Exploring Sexual Dimorphism and Sex Hormone Receptor Expression in the Bed Nucleus of the Stria Terminalis (BNST) in the Monogamous Prairie Vole

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Sex differences in the brain can be seen in the behavior of rodent species in approaches towards mating, acts of aggression, and parenting, which are regulated by gonadal sex hormones. Developmental sex hormones organize neural circuity while adult sex hormones activate sex-typical behaviors. Moreover, estrogen organizes and activates rodent sex-typical behaviors. In males, testosterone is released from the testes neonatally. This is converted to estrogen in the brain by the enzyme aromatase. A perinatal hormone surge establishes the sex difference in brain structure in mammals. However, specifically in the prairie vole, sexual dimorphism is not as evident in parental/social behaviors compared to other rodent species. For example, both sexes in the monogamous voles form pair bonds and co-parent while promiscuous rodent species do not. There is also less dimorphism in genital anatomy in early life, adult body size, and basal corticosterone in voles. It was hypothesized that a contributing factor to limited sexual dimorphism in the social behavior of prairie votes is diminished sexual dimorphism in the bed nucleus of the stria terminalis (BNST), a known area in the brain that exhibits sexual dimorphism. To identify sexually dimorphic cell populations in this region, Nissl staining and in-situ hybridization were used for established markers of dimorphic populations, including estrogen receptor alpha and androgen receptor. These markers were examined in juvenile and adult voles, establishing a trajectory for the development of BNST dimorphism. It was found there was no statistically significant difference between male and female voles in P14 (juvenile) and adult voles.

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