

Effect of ACTH (tetracosactide) on steroid hormone levels in the mare. Part B: effect in ovariectomized mares (including estrous behavior)

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Abstract

The mare is the only non-primate species known to display estrous signs after ovariectomy and adrenal hormones have been implicated as a possible cause. Moreover, in several species, estradiol seems to have a stimulatory effect on the hypothalamic-pituitary-adrenal axis. The aim of the present study was to compare the effect of ACTH (tetracosactide) on pertinent hormones [cortisol, progesterone, androstenedione, testosterone (intact and ovariectomized mares) and estradiol (ovariectomized mares only)] in intact mares in estrus with the same mares after ovariectomy (n=5). Blood samples were collected hourly from 12:00 until 14:00 h the following day (half-hourly between 14:00 and 17:00 h) on two occasions, with saline or ACTH treatment at 14:00 h (saline treatment day or ACTH treatment day). The mares, both when intact and after ovariectomy, showed a significant increase in all measured hormones, except estradiol (not measured in intact mares), after ACTH treatment, lasting at least 3h post-treatment ($P<0.001$). On the saline treatment day, cortisol levels in ovariectomized mares were lower than in intact mares in the evening (18:00-23:00 h), but higher at night (24:00-05:00 h). No differences in cortisol response between mares, when intact and after ovariectomy, were found after ACTH treatment ($P=0.3$). Androstenedione levels were lower ($P<0.001$) and increased less after ACTH treatment in ovariectomized mares, as compared to when intact ($P<0.05$). Progesterone concentrations were lower in the ovariectomized mares at night (24:00-05:00 h) on the saline treatment day and at all times on the ACTH treatment day ($P<0.05$). Testosterone concentrations were lower in ovariectomized mares on both treatment days, as compared to when intact ($P<0.001$). It was concluded that ovariectomy affected basal cortisol pattern. Ovarian androstenedione and testosterone contributed to the basal circulating levels and, in the case of androstenedione, was stimulated by ACTH. Endogenous estradiol did not act stimulatory on adrenal gland hormone production in the mare.