

To date, hormone information has been collected from cattle which were part of feeding trials conducted under simulated feedlot conditions. In one study, four spring-weaned and four fall-weaned Charolais steers were sampled after 0, 7, 14, 28 and 56 days of high quality forage (HF; 60 percent digestible dry matter (DDM)) or low quality forage (LF; 50 percent DDM) growing rations. Glucocorticoids (CORT) decreased ($P < .05$) from day 0 to 7, and thyroxine (T₄) decreased ($P < .01$) from day 0 to 14. Hormones were not affected ($P > .10$) by age of steer or forage quality. In a second study, CORT and T₄ were measured in samples obtained at 0, 14, 28 and 56 days after eight Charolais and eight Angus steers were switched from HF or LF to 76 percent DDM feedlot diets. Concentrations of both hormones increased ($P < .01$) between days 0 and 56; however, neither breed of steer nor prior diet affected ($P > .10$) CORT and T₄ concentrations.

Additional studies have been conducted using 8-16 head of weanling steers in light and temperature controlled chambers. In previous studies, both light and temperature affected hormone concentrations. Since ambient temperatures can change rapidly within a day, as well as from day to day, control of temperatures is important so we can observe effects of other environmental factors which may change normal concentrations of hormones. Data collected from cattle in environmental chambers will pinpoint management practices which change hormone concentrations. Ideally, studies will then be designed to test these management practices using larger numbers of cattle under normal environmental conditions, with emphasis on growth rate rather than hormone information.

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