Investigation into Tyrosine Hydroxylase Expression in the Locus Coeruleus as it Relates to Neurodegenerative Disease

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Tyrosine hydroxylase is a rate-limiting enzyme from the catecholamine synthesis pathway that is thought to play a key role in risk factors for the development of Parkinson’s Disease (PD), a progressive neurodegenerative condition that causes motor symptoms. Extensive research has been conducted that suggests the presence of a norepinephrine deficiency in the locus coeruleus that contributes to the development of the disease. However, there has been less attention to research that identifies how this difference may present itself between the sexes. Previous studies have shown that males are more likely to develop PD, and therefore it is relevant to explore the relative differences in tyrosine hydroxylase expression between the sexes. We have been able to utilize immunohistochemical methods along with fluorescent microscopy in order to analyze the relative expression of tyrosine hydroxylase within the locus coeruleus between male and female transgenic mice. No relative differences were found, prompting future studies to utilize other methods and perhaps explore other reasons to explain this deficiency.