Identification of Scn1a, Scn2a, and Scn8a in Mammalian Sexual Structures

Ion channels are important membrane bound proteins that are responsible for the the activation and initiation of action potentials in excitable cells. Alterations in function of these channels by mutations have been identified as a cause of several neurological conditions such as epilepsy, ataxia, migraines, and spasms. These conditions are known as channelopathies. Of particular interest is the role that these proteins play in sexual arousal and orgasms. 40-53 percent of American women report sexual dysfunction experienced as loss of libido, lack of arousal, anorgasmia, and sexual pain. In addition, sexual dysfunction is often reported by women with epilepsy and it is often exacerbated by antiepileptic drugs (AEDs). Specifically, common AEDs such as carbamazepine and phenytoin have been reported to impair sexual arousal in patients. This suggests that voltage-gated ion channels genes are good candidate genes for exploring sexual dysfunction conditions. In this study we sought to first examine the specific ion channels present in female C57BL/6 mouse reproductive structures. We looked at three common voltage gated sodium channels found in the central nervous system: *Scn1a, Scn2a,* and *Scn8a*. Using the RT-PCR profiler array for neuronal ion channels, we determined the relative expression of these ion channels in crude dissections of mouse sexual organs such as the clitoris, vaginal canal and urethra. Single RT-PCR was then used to confirm the results. Transcripts with ≥ 2 fold differences were considered significant. Our results indicates that *Scn8a* is expressed in female sexual structures, suggesting its role in arousal and/or in the generation of orgasms and the potential for therapeutic intervention.