THE EFFECT OF TESTOSTERONE AND SEASON ON PRODYNORPHIN mRNA EXPRESSION IN THE PREOPTIC AREA-HYPOTHALAMUS OF THE RAM

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Progesterone stimulates prodynorphin mRNA expression in the hypothalamus of the ewe (1), but whether testosterone regulates dynorphin gene expression in the ram is unknown. In a previous study (2), we showed that both testosterone and season influence mRNA expression of another opioid, enkephalin, in the preoptic area and hypothalamus of rams. Using tissue from the same study, we tested the hypothesis that testosterone and/or season modulate prodynorphin mRNA expression in specific areas of the hypothalamus in the ram. Adult Romney Marsh rams were castrated either during the 'breeding' season or 'non-breeding' season and 1 week later received intramuscular injections of either peanut oil (vehicle) or testosterone propionate (8 mg/12 h for 7 days) (5/group). Blood samples taken every 10 min for 12 h were assayed for plasma LH and testosterone. Prodynorphin mRNA expression was quantified in hypothalamic sections by *in situ* hybridisation using a ^{35}S-labelled riboprobe and computer-aided image analysis. Plasma testosterone levels were higher in testosterone propionate-treated than oil-treated sheep. Mean plasma LH concentrations were reduced and the interpulse interval for LH pulses was greater in testosterone propionate-treated wethers compared to oil-treated wethers, with no change in LH pulse amplitude. Testosterone propionate treatment increased prodynorphin mRNA expression in the supraoptic nucleus and the bed nucleus of the stria terminalis, but only during the breeding season. Proenkephalin mRNA expression was also higher in the 'breeding' season than in the 'non-breeding' season in the caudal preoptic area and paraventricular nucleus. No differences were observed between treatments in five other regions of the hypothalamus. We conclude that testosterone and season regulate preproenkephalin mRNA levels in the preoptic area/hypothalamus in the ram in a region-specific manner.

(1) Foradori *et al.* (2002) *Proc. Soc. Neurosci.* A572.9. (2) Scott *et al.* (2003) *Biol. Reprod.* **69**, 2015–2021.

10.1071/SRB04Ab246