

Responsiveness of Anestrous Labrador Bitches to GnRH (39618)

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Several studies have indicated that hypothalamic gonadotropin-releasing hormone (GnRH) can induce release of luteinizing hormone (LH) into the peripheral circulation in rats (1), hamsters (2), sheep (3), cattle (4), and in primates including man (5, 6). Effectiveness of GnRH to release LH in the canine, however, has not been reported. Dogs have been used extensively as a model animal in biological research and particularly in medical research. Many breeds of dogs have relatively long periods of postpartum anestrus, and induction of ovulation and pregnancy could improve their breeding performance. The present experiment was undertaken to evaluate the ability of anestrous bitches to respond to varying levels of synthetic GnRH.

Materials and methods. Twelve purebred Labrador bitches having a mean body weight of 27.8 kg were assigned at random to four groups in equal numbers. All animals have whelped at least once and were between 1 to 2 months following the last whelping at the time of the experiment. Vaginal smears were checked from each animal prior to the initiation of the experiment to ensure that all the animals were in anestrus. Each animal in all four groups was injected im with 1 ml of saline or 1 ml of saline containing varying amounts of GnRH (Abbott Laboratories) as follows: group I, saline only; group II, 5 μ g of GnRH; group III, 25 μ g of GnRH; and group IV, 50 μ g of GnRH. Blood samples were collected immediately before the injection and at 15, 30, 60, 90, 120, 240, and 360 min following the injection of GnRH or saline from each animal by jugular puncture. Blood samples were allowed to clot and were stored at 4° overnight, and the serum was separated by centrifugation and stored frozen until as-

sayed. All samples were analyzed for serum LH content using a double-antibody radioimmunoassay for canine LH (7). A highly purified ovine pituitary LH preparation (LER-1056-C2) was used for iodination and a canine LH preparation (LER-1685-1) was used as the standard. The difference between pre- and post-treatment peak serum LH concentration (Δ LH) of each animal was used as an index of relative LH-releasing potency of different doses of GnRH. These data on Δ LH were then subjected to a linear regression analysis (8).

Results and discussion. All animals treated with GnRH showed an immediate increase in the serum levels of LH (Fig. 1). Animals treated with 5 and 25 μ g of GnRH exhibited mean peak levels of 8.5 ± 3.2 and 18.7 ± 3.2 ng/ml, respectively, at 15-min following treatment. Serum LH levels returned to pretreatment levels by 2 hr following treatment in these groups of animals. Significant increases in serum LH concentrations within 15-30 min of treatment have been previously reported in pigs (9) and sheep (10).

Animals treated with 50 μ g of GnRH showed a mean peak LH level of 39.7 ± 7.8 ng/ml at 30 min postinjection and returned to the pretreatment level after 4 hr. Similar observations have been made where higher levels of GnRH have resulted in both an increase in serum LH levels and duration of LH response (4). A peak LH level of 35.5 ng/ml during estrus has been reported in the beagle bitch (7). Saline-treated animals showed no prolonged elevated release of LH, although spontaneous releases of 6.1 and 3.8 ng/ml of LH were detected in two such animals. Treatment of anestrous bitches with varying doses of GnRH resulted in a linear response in serum LH increment (Fig. 2). The mean serum Δ LH responses to treatment with 5, 25, and 50 μ g of GnRH were 6.5 ± 0.5 , 17.2 ± 3.7 , and 44.6 ± 7.8 ng/ml, respectively. Similar

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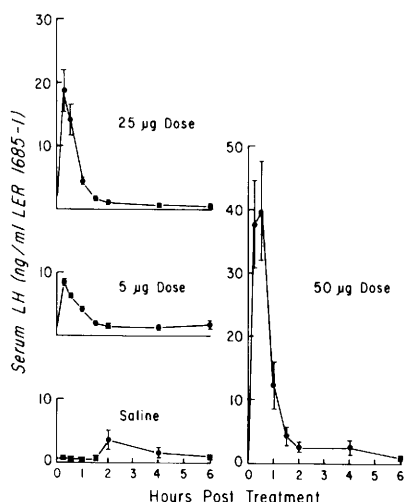


FIG. 1. Serum LH levels of anestrus Labrador bitches following injection of saline or varying doses of GnRH. Vertical bars indicate standard error of the mean.

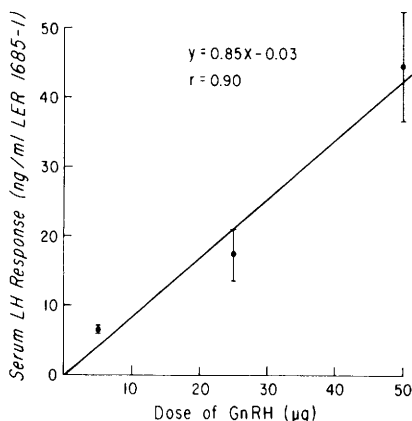


FIG. 2. Dose-response regression line for GnRH expressed as serum LH increment in anestrus Labrador bitches. Vertical bars indicate standard error of the mean.

dose-response relationships with GnRH treatment in cattle have been reported earlier (4). The regression line predicting the ΔLH to a given dose of GnRH is given by the equation $Y = 0.85X - 0.03$ (where $X =$

dose and $Y = \Delta LH$). In the present study, a 50- μg dose of GnRH elicited a serum LH response in anestrus Labrador bitches which was similar to or higher than previously reported preovulatory surges of serum LH in the canine.

Summary. Serum LH concentrations of anestrus Labrador bitches treated with 5 or 25 μg of GnRH reached mean peak levels of 8.5 ± 0.5 and 18.7 ± 3.2 ng/ml, respectively, at 15 min following a single im injection. Animals treated with 50 μg of GnRH exhibited a peak LH concentration of 39.7 ± 7.8 ng/ml at 30 min post-treatment. A linear dose-response relationship was observed between the doses of 5 and 50 μg .

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