LH AND TESTOSTERONE FROM STAGS ON A MANIPULATED PHOTOPERIOD

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Deer exposed to artificially alternating periods of 60 long and 60 short days are capable of growing 3 sets of antlers in one calendar year (1). The present study investigated the role of secretion of LH and testosterone in determining these cycles. Six red deer stags were kept in a light proof room on an artificial photoperiod of 2 months of 8 hours light and 16 hours dark (8L:16D) per day followed by 2 months of 16L:8D per day, alternating for 4 cycles. At 2-3 weekly intervals the stags were anaesthetised with Rompun (Bayer Ltd) and challenged i.v. with 10 µg GnRH. Blood samples were withdrawn immediately prior to injection and 10 and 60 minutes after. LH and testosterone were measured on all samples by RIA. Antler status was recorded daily.

Peak LH levels on each sampling day occurred at the sample taken 10 minutes after GnRH stimulation; peak testosterone occurred in the sample taken 60 minutes after. There were 4 cycles of LH and testosterone secretion accompanied by 4 antler cycles in the stags.

The highest LH responses were detected during short days (8L:16D), the highest testosterone responses were detected soon after the change from short to long days. The responses of both hormones were lowest at the end of the period of long days.

The stags were capable of responding within 3 weeks of exposure to short days (stimulatory for gonadal development) by increasing the pituitary LH response to GnRH. Some stags also showed an increased capacity to secrete LH but not testosterone when photoperiod changed from short to long days. The LH response resulted in testosterone release, followed by a reduction in LH release, although the amplitude of the response declined during the study. Antler casting occurred at the end of long days and cleaning at the beginning of long days. It is considered that antler cycles are due to the capability of the stags to release LH and testosterone in response to the artificial photoperiod.

1. Goss R J (1969) J. Exp. Zool. 170:311-314