

Intravenous administration of 7-hydroxy-(di-*N*-propylamino)tetralin (7-OH-DPAT) induces sexual responses in anaesthetised male rats

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OBJECTIVE, AIMS OF STUDY

Among all central dopaminergic pathways, three major systems (incerto-hypothalamic, nigrostriatal and mesolimbic systems) play a role in facilitating male sexual behaviour (for review see Hull et al., 2004). More particularly, the incerto-hypothalamic system, which includes the medial preoptic area and the paraventricular nucleus of the hypothalamus, has been described as essential in controlling ejaculation (for review see Giuliano and Clément, 2006).

Numerous behavioural studies assessing the ability of systemically administered D₂-like receptor agonists, SND 919 and quinolorane, to modulate male rat copulatory behavior demonstrated the key role played by these receptor subtypes in facilitating seminal emission (Bitran et al., 1989), in reducing ejaculation latency (Ferrari and Giuliano, 1994; Foreman and Hall, 1987; Giuliano and Ferrari, 1996) and in lowering the threshold for ejaculation (Foreman and Hall, 1987).

Shortly after the identification of the DA receptor subtype D₃, it has been reported that systemic administration of 7-hydroxy-2-(di-*N*-propylamino)tetralin (7-OH-DPAT), a preferential D₃ receptor agonist, facilitated ejaculation mechanisms without affecting sexual arousal (Ahlenius and Larsson, 1995; Ferrari and Giuliano, 1996).

The aim of this study was:

To characterise the effect of peripheral administration of 7-OH-DPAT, a preferential D₃ receptor agonist, on sexual responses

STUDY DESIGN, MATERIALS & METHODS

Method

Male Wistar rats (*n* = 25) were anaesthetised with isoflurane and the jugular vein was catheterised to allow i.v. delivery of 7-OH-DPAT (0.1, 1 and 10 mg/kg). Additionally, in 5 rats anaesthetised with urethane, acute spinal transection at the thoracic (T8) level was performed. Sexual responses were recorded over 30 min following i.v. injection of 7-OH-DPAT.

Seminal vesicle pressure (SVP) and bulbospongiosus muscle electromyogram (BS-EMG) activity are measured as physiological markers of, respectively, emission and expulsion phases of ejaculation.

Intracavernosal pressure (ICP) is measured as physiological marker of erection

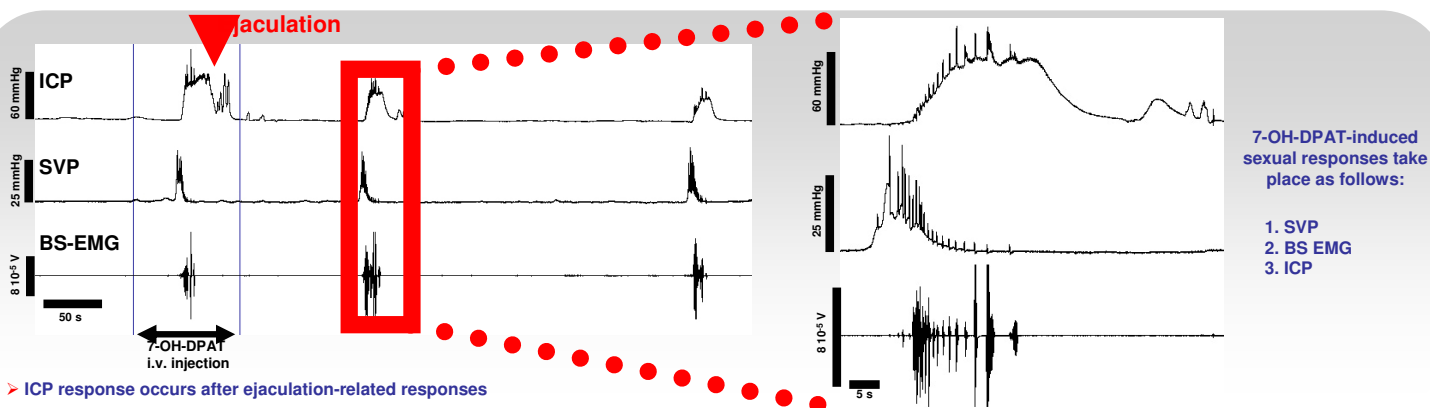
Data Analysis

Ejaculation and erectile responses, identified by direct observation, associated respectively with SVP rises together with synchronized BS-EMG activity and ICP increases are enumerated during 30 min following 7-OH-DPAT delivery. The proportion of rats ejaculating is then determined.

Rats exhibiting a diastolic arterial pressure under 40 mm Hg during baseline period are discarded from the study. The proportions of rats ejaculating were compared using exact Fisher's test. Results obtained from the different experimental groups are statistically compared with Kruskal-Wallis test (number of events) or one-way ANOVA (latency). Kruskal-Wallis test and one-way ANOVA are followed by, respectively, Dunn's multiple comparison test and Student-Newman-Keul's test when applicable (*p* < 0.05). Data are expressed as the mean ± SEM.

RESULTS

Typical recordings of ICP, SVP and BS muscle EMG obtained in anaesthetised rats after i.v. delivery of 7-OH-DPAT (1mg/kg). A magnification of the recordings is displayed on the right-hand side.

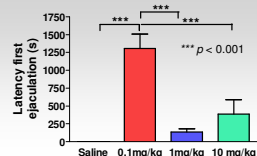
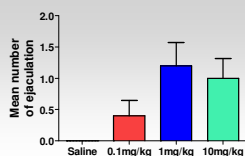


ICP response occurs after ejaculation-related responses

Effects of 7-OH-DPAT i.v. delivered on proportion of rats ejaculating, mean ejaculation number and ejaculation latency in anaesthetised rats

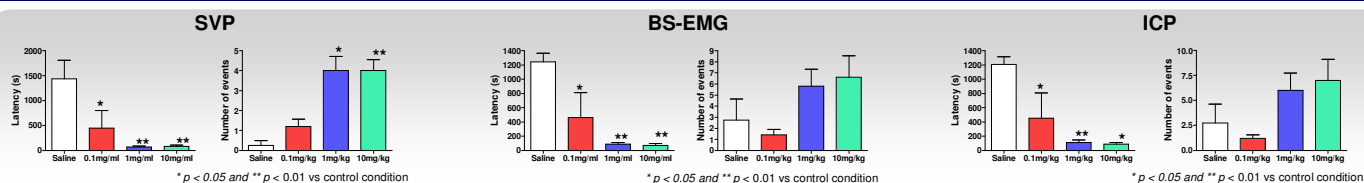
i.v. treatment	Doses (mg/kg)	Ejaculating rats
7-OH-DPAT	0	0/5
	0.1	2/5
	1	4/5*
	10	4/5*

p < 0.05, Fisher's exact test



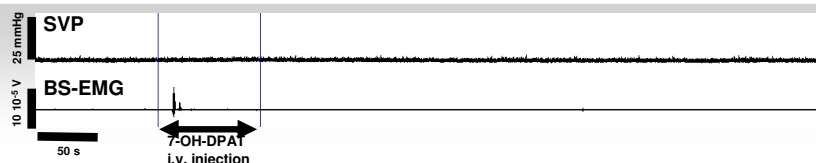
Intravenous administration of 7-OH-DPAT dose-dependently induced ejaculation in anaesthetised rats.

Effects of 7-OH-DPAT i.v. delivered on latency and number of sexual responses in anaesthetised rats.



Intravenous administration of 7-OH-DPAT dose-dependently decrease latency of sexual response and increase the number of events (even if the only significant increase is observed with SVP) in anaesthetised rats.

Effects of acute spinal transection at the T8 level on 7-OH-DPAT-induced sexual responses in anaesthetised rats.



Acute spinalisation at T8 level totally abolished sexual responses elicited by i.v. 7-OH-DPAT in anaesthetised rats.

CONCLUSIONS

Intravenous 7-OH-DPAT, a preferential D₃ receptor agonist, is capable to elicit a complete ejaculatory response in anaesthetised male rat.

Acting at a supraspinal level, i.v. 7-OH-DPAT can activate synchronously emission and expulsion phases of ejaculation.

Erection being observed after ejaculation-related responses, we may suggest that in 7-OH-DPAT model, erection is reflexive.

Intravenous injection of 7-OH-DPAT is a valuable experimental paradigm of pharmacologically-induced ejaculation