ABSTRACTS

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CONCENTRATIONS OF PROLACTIN, LH AND TESTOSTERONE AS WELL AS OF TSH AND THYROXIN IN MALE DOGS OF DIFFERENT BREEDS SHOWING NORMOSPERMIA

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Introduction - The physiology of prolactin secretion in intact male dogs has been the subject of a number of investigations during the last five years. A reference range (mean ±2 SD) for prolactin in male dogs between non detectable to 6 ng ml⁻¹ has been set including the prolactin values of 65 male dogs of different breeds as basis for assessing pathological conditions [2]. Breed differences have been detected with the mean prolactin concentration in Beagles being significantly higher than in crossbred and German shepherd dogs (p<0.05) [2]. Interactions between prolactin and its superior regulatory areas and the hypothalamo-pituitary-gonad and -thyroid axes are widely assumed in a variety of species, including man. Prolactin is supposed to be one of the factors modulating the pituitary sensitivity to gonadal steroid feedback [1]. Regulation of prolactin secretion involves the major dopaminergic tone and substances with prolactin-releasing activity such as TRH (for review see [4]). Thyroid function is known to contribute to reproduction processes. The physiological interactions between male gonadal and thyroid hormones are still not completely elucidated. The objective of the present study was to compare the concentrations of prolactin, LH and testosterone in male dogs of four different breeds showing normospermia and to characterise the response of a single intravenous TRH–injection on the secretion of the three hormones as well as on thyrotropin (TSH) and thyroxin.

Materials and Methods - In eight Beagles, eight Foxterriers, six Labrador Retrievers, and five Great Danes (age: 1 to 6 years) showing normospermia the concentrations of prolactin, LH and testosterone as well as of TSH and thyroxin were analysed in blood serum before and 20, 120, and 180 minutes after a single intravenous injection of TRH (10 µg kg⁻¹) [3]. For hormone determination assays were used as previously described [4].

Results - Although the overall mean prolactin concentrations did not vary between breeds, a significant difference was found between the lowest [Foxterrier dogs: 3.3 ±0.6 (2.6 to 4.2) ng ml⁻¹] and highest mean basal prolactin concentration [Great Danes: 4.5 ±1.3 (3.3 to 5.7) ng ml⁻¹]. In all dogs TRH-injection was followed by a sharp prolactin increase by 20 minutes and a subsequent about equal decrease until 120 and 180 minutes, respectively. The prolactin values measured at 180 minutes were highest in the Labradors (4.3 ±0.6 ng ml⁻¹) and lowest in the Beagles (3.6 ±0.7 ng ml⁻¹, p<0.05). Overall mean LH-concentrations were highest in the Foxterriers and lowest in the Labradors and Great Danes (p<0.05). Mean basal LH concentrations differed significantly between Foxterriers (8.2 ±4.7 ng ml⁻¹) and Beagles (4.6 ±2.7 ng ml⁻¹). In all four breeds TRH injection was followed by a decrease in LH at 20 minutes. At 120 and 180 minutes a re-increase (Beagle and Foxterrier) or a mean plateau (Labrador) or a further decrease (Great Dane) was observed. In the Foxterriers the mean testosterone concentrations were on a constantly low mean level of 0.8 ng ml⁻¹ throughout the TRH test. The values measured 120 and 180 minutes after TRH injection were significantly lower than the corresponding values of the Beagles (p<0.05). The mean testosterone concentrations of the Labradors and Great Danes varied inconsistently during the TRH test. Overall mean TSH concentrations were similar in all four breeds, but mean basal TSH values differed significantly between Foxterriers (0.10 ±0.09 ng ml⁻¹) and Great Danes (0.20 ±0.11 ng ml⁻¹).
ng ml⁻¹). As expected intravenous TRH injection was followed by a marked TSH release after 20 minutes in all breeds. The highest stimulated TSH concentrations were found in the Foxterriers (0.49 ±0.30 ng ml⁻¹), the lowest in the Beagles (0.39 ±0.12 ng ml⁻¹, p>0.05). Overall mean thyroxin concentrations differed significantly between Beagles and Great Danes. Lowest basal values were detected in the Foxterriers (0.9 ±0.4 µg dl⁻¹), which were significantly below those measured in the Labradors (1.3 ±0.30 µg dl⁻¹) and in the Great Danes (1.4 ±0.4 µg dl⁻¹). Stimulation of thyroxin secretion after 120 minutes was most pronounced in the beagles (mean increase of 1.1 µg dl⁻¹), followed by the Labradors, Foxterriers and Great Danes (mean increases of 0.8 µg dl⁻¹, 0.7 µg dl⁻¹ and 0.5 µg dl⁻¹, respectively). Absolute mean values at 120 minutes after TRH injection were highest in the Beagles and lowest in the Foxterriers, thus differing significantly (2.2 ±0.5 µg dl⁻¹ vs. 1.6 ±0.5 µg dl⁻¹).

Discussion - The basal prolactin values measured in the 27 individual healthy dogs with normospermia were within the reference range given in the literature [2], indicating physiological prolactin secretion. Nevertheless clear breed related peculiarities seem to exist in the basal secretion of hormones representing pituitary as well as gonad and thyroid function. A temporary decrease of the LH concentrations found at 20 minutes after TRH injection may demonstrate a weak response to the corresponding prolactin increase. As stated for the Beagle [4] a clear effect of TRH on LH and testosterone secretion was also missing in the other three breeds. The high LH concentrations found in the Foxterriers may be related to the low testosterone secretion found in this breed, indicating increased gonadotropic feedback. A possible breed specific causal connection with the comparably low thyroid activity has to be elucidated.

References