Facilitation of proceptivity/sexual motivation in female rats by a serotonin 2A/2C (5-HT2A/2C) receptors agonist

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ABSTRACT

OBJECTIVES

In women, genital arousal (potency) is separated from psychological arousal (libido, motivation). Similarly and respectively, in female rat, receptivity (lordosis) is distinguished from proceptivity (darts, hops, solicitations). 5-HT2A/2C receptors agonists have been reported to increase lordosis in normal and ovariectomized rats injected with estradiol benzoate (EB) and progesterone (P). Nevertheless, little information is available regarding the effect of 5-HT2A/2C agonists on receptivity in non-estrous female rats. In the present study, we evaluated the effects of DOI (0.5-1.5 mg/kg) on proceptive behavior in ovariectomized rats with a submaximal hormonal supplementation.

MATERIAL AND METHODS

Ovariectomized Long Evans rats were injected subcutaneously (s.c.) with EB (10 µg) and P (100 µg) in 0.1 ml of 5% carboxymethyl cellulose (CMC) solution. Mounting was performed with sexually active males. Female rat was placed 5 min alone in the arena for habituation. For baseline determination, they were tested for 15 min with the male. Following this test, DOI (0.5 or 1 mg/kg) or saline was injected and 15 min later, female was again placed with the male and sexual behavior was scored for 30 min. Data were analyzed for these 15 min periods.

RESULTS

COMPARISON TO CONTROL

DOI 1 mg/kg showed a significant increase in the number of darts, hops and ear wigglings. DOI 0.5 mg/kg increased hops and darts. Lordosis was not affected by DOI.

SUMMARY OF RESULTS

> To investigate the effects of DOI on proceptive (darts and hops and ear wigglings) and receptive (lordosis) behaviors in ovariectomized female rats with a submaximal hormonal supplementation.

METHODS

> Female Long Evans rats (250-275 g) were bilaterally ovariectomized (OVX) under isoflurane anesthesia.

OVX rats were injected subcutaneously (s.c) with a submaximal hormonal priming with estradiol benzoate (EB 10 µg at 48 h before the test) and progesterone (P 230 µg at 4.5 h before testing) in a volume of 0.1 ml (Mitra and Pfaff, 1992).

> Proceptive and receptive behaviors were evaluated in a rectangular chamber (60 L X30 W X35 H cm) during dark phase of light/dark cycle. After a 5-min habituation period for the female to the chambers, a sexually active male was introduced and forced to ejaculate. Ear wigglings by the female was noted.

CONCLUSION

This study confirms the involvement of 5-HT2A/2C receptors in the control of female sexual activity. DOI 0.5 and 1 mg/kg facilitated sexual proceptive behaviors in ovariectomized rats with a submaximal hormonal treatment. 5-HT2A/2C receptors agonists in combination with hormonal replacement could represent a treatment for postmenopausal women on complaining about hyposexual desire.

BACKGROUND

In Europe, 10 to 40 % of women aged between 14 and 60 years report low sexual desire (see review by Agnoli et al., 2004).

In women, desire has been described as “conscious impulse toward something” or “sexual urge or appetite”, which are signs of motivation. According to these definitions, desire in women is equivalent to what is called sexual motivation in animals (Agnoli et al., 2004).

Extravagant female rats display hopping, darting and ear wigglings and solicitation for provoking males to initiate mounting. These female sexual behaviors, which represent anticipatory and motivational aspects have been collectively termed proceptivity by behavioral scientists (Beach, 1976).

Sexual receptivity has been defined in terms of the display of a characteristic spinal reflex, the lordosis response (Hardy and DeBold, 1971), which motivates the consumer consummatory aspects of sexual behavior (Maswood et al., 1996).

DOI[(1R,2S)-2,5-dimethoxy-4-iodophenyl]-2-iminoopropane hydrochloride] is a 5-HT2A/2C receptors agonist.

DOI increased lordosis in low sexually receptive females (Wolf et al., 1998; 1999) or could protect against the lordosis-inhibiting effects of 5-HT and of 5-HT2, agonists (Maswood et al., 1996).

The administration of DOI to non ovariectomized female rats primed with estradiol benzoate (EB) and progesterone (P), increased sexual motivation in paced mating behavior, by decreasing return latencies following ejaculation and inter-ejaculation intervals (Niedergärd et al., 2004).

RESULTS

COMPARISON TO CONTROL

> Darts and hops/mounts were significantly increased 10-20 min after injection of DOI 1 mg/kg, as compared to saline.

CONCLUSION

DOI facilitated sexual motivation in females which received a submaximal hormonal supplementation, without modifying the lordosis response.

REFERENCES