

Comparison of effect of sex hormone manipulation during neonatal period, on mRNA expression of Slc9a4, Nr3c2, Htr5b and Mas1 in hippocampus and frontal cortex of male and female rats.

ABSTRACT

It has long been known that spatial memory and the ability to navigate through space are sexually dimorphic traits among mammals, and numerous studies have shown that these traits can be altered by means of sex hormone manipulation. Hippocampus, the main organ involved in this kind of memory, has specific signature genes with high expression level compared to other regions of the brain. Based on their expression levels and the role that products of these genes can play in processes like signal transduction, mediation of hormone effects and long term potentiation, these genes can be considered as genes necessary for routine tasks of hippocampus. Male and female rat pups were injected with estradiol and testosterone respectively. at early stage of their lives to examine the effect of sex hormone manipulation on mRNA expression of Slc9a4, Nr3c2, Htr5b and Mas1 using comparative quantitative real-time polymerase chain reaction. The results showed that expressions of these genes are strongly influenced by sex hormones in both the frontal cortex and hippocampus, especially in male hippocampus, in which expression of all genes were up-regulated. Htr5b was the only gene that was affected only in the males. Expression of Mas1 was contrary to expectations, showed stronger changes in its expression in cortex than in hippocampus. Nr3c2 was down regulated in all samples but up regulated in male hippocampus, and Slc9a4 also showed a huge up-regulation in male hippocampus compared to other samples.

Keyword: Hippocampus; Spatial navigation; Gene expression; Sex hormones; Brain development.