

ADRENOCORTICOTROPHIC HORMONE CHALLENGE IN FREE RANGING RED DEER (*CERVUS ELAPHUS*).

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Adaptation to chronic stress has been assessed in a variety of species by measurement of adrenocortical response to adrenocorticotrophic hormone (ACTH) challenge. To date, adrenal function in red deer has only been determined in either chemically or physically restrained animals^(1,2). However, the effect of the associated stressors (handling and restraint) on the HPA axis may make meaningful interpretation of such data difficult. To avoid the need to handle animals for blood sampling, a remote blood collection and infusion device (Dracpac)⁽³⁾ has been developed for use on free-ranging animals. This device was used for infusion of ACTH₁₋₂₄ (Synacthen, Ciba-Geigy) and collection of blood for subsequent plasma cortisol analysis.

Twelve 2 year old red deer stags were infused with a range of ACTH doses (0 (saline), 1, 4 and 16 IU / 100 kg) at pasture, 3.5 hours after release from the yarding facility. Eleven, 20-minute continuous blood samples were collected starting at 2 pm. The bolus ACTH dose (in 2 ml physiological saline) was given at the start of the second blood sample. At the end of the sampling period the animals were yarded, the blood samples removed and prepared for later analysis.

There was no detectable plasma cortisol response to infusion of saline alone with a mean value of 7.5 ± 0.7 ng/ml (N=5). In the animals given ACTH, plasma cortisol increased from a mean baseline of 6.6 ± 0.2 ng/ml (N=19), to peak mean levels of 26.3 ± 4.7 (N=6), 38.3 ± 3.7 (N=6), and 43.2 ± 2.8 (N=7) ng/ml for ACTH doses of 1, 4 and 16 IU / 100 kg respectively. Peak values were measured in the third blood sample, ie 20 to 40 minutes post-infusion. Mean plasma cortisol levels returned to pre-infusion values by 80, 120 and 180 minutes post-infusion in the 1, 4, and 16 IU ACTH treatments, respectively. The total area under the curve (as a measure of total cortisol response after ACTH infusion) increased to 99.2 ± 14.2 , 162.5 ± 20.2 , and 239.8 ± 26.5 for 1, 4 and 16 IU ACTH respectively.

Although there was some variation in cortisol response between individuals, the results indicate that the technique for remote infusion of ACTH and blood sampling is stress free (since mean basal levels were less than 10 ng/ml and there was no response to saline infusion), and sensitive (a dose as low as 1 IU ACTH/100 kg liveweight produced a significant cortisol response). The magnitude of the cortisol response to increasing doses of ACTH appeared to plateau at the highest doses used, however, the duration of the cortisol response was more prolonged with increasing doses of ACTH. It is now possible using the remote infusion and blood sampling device to assess adrenal function in non tamed, free ranging, unstressed animals under various management regimes.

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- 2) Goddard PJ, Rhind SM, Hanlon AJ, Hamilton WJ. 1994. Proc. Deer Course for Vets. Deer Branch Course No. 11, Queenstown. pp 147-155.
- 3) Ingram JR, Matthews LR, McDonald RM. 1994. *Proc. NZ. Soc. Ani. Prod.* 54: 39-42.