ABSTRACTS

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EFFECTS OF SHORT TERM HYPER- AND HYPOPROLACTINEMIA ON HORMONES OF THE PITUITARY GONAD AND –THYROID AXIS AND ON SEMEN QUALITY IN MALE BEAGLES

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Introduction - Little is known about the relevance of prolactin in relation to other endocrine systems regarding reproduction in the male dog. In a previous study [4] it was shown that the basal prolactin secretion could be slightly but significantly reduced by the dopamine agonist cabergoline (p<0.05). A significant prolactin release was induced by intravenous TRH administration, which was almost completely suppressed by cabergoline. The concentrations of LH and testosterone did not show a relation to prolactin and were not affected by TRH administration. In men with hyperprolactinemia, both LH and testosterone levels are reduced, implying increased sensitivity of LH release to negative testosterone feedback [1]. Hyperprolactinemia was experimentally induced in the male dog by administration of the dopamine-2-antagonist metoclopramide [2]. No data are available on the influence of hyperprolactinemia on the secretion of LH and testosterone and fertility in the dog so far. The aim of this study was to characterize the effects of a short term hyper- and hypoprolactinemia on serum concentrations of LH, testosterone and semen quality in male Beagles. Furthermore, the effect of a single intravenous TRH-injection on the secretion of prolactin, LH and testosterone as well as of TSH and thyroxin was tested under both these conditions.

Materials and methods - In six clinically healthy fertile male beagles of 1 to 4 years of age blood samples were collected at three day intervals for 12 weeks. This time span was divided into four three week periods: pre-treatment, metoclopramide (MCP) treatment (0.2 mg kg⁻¹ orally three times daily), cabergoline (CAB) treatment (5 µg/kg orally once daily), post-treatment. Semen parameters were evaluated once per week for a total of 15 weeks. At the end of each period the effects of a single intravenous injection of TRH (10 µg kg⁻¹) on the secretion of prolactin, LH, testosterone, TSH and thyroxin were investigated. Hormone analyses were performed as previously described [4].

Results and Discussion - Pre-treatment serum prolactin concentration of 4.5 ng ml⁻¹ increased under MCP to 6.5 ng ml⁻¹ (p<0.01) followed by a decrease to 3.0 ng ml⁻¹ under CAB administration (p<0.01). Mean post-treatment values were on pre-treatment level (4.4 ng ml⁻¹). In accordance with findings in men [4] LH concentrations were significantly reduced during hyperprolactinemia (p<0.05) but as in our previous study were not affected by CAB [4]. Testosterone concentrations did not show clear prolactin or LH related changes, but showed a significant reduction under CAB treatment (p<0.05). Except for curvilinear sperm velocity, which was significantly reduced during hyperprolactinemia (p<0.05), semen quality was within normal variability throughout the study.

A single intravenous TRH injection induced a significant prolactin increase at 20 minutes in all experimental periods except during CAB treatment, confirming the results of previous studies [3,4], whereas no reactions were observed for LH and testosterone. TSH concentrations were significantly increased at 20 minutes, thyroxin values at 120 and 180 minutes after TRH injection. TSH concentrations measured prior to TRH injection were
significantly lower under CAB compared with pre-treatment values (p<0.05). This difference could also be detected for thyroxin, which was still reduced in the post-treatment period, indicating a possible influence of the dopaminergic tone on the pituitary-thyroid-axis. In conclusion, the results of the present study demonstrate that administration of a dopamine-2-antagonist raised serum prolactin levels, inducing the reduction of LH and testosterone levels and did not seriously affect semen quality.

References