Investigating Norepinephrine and CGRP Co-expression in the Thalamus and Hypothalamus

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Abstract: Norepinephrine (NE) is a neurotransmitter that is distributed throughout the central nervous system (CNS) and peripheral nervous system (PNS) and has a diverse range of functions, including mediating the stress response, sleep/wake cycle, cognitive arousal, among other complex behaviors. Calcitonin gene-related peptide (CGRP) is a widely distributed peptide throughout the CNS and PNS, acting on the walls of blood vessels and reducing blood pressure. It has also been shown to be implicated in migraines and other pathologies. Preliminary research indicates NE and CGRP are highly expressed throughout the brain, including the thalamus (TH) and hypothalamus (HY); their overlap in expression could give insight into mechanisms instigating migraines and other CGRP-related pathologies. To investigate co-expression and possible sex differences, double immunohistochemistry was conducted on transgenic rodent TH and HY brain tissue and then observed in fluorescent and confocal microscopes. Background corrected fluorescence per area (BCF/Area) was significantly above background in both the TH and HY when respectively compared with negative controls, showing that our protocol was successful. However, no significant differences were found between sexes within the TH or HY as well as between the two regions.