

In the field of neuroscience, there is limited research delegated to investigate sex differences in the brain. There are many different genes within the brain that cause differences in expression between sexes, specifically in the norepinephrine (NE) system. These neurons are crucial in regulating stress responses, fight-or-flight and heart rate throughout the norepinephrine system. To visualize these neurons within the brain, an enzyme that is known to be present throughout the norepinephrine system, tyrosine hydroxylase (TH), was stained using immunohistochemistry. Tyrosine hydroxylase is used to synthesize dopaminergic and noradrenergic neurotransmitters within the NE system. While multiple brain regions can be seen using this technique, we chose to focus on the sex differences of TH expression in the SubCD and SubCV. There are known sex differences in disorders of the NE system, for example, males are twice as likely to develop Parkinson's disease, whereas women are twice as likely to develop Alzheimers. TH is used to come to these conclusions, but there is little research on the expression of TH and how it compares in males and females. Our study found that there was not a significant difference of TH expression within the SubCD or SubCV regarding sex. However, there was seen to be overall more expression in the male SubCD and the female SubCV when compared to their counterparts. These results indicate that this research is important in its role of eliminating sex omission from current literature. Our study clearly showed that there is a need for sex omission as it could lead to proper treatment tailored to specific sexes based upon the molecular differences in expression of TH in the norepinephrine system.