

Sex Differences in the Expression of Tyrosine Hydroxylase in the A1 and A2 Nuclei

Abstract: Tyrosine hydroxylase (TH) is an enzyme responsible for the synthesis of catecholamines, including norepinephrine (NE) and dopamine, and is therefore expressed in all noradrenergic neurons. TH's involvement in the synthesis of NE influences various functions and behaviors mediated by the NE system such as alertness, arousal, attention, and motivation. More specifically, the A1 and A2 nuclei in the norepinephrine (NE) system have been found to influence the regulation of the HPA axis, whose dysregulation is associated with significant neuropsychiatric disorders like depression and schizophrenia. The objective of this study is to identify sex differences in TH expression in the A1 and A2 nuclei of the NE system that may contribute to sex differences in schizophrenia. In the present study, 5 female and 5 male *Dbh^{Flpo}* mice underwent immunohistochemistry to allow for the visualization and calculation of NE neurons and TH within NE neurons. The results from this study show that there is a statistically significant difference between male and female expression of TH in the A1 nucleus (p value = 0.0262), but not in the A2 region (p value = 0.1556). This difference in TH expression could contribute to the sex differences seen in the diagnosis and severity of symptoms in people living with schizophrenia.