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## Use of a GnRH Agonist and hCG to Obtain an Index of Testosterone Secretory Capacity in the Koala (*Phascolarctos cinereus*)

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Testosterone secretion in mammals typically occurs in random pulses such that a single blood sample provides limited information on reproductive endocrine status. However, it has been shown in several species that an index of the prevailing testosterone biosynthetic capacity of the testes can be obtained by measuring the increase in circulating testosterone after injection of a GnRH agonist or human chorionic gonadotrophin (hCG). Hence, the aims of the present study were to examine fluctuations in testosterone secretion in the koala ( $n = 6$ ) over a 24-hour period and then characterise testosterone secretion after injection of the GnRH agonist buserelin (4  $\mu\text{g}$ ) or hCG (1000 IU). The latter was used to establish an index of the prevailing testosterone biosynthetic capacity of the koala testis. Individual koalas showed major changes in blood testosterone concentrations over 24 hours, but there was no apparent diurnal pattern of testosterone secretion ( $P > .05$ ). Injection of buserelin and hCG resulted in an increase ( $P < .05$ ) in blood testosterone concentration. After injection of exogenous hormone, near maximal concentrations of testosterone occurred at around 60 minutes. There was a tendency for plasma testosterone to decline after 90 minutes with buserelin, but concentrations remained close to the upper limit for 240 minutes with hCG. There were strong positive correlations between the average testosterone concentration over 24 hours and the maximum observed testosterone concentration after stimulation with GnRH and hCG (GnRH,  $r = .772$ ;  $P = .07$  and hCG,  $r = 1.0$ ;  $P < .01$ ). The findings in the present study confirmed that individual male koalas can show large fluctuations in blood testosterone concentrations over time and that a GnRH agonist and hCG can be used in the koala to obtain an index of the prevailing steroidogenic capacity of the testes.

Key words: Marsupial, hormone stimulation test

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