

## Effects of synthetic TRH and LRH on serum levels of FSH, LH, TSH and thyroid hormones in female reindeer

Juhani Leppäluoto<sup>1</sup>, Jouni Timisjärvi<sup>1</sup>, Eija Eloranta<sup>2</sup>, Virve Ojutkangas<sup>2</sup> and Mauri Nieminen<sup>2</sup>

<sup>1</sup> Department of Physiology, University of Oulu, Finland

<sup>2</sup> Finnish Game and Fisheries Research Institute, Reindeer Research, Rovaniemi, Finland

The effects of synthetic luteinizing hormone-releasing hormone (LHRH) and thyrotropin-releasing hormone (TRH) on the serum concentrations of hypophyseal thyrotrophic and gonadotrophic hormones have been studied in lambs (Crichton et al, 1975), dairy cows (Foster, 1978) and in some cervids such as red deer (Kelly et al, 1982). Synthetic releasing hormones have not, to our knowledge, been tested in the genus *Rangifer*. The aim of the present study was to examine, how the synthetic releasing hormones affect the serum levels of TSH, FSH and LH in reindeer (*Rangifer tarandus tarandus* L.)

The present study was carried out in the Kaamanen Reindeer Research Station in Inari (69°10'N) in northern Finland. Blood samples were taken from 10 lactating reindeer hinds, 2-8 years of age. A mixture of synthetic thyrotropin-releasing hormone, TRH (500 µg), (UCB-Bioproducts) and luteinizing hormone-releasing hormone, LHRH (500 µg), (UCB-Bioproducts) was injected intramuscularly. Jugular venous samples (15 ml) were collected just before the injection and then after the injection at 30-min intervals up to 90 min. The studies were carried out at the beginning of June.

During blood sampling all hinds were restrained by hand. The samples were collected into serum tubes, centrifuged within 4 h of collection and the serum fractions were stored at -20°C until analysed. Serum TSH, FSH and LH were measured by radioimmunoassays using commercial heterologous antisera produced in rabbits from UCB-Bioproducts (i550/001, i558/001 and 555/001) and standards (NIADDK-

bTSHII, NIAMDD-oFHSI1 and NIADDK-oLHII). Hormones were iodinated by the Chloramine-T method. Immunocomplexes were precipitated by sheep antiserum against rabbit immunoglobulins. Serum T<sub>3</sub> and T<sub>4</sub> were measured by commercial radioimmunoassay kits supplied by Farnos Diagnostica.

The concentrations of TSH in serum varied from 48.6 uIU/ml to 551 uIU/ml. As a response to the single i.m. injection of TRH and LHRH, TSH rose 60% in 30 minutes. Another TSH concentration peak was detectable at 90 minutes. Serum T<sub>4</sub> concentration before the injection ranged from 93 nmol/l to 163 nmol/l. A rise of on average 11% was detected 90 minutes after injection. Serum T<sub>3</sub> concentration varied from 1.6 nmol/l to 2.7 nmol/l. T<sub>3</sub> concentration was increased 35% at 30 minutes ( $p < 0.01$ ). The most marked rise was established 90 minutes after TRH injection ( $p < 0.001$ ).

Serum FSH concentration before injection varied between 70.7 uIU/ml and 257 uIU/ml. FSH concentration rose 56% in 30 minutes ( $p < 0.01$ ) and 92% in 90 minutes ( $p < 0.001$ ) when compared to the control values. Serum LH concentrations showed a large range of variations (162 uIU/ml - 1257 uIU/ml). LH concentration sharply increased after the injection; 359% at 30 minutes, 385% at 60 minutes and 560% at 90 minutes ( $p < 0.05$ ).

In conclusion, after the administration of synthetic TRH, the serum concentration of hypophyseal TSH was elevated at 30 minutes after injection. Another peak value was established at 90 minutes. Thyroid hormones (T<sub>4</sub> and

T<sub>3</sub>) reached their peak concentrations at 90 minutes. With synthetic LHRH the concentration of FSH and LH started to increase after 30 minutes from injection and the peak values were established at 90 minutes.

Our results are in agreement with those obtained from dairy cows or sheep.

#### References

- Crichton, D. B., Foster, J. P., Haresign, W. & Scott, S. A. 1975. Plasma LH and progesterone levels after single or multiple injections of synthetic LH-RH in anoestrous ewes and comparison with levels during the oestrous cycle. — *J. Reprod. Fert.* 44: 121 - 124.
- Foster, J. P. 1978. Plasma LH concentrations after single or double injections of synthetic LH-RH in dairy cows. — *J. Reprod. Fert.* 54: 119 - 121.
- Kelly, R. W., McNatty, K. P., Moore, G. H., Ross, D. & Gibb, M. 1982. Plasma concentrations of LH, prolactin, oestradiol and progesterone in female red deer (*Cervus elaphus*) during pregnancy. — *J. Reprod. Fert.* 64: 475 - 483.