Sexual dimorphic effects of restraint stress in the limbic system: The role of corticoptropin releasing factor receptors

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ABSTRACT

To investigate the differential effects of restraint stress (RS) in male and female mice and the contribution of corticotropin releasing factor receptor 1 (CRFR1s) in the prefrontal cortex (PFC).

Adult male and female mice subjected to RS for 2hrs, or not (NR), and then tested in the Light-Dark (LD) test followed by the temporal order object recognition (TOR) test. The mice brains removed for c-FOS immunofluorescence.

A second group of mice underwent surgery for a guide cannula implantation into PFC so, that after the 2hrs RS, they could be administered the antagonist of CRFR1, α-Helical CRF9-41 into the PFC and then tested in LD and TOR.

In a third cohort, 2hrs after RS, field excitatory postsynaptic potentials (fEPSPs) were recorded from PFC slices, to study long-term potentiation (LTP) following tetanic stimulation. Additionally, the effect of α-Helical CRF9-41 on LTP was examined.

RS resulted in significant increase of time spent in the dark side of LD in females only, and significant decrease in the discrimination index of the TOR task in males only. Expression of RS-induced c-FOS expression was enhanced in PFC of both males and females. Administration of α-Helical CRF9-41 into the PFC reversed the discrimination impairment in males and increased anxiety in females. Moreover, RS significantly reduced the LTP in males but not females. Similarly, α-Helical CRF9-41 treatment showed reduced LTP in PFC slices of NR males but not females.

RS induced sexual dimorphic effects, particularly in the PFC, possibly through mechanisms involving the CRFR1.