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Failure of Naloxone to Block the Reduction in Burying Behaviour After Ejaculation in Male Rats

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FERNÁNDEZ-GUASTI, A. AND A. SALDÍVAR *Failure of naloxone to block the reduction in burying behaviour after ejaculation in male rats* PHARMACOL BIOCHEM BEHAV **38**(2) 371–373, 1991.—In the present study we analyzed whether the opiate nociceptive system participates in the reduction in burying behaviour observed after ejaculation To that purpose the opiate antagonist naloxone (0.5, 1.0 and 2 0 mg/kg) was administered before ejaculation The results showing that this antagonist does not interfere with the drastic reduction in burying behaviour suggest that an opiate nociceptive mechanism is not involved in this effect Present data further support the idea that the reduction in burying behaviour is reflecting a specific reduction in anxiety

Burying behaviour Ejaculation Naloxone

RECENTLY we reported a reduction in burying behaviour after ejaculation in male rats (4, 7, 16). Since anxiolytic compounds produce similar responses (5, 6, 21, 22), these data were interpreted as a reduction in anxiety (4).

In the burying behaviour test the animal is exposed to a prod through which it receives an electric shock and thereby identifies it as an aversive stimulus (21,22). It has been reported that after ejaculation there is an opiate-dependent naloxone-sensitive increase in the nociceptive threshold (8). On these bases, the purpose of the present study was to analyze whether the reduction in burying behaviour, observed after ejaculation, is reflecting an hypoalgesic action rather than an anxiolytic effect. Accordingly, we tried to antagonize the reduction in burying behaviour found after ejaculation by administering the opiate antagonist, naloxone. A large body of evidence has indicated that this drug possesses antinociceptive properties at the doses used in the present study (2, 9, 11, 20).

METHOD

Sexually active male Wistar rats were used in this study. Two main groups of animals were tested in the burying behaviour test: control (without sexual activity) and experimental (animals tested after the second ejaculation). Both groups received the following treatments: saline (2 ml/kg) or naloxone (0.5, 1.0 and 2.0 mg/kg, Sigma Chemicals, St. Louis, MO). The control groups received the treatments 30 min before the burying behaviour test, while for the experimental groups the latencies vary between 25.5, 25.8 and 28.8 min for each dose respectively. The male sexual behaviour tests were made as previously described (4,7). The sexual behaviour parameters registered were: intromission and ejaculation latencies, number of mounts and intromissions preceding ejaculation and the length of the postejaculatory interval [for description of each behavioural parameter see (4)]. The sexual behaviour data were analyzed by means of the Wilcoxon matched-pairs signed-ranks test (18).

The burying behaviour test was performed as previously described (4, 7, 21–23). Briefly, the animal was placed in a test chamber of $27 \times 16 \times 23$ cm with a prod emerging from one of its walls through which the animal received an electric shock of 0.3 mA. The animal receives the shock, first withdraws from the shock source and then moves directly towards the prod pushing and spraying a pile of bedding material ahead with rapid alternative movements of its forepaws. The latency to the expression of the burying behaviour and the cumulative time the animal spends burying the prod (cumulative burying behaviour) during a 10-min test were recorded. The statistical analysis was performed using the Kruskal-Wallis analysis of variance followed by the Mann-Whitney U-test (18).

RESULTS

The results of this study are shown in Fig. 1. Clearly, 0.5, 1 0 or 2.0 mg/kg of naloxone did not alter the burying behaviour in the control group of animals. As previously demonstrated (4,7), a clear reduction in burying behaviour was observed after ejacu-

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TABLE 1

EFFECT OF NALOXONE ON MALE SEXUAL BEHAVIOUR

Treatment	N	IL	NM	NI	EL	PEI
Predrug Control	7	0 7	1	7	3 7	5 2
Naloxone 0 5 mg/kg		0 2	1	7	5 3	5 8
Predrug Control	8	0 3	0	6	4 1	5 5
Naloxone 1 0 mg/kg		0 2	2	10*	6 2†	6 2
Predrug Control	9	0 7	4	9	6 5	5 5
Naloxone 2 0 mg/kg		0 1†	2	12*	6 8	6 1

The table shows median values IL, intromission latency, NM, number of mounts, NI, number of intromissions, EL, ejaculation latency, PEI, postejaculatory interval Statistical comparisons were performed between the predrug test (control) and the experimental (postdrug) group Wilcoxon matched-pairs signed-ranks test, *$p<0$ 05, †$p<0$ 02

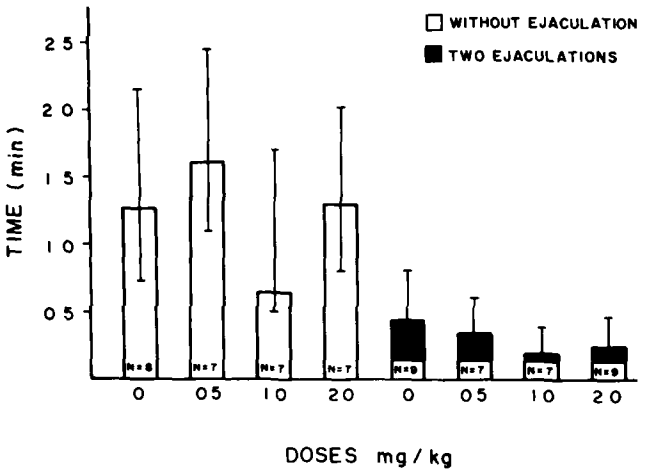

FIG 1 Effect of naloxone on the reduction in burying behaviour observed after ejaculation The figure shows medians ± seminterquartile ranges of the cumulative burying behaviour during a 10-min test The clear bars represent the burying behaviour levels of those animals tested after the pharmacological treatment but without sexual behaviour test (control groups) The dark bars represent the burying behaviour levels of the animals tested after the pharmacological treatment and the sexual behaviour test (experimental groups) Kruskal-Wallis analysis of variance a) for the control groups, H(3)=0 8346, nonsignificant, b) for the experimental groups, H(3)=1 3659, nonsignificant Mann-Whitney U-test versus their respective controls, n s , nonsignificant

lation [Kruskal-Wallis Analysis of Variance, H(7)=22.0713, $p<0.01$] Naloxone administration (0.5, 1.0 and 2.0 mg/kg) did not prevent the reduction in burying behaviour produced by ejaculation (Fig 1). The burying behaviour latency was not affected under any treatment (data not shown).

The effects of naloxone on male sexual behaviour are shown in Table 1. Treatment with the opiate antagonist produced a slight though consistent inhibition of male sexual behaviour reflected as an increase in the number of intromissions preceding ejaculation accompanied by an increase in ejaculation latency

DISCUSSION

The present results demonstrate that the opiate antagonist, naloxone, is not able to reverse the inhibitory actions of ejaculation on burying behaviour. These results lead to the conclusion that the reduction in burying behaviour found after ejaculation (4,7) is not mediated via an opiate nociceptive mechanism. These data also suggest that the reduction in burying behaviour observed after ejaculation reflects an anxiolytic state. This conclusion is further supported by the recent findings demonstrating that the inhibition of burying behaviour is effectively blocked by some GABA/benzodiazepine antagonists that do not possess antinociceptive actions (7), and that subthreshold doses of the anxiolytic compound, diazepam, summate with ejaculation in reducing the burying behaviour values (7).

As forementioned, the burying behaviour paradigm has been proposed as a useful test to determine the anxiety levels (22). In this particular test the anxiolytic compound diazepam produces a clear effect that is not prevented by naloxone administration (23) These data, together with present results, suggest that this paradigm is selective to measure anxiety variations and that the antianxiety effect of drugs or of a behavioural manipulation like ejaculation can effectively be dissected from an antinociceptive mediation

The effect of naloxone on male sexual behaviour has been extensively studied [cf. (1,14)] However, while some authors have found a facilitation of copulation after high doses of this antagonist (12,13), some others have observed inhibitory effects (10, 15, 19) Present results are in line with the later findings.

The nociception changes along the various phases of copulation have been explored by several authors including ourselves (3, 8, 17, 19). The results, however, showed various inconsistencies while some studies (3,8) have revealed a reduced nociception (hypoalgesia) during the postejaculatory interval, others have found the same effect during the execution of the copulatory series (19). A third group (3,17) has failed to find any change in the hot plate test The possible role of the different techniques used to measure nociception in establishing changes along the different phases of copulation is discussed elsewhere (17).

In closing, the present experiment demonstrates that the reduction in burying behaviour observed after ejaculation could not be interpreted on the basis of an opiate antinociceptive action. This conclusion further strengthens the idea of an anxiolytic effect of ejaculation The putative action of ejaculation in other paradigms specifically designed to measure the anxiety and the nociception levels is at present under study in our laboratory

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