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BLOOD LEVELS OF TESTOSTERONE AFTER Gn-RH INJECTION IN BOARS WITH OR WITHOUT LIBIDO*

By

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EINARSSON, S. and K. LARSSON: *Blood levels of testosterone after Gn-RH injection in boars with or without libido.* Acta vet. scand. 1980, *21*, 375—379. — The peripheral plasma levels of testosterone were measured before and after Gn-RH injection in boars with normal sexual behaviour and in boars refusing to mount a dummy sow or oestrous pigs. The testosterone response in peripheral plasma was similar for the two groups of boars. Peak values were reached within 2—4 h, and pretreatment levels were found 7—12 h after the administration of Gn-RH.

testosterone; Gn-RH; libido; boar.

The androgen dependence of male sexual behaviour has been well known for several decades. The testosterone level in spermatic vein blood of boars, sampled from 3 to 9 months of age, indicated that peak production is reached between 5 and 7 months of age, coinciding with sexual maturity (*Gray et al.* 1971). Furthermore, *Ellendorff et al.* (1970) showed that testosterone treatment of immature boars could advance the onset of sexual behaviour.

Foote et al. (1976) found no relationship between peripheral plasma levels of testosterone and libido in Holstein bulls. After castration the testosterone level fell rapidly to very low levels in boars (*Einarsson* 1971). Nevertheless libido persisted unchanged for a varying number of days after castration, indicating that the sexual behaviour can remain normal for a period without the assistance of testosterone.

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The object of the present investigation was to measure the peripheral levels of testosterone before and after Gn-RH injection — in boars refusing to mount a dummy sow as well as oestrous pigs — in boars with normal sexual behaviour.

MATERIAL AND METHODS

The study comprised 6 pure-bred boars (Swedish Landrace or Swedish Yorkshire breed), 3 of which demonstrated normal sexual behaviour. Up to 6 months of age the boars were reared in pens together with other boars. From 6 months of age the boars were kept individually in pens under conventional conditions at the Clinic of Obstetrics and Gynaecology. The boars were regularly exposed to a dummy sow and oestrous gilts during at least a 2-months period. Boars 1, 2 and 3 mounted the dummy sow at the first or second presentation and thereafter on each occasion. Boars 4, 5 and 6 were slightly interested but never mounted the dummy sow. When presented to oestrous gilts the latter boars became slightly excited but never mounted the gilts. None of these boars showed signs of leg weakness.

In order to minimize stress on the animals during blood sampling a permanent vein catheter was inserted into the brachial vein and drawn to the back of the animal according to the method of Karlbom et al. (*Shille et al.* 1979). This procedure did not require restraint of the animals during sampling. Blood samples were collected daily until the administration of Gn-RH. After i.v. administration of 2 mg Gn-RH (Nialutin®, Novo A/S, Copenhagen*) dissolved in 5 ml NaCl solution (0.9 %), blood samples were collected at 0, ½, 1, 1½, 2, 2½, 3, 3½, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 24 h. The blood was collected in heparinized tubes, centrifuged immediately and the plasma was stored at —20°C until assay. Levels of testosterone were assayed in duplicate using a radio-immunoassay system (*Oltner et al.* 1979).

The boars were slaughtered at the end of the experimental period. Testicles, epididymides and accessory sex glands were obtained at slaughter and examined immediately afterwards.

RESULTS

Boars 1, 2 and 3 displayed a slight sexual activity with penis erection in the prepuce after the administration of Gn-RH. No

* The Gn-RH was a gift from Novo.

sexual activity was observed in Boars 4, 5 and 6. Neither did the latter boars mount the dummy sow or oestrous gilts after the Gn-RH administration.

The peripheral testosterone levels before and after the Gn-RH administration are presented in Fig. 1. The pretreatment levels were 4.6, 5.8 and 20.1 nmol/l and, respectively, 2.1, 7.2 and 10.9 nmol/l for boars with and without libido.

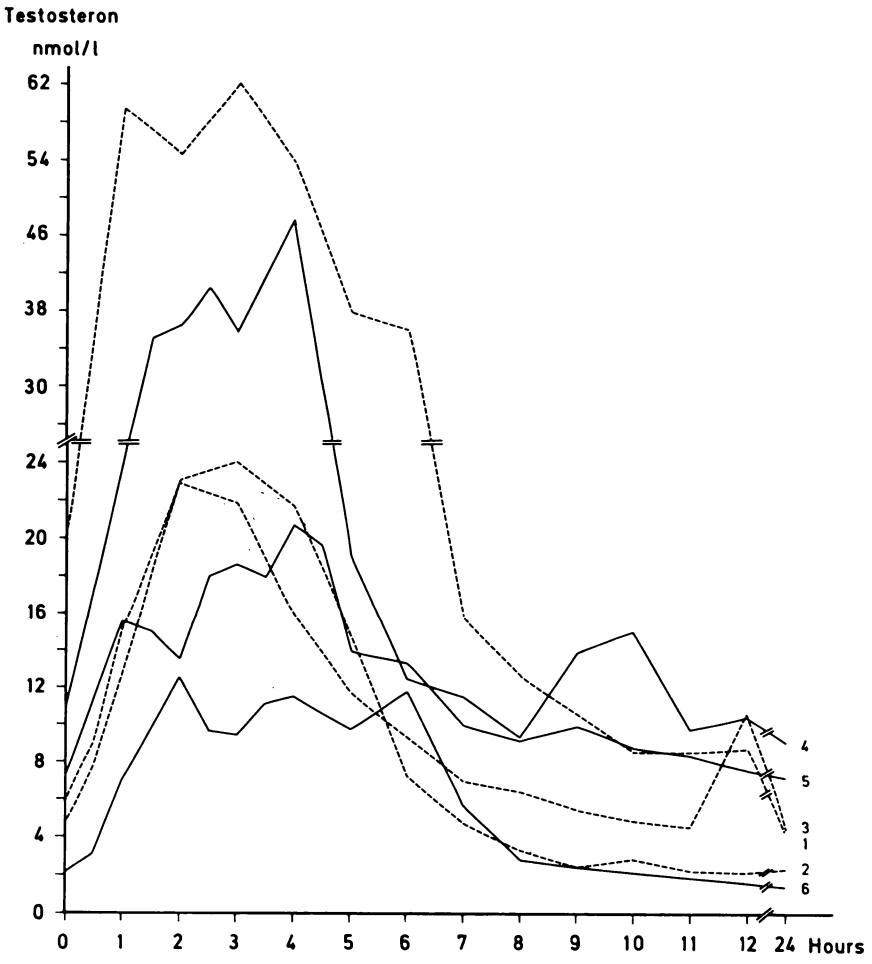

Figure 1. Plasma levels of testosterone before and after i.v. injection of 2 mg Gn-RH. Boars 1, 2 and 3 with normal sexual behaviour and Boars 4, 5 and 6 refusing to mount a dummy sow or oestrous gilts.

The testosterone patterns in the peripheral blood were similar for the two groups of boars. Peak values were reached within 2—4 h and pretreatment levels were found 7—12 h after the administration of Gn-RH.

The post-mortem examination of the sexual organs revealed no morphological lesions. The examination of the morphology of the caudal spermatozoa showed no difference between the two groups of boars.

DISCUSSION

The peripheral testosterone levels before and after Gn-RH administration were of the same magnitude in the boars with normal libido as in those without libido. The elevated testosterone levels after Gn-RH administration resulted in a spontaneous sexual activity in the normal boars. Copulation is generally followed by increase in peripheral testosterone levels in normal boars (*Andresen* 1976, *Liptrap & Raeside* 1978). A relationship might therefore exist between elevated testosterone level and sexual activity in boars. The corresponding rise in the testosterone levels after the Gn-RH administration in Boars 4, 5 and 6, on the other hand, did not result in any sexual activity.

Damassa et al. (1977), studying the relationship between circulating testosterone levels and male sexual behaviour in rats, found that less than one-third of the mean precastration testosterone concentration was enough to maintain normal sexual behaviour.

It appears from this study that the circulating testosterone level can not be used as an indicator of the sexual capacity of an individual boar. Variation in testosterone-binding globulin (*Corvol & Bardin* 1973), hormone receptor function or inability of neural target tissues to convert circulating testosterone may be responsible for abberant sexual performance despite normal circulating testosterone (*Foote et al.* 1976). The active hormones in neural tissue responsible for various characteristics of sexual behaviour in the boar have not yet been determined.

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SAMMANFATTNING

Testosteronkoncentrationen i perifera blodet efter Gn-RH injektion hos galtar med normal könsdrift och hos galtar utan könsdrift.

Testosteronkoncentrationen mättes före och efter Gn-RH injektion hos galtar med normal könsdrift och hos galtar som vägrade bestiga suggfantom eller brunstigt honsvin. Testosteronmönstret i perifera blodplasman var lika i de båda galtgrupperna. Högsta nivån erhölls inom 2—4 timmar och ursprungsnivån registrerades 7—12 timmar efter Gn-RH injektionen.

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