LETTER TO THE EDITOR

MODIFICATION OF THERMAL PAIN THRESHOLD BY TESTOSTERONE AND ETHINYLOESTRADIOL IN MALE AND FEMALE RATS

Sir,

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Sex affects sensitivity to pain (1,2). Testosterone decreases threshold to thermal pain in male rat while lack of it after castration elevates the threshold (3). Testosterone was also shown to alter morphine analgesia in thermal pain testing in rats (4). It is conceivable that pain mechanism is sensitized by testosterone in male rats. We now report on the influence of testosterone on pain threshold in female rats and the influence of oestrogen on pain threshold in male and female animals.

Albino rats (28 males and 28 nonpregnant females) weighing between 150-200 *g* were divided into groups (Table I). Tail withdrawal time following application of thermal stimulus to tail was determined by analgesiometer (Techno Electronics, Lucknow) as described earlier (3). The mean of a total of 9 readings, (3 readings taken daily at interval of 1 hour for 3 successive days) was determined. The tail withdrawal time was determined again after 24 hrs of the each treatment. For this, again a mean of 9 readings (see above) was determined to indicate a change produced by a treatment. Data was analysed by Student's t-test.

There is a significant and almost identical decrease in the tail-withdrawal time after im testosterone treatment in both male and female rats. (Table I). In both sexes ethinyloestradiol caused rise in the tail withdrawal time. However, when testosterone and ethinyloestradiol were combined, the reaction time remained unchanged with reference to the control value.

Peripheral genital sensory inputs are implicated to play selective role in genitosensory motor cortex to determine pain perception and motor reaction (2). Castration in male rats raises thermal pain threshold (3). This change in the sensitivity to pain might have arisen from severing the genitosensory nerves during surgical removal of the

BLE I : Meodification of thermal pain threshold by testosterone (2.5 *mg*) and ethinyloestradiol (0.05 *mg*) in male and female rats.

S. No.	*Treatment (daily im, for 3 days)*	*n=*	*Mean tail withdrawal time Sec (±SEM)*	*P value**
Mala				
1.	Nil (Control group)	28	5.70±0.78	—
2.	Testosterone	7	2.5 ±0.88	< 0.001
3.	Ethinyloestradiol	7	8.43±1.18	< 0.001
4.	Testosterone + Ethinyloestradiol	7	5.11±1.06	< 0.01
Female				
5.	Nil (Control group)	28	5.70±0.88	—
6.	Testosterone	7	2.66±1.46	< 0.01
7.	Ethinyloestradiol	7	11.49±1.28	< 0.001
8.	Testosterone + Ethinyloestradiol	7	5.35±1.08	< 0.01

*t-test : value in comparision with respective controls.

n = number of rats in a group.

testes (3). Therefore the effect of high doses of testosterone and estrogen (testosterone antagonist) was studied in animals with intact gonads (uncastrated rats) of either sex. The present work demonstrates that the thermal pain mechanism is vulnerable to modification by the relative levels of male and female sex hormones. Testosterone and ethinyloestradiol thus modulate the thermal pain mechanism so that the former sensititizes it and the later desensitizes it in either sex.

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