

GENDER-RELATED EFFECTS OF PREGS ON EMOTIONALITY, LEARNING AND MEMORY PERFORMANCE IN ADULT RATS

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Pregnenolone sulphate (PREGS) is one of the most potent memory-enhancing neurosteroids in rodent learning studies, also involved in the regulation of the anxiety-like behaviour (1). Neurosteroids exert an important role as modulators of the neuronal activity by interacting with different receptors or ion channels (2). Altered levels in PREGS have also been reported during aging and in human neurodegenerative pathologies like Alzheimer's disease.

The aim of this study was to investigate in adult female and male rats the effects of PREGS (10mg/kg s.c.), administered 60 min before the sessions, on learning and memory performance, using a thirst-motivated, non aversive, learning task, the "Can test"; and on emotionality, using the Elevated Plus Maze test (EPM). The Can test protocol consisted in two separate parts: the baseline training (BT) in order to measure learning; the longitudinal evaluation (LE), in order to record memory retention. Rats, following their performance in the baseline training, were divided in non active (NA), and active (A) animals. Our results show that in NA female rats PREGS decreased learning performance in the BT ($p<0.05$), facilitated memory retention in LE ($p<0.01$), and increased anxiety-like behaviour in the EPM ($p<0.05$), when compared to respective controls. No significant effects were observed in A female rats. Conversely, in A male rats PREGS induced an improvement in learning and memory performance in BT ($p<0.05$) and in LE, and it induced an increase in anxiety-like behaviour ($p<0.05$), compared to respective controls. In NA male rats PREGS produced an impairment in memory performance in LE ($p<0.05$), while no significant differences were recorded in the EPM, with respect to controls.

In conclusion, we suggest that PREGS may enhance cognitive processes together with an increase in the emotional state, in a pattern- and in a gender- related manner. This effect may be due to PREGS modulatory activity on GABA and/or NMDA receptors, which in turn may promote a higher arousal, leading to an enhancement in the animal capability to process information about the environment.

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2) Maurice T., Urani A., Phan V. L., Romieu P. (2001) Brain Res. 37: 116-132