

THE EFFECTS OF HANDLING ON EPISODIC RELEASE OF LH IN IMMATURE RATS

Pamela C. B. MacKINNON and Jeannine MATTOCK

*Department of Human Anatomy,
University of Oxford*

It has previously been found that during development immature female rats between 4-30 days of age and male rats from 6 days of age to adulthood occasionally show very high serum LH levels. Thus 13 p. 100 of female and 4 p. 100 of male infant *Wistar* rats, which were killed by decapitation, had serum levels > 7.0 ng NIH-LH-S13/ml (MATTOCK and MacKINNON, 1975). To characterize the nature of these high LH levels groups of immature females (23-30 days of age) were serially bled by a number of different techniques with or without the use of anaesthesia (table 1).

TABLE I

*Serial blood sampling data obtained from groups of 23-30-day old female rats
(Note the small number of LH samples > 7.0 ng/ml)*

	No. animals	Sampling times	Total no. samples	Samples > 7.0 ng NIH-LH-S13/ml
Jug. vein cann. no anaesthetic	8	20'/1 h	48	0
Iliac vein cann. nembutal.	5	5'/1 h	48	0
Tail bleeds no anaesthetic	6	10'/40'	21	0
Cardiac puncture ether	8	15'/1 h	32	0
Jugular vein ether	21	10'/40'-60'	111	8

In the unanaesthetized animals which were bled either through an intra-atrial catheter or from the tail vein, or in anaesthetized groups bled through an iliac catheter or by cardiac puncture, only basal LH levels were found. However, 3 rats bled by jugular vein puncture under ether anaesthesia had high LH levels (fig. 1), two of which showed peak levels of LH (> 7.0 ng/ml) which lasted for 20-30 minutes. This

apparent episodic release was unlike that of pulsatile LH release which is of smaller amplitude and greater frequency and has been observed in castrate rats of both sexes (GAY and SHETH, 1972). Moreover, since episodic high LH levels were observed in both immature males and females and were not accompanied by increased prolactin levels (MATTOCK and MacKINNON, 1975; see also fig. 2), they cannot easily be

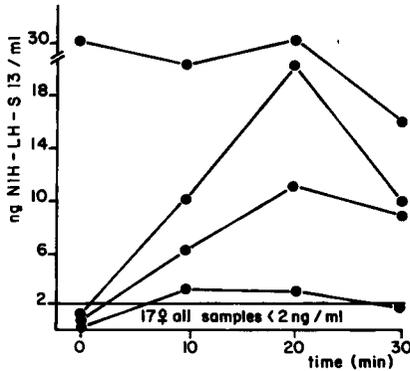


FIG. 1. — LH levels (ng NIH-LH-S₁₃/ml) obtained at 10 minute intervals by jugular vein puncture under ether anaesthesia in 23-30-day old female rats ($n = 21$)

explained by a « positive feedback » response to an oestrogen stimulus. Nevertheless, episodic LH release was shown to be affected by « negative feedback » since the administration of a single dose of oestrogen (1 μ g) 48 hours prior to decapitation suppressed high LH levels.

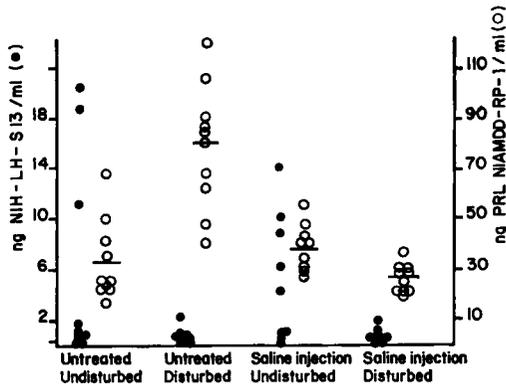


FIG. 2. — The effect of disturbance on LH and PRL levels in untreated females aged 23-30 days, and those given an injection of saline (10 ♀/group)

The unexpected paucity of high LH values observed in the serially bled rats prompted an investigation of the effects of disturbance on LH release in the immature female (fig. 2). Groups of rats were left completely undisturbed for 24 hours or were given a single saline injection (but without further disturbance) 3 hours prior to

decapitation. Other groups were similarly treated except that the animals were disturbed by transporting the cages to the laboratory about 30 min. before decapitation. High LH levels were found in the « undisturbed » groups while only basal LH levels were found in the « disturbed » groups. It is notable that the effects of acute general disturbance could not be correlated with changes in prolactin levels, a finding which is contrary to reports on adult rats in which stress was observed to increase serum LH and prolactin levels (AJIKA *et al.*, 1972).

Preliminary data not included here indicate that the inhibition of episodic LH release is not mediated either by adrenaline or ACTH secretion since inhibition of high LH values was still present in groups of adrenalectomized rats, and the presence of episodic release was observed in undisturbed rats treated either with ACTH or Dexamethasone. Administration of pentobarbitone (Nembutal, 0.3 mg/100 g body weight) 3 hours prior to decapitation was commensurate with episodic LH release and therefore presumably prevented its inhibition. Although the possibility of a direct sympathetic effect on pituitary portal vessel blood flow has yet to be excluded, the evidence suggests that certain sensory stimuli transmitted via the central nervous system may lead to a suppression of high LH levels in immature animals.

*Sexual Maturation 3rd Workshop
August 31 September 3, 1975.*

ACKNOWLEDGEMENTS

We wish to acknowledge Dr. G. D. NISWENDER who provided the antibody for an ovine-ovine radioimmunoassay; the National Institute of Health for NIH-LH-S13 standard; the NIAMDD for the prolactin kit with NIAMDD-RP-1 standard; and the Medical Research Council for financial support (grant No. G 973/922 B).

RÉSUMÉ

EFFET DE LA MANIPULATION DES ANIMAUX SUR LES DÉCHARGES ÉPISODIQUES DE LH CHEZ LE RAT IMPUBÈRE

Chez le Rat immature, 13 p. 100 des femelles et 4 p. 100 des mâles présentent des taux de LH supérieurs à 7 ng/ml quand le sang est prélevé par décapitation.

Pour déterminer la nature de ces décharges de LH, on a fait des prises de sang sériées à des Rattes de 23-30 jours avec ou sans anesthésie. Chez les animaux non anesthésiés et porteurs d'un cathéter intra-artériel et chez les animaux anesthésiés, on observe toujours un bas niveau de LH circulante.

D'autre part des animaux qui ne subissent aucune perturbation pendant 24 heures, décapités sur place (non stressés), ou après transport au laboratoire (stressés) présentent un taux de LH élevé en l'absence de stress et bas après le stress du transport.

Il semble que des stimuli sensoriels transmis par le système nerveux central peuvent provoquer une suppression des niveaux élevés de LH chez le Rat immature.

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