



## **Mechanisms of Sex-specific Behavioral and Structural Deficits in a Mouse Model of Autism**

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This summer, I conducted research on a mouse model of autism in Dr. Ted Abel's laboratory in the Biology Department at the Smilow Center for Translational Research. Specifically, we were looking at the protocadherin pathway regulated by the *Pcdh10* gene, which has been shown to cause a social deficit in its heterozygous form. Out of the myriad of genes associated with autism spectrum disorders (ASD), *Pcdh10*<sup>+/-</sup> shows sex-specific deficits, in which only male mice exhibit significant social impairments, reflecting the 5 to 1 ratio of males to females in humans that are diagnosed with ASDs. The goals of my project were to show the male-specific deficits of ASD, determine the role testosterone might have on this process, and to examine how the amygdala activity is altered in the *Pcdh10*<sup>+/-</sup> mice.

The protocadherin pathway involves the PCDH10 protein, which ultimately facilitates the degradation of PSD-95 protein, causing synapse elimination. By manually counting the spines on dendrites, we have found that with less PCDH10, there seems to be less synapse elimination, and an increase in the synaptic density. However, we notice a lot of immature spines, known as filopodia, and we are trying to understand how that may affect the NMDA receptor function. We're also curious as to how testosterone is related throughout this process, and why it seems to have a larger effect in juvenile mice.

I've learned many techniques within the lab, such as how to run a three-chambered social experiment on mice and how to score mouse videos both manually and through a program known as TopScan. I also learned how to genotype, cut a brain into slices, perform immunohistochemistry on these slices, and how to prepare these slices on a microscope slide for subsequent analysis of proteins and antibodies on a microscope. By reading hundreds of research papers during the process, I have gained experience into how research papers are written and how to efficiently read them for the information you are looking for. I've had the opportunity to watch multiple surgeries done on mice in order to analyze their brain activity, but most of all, I've learned how the research process works. Instead of finding all the answers, I've actually developed more questions, which is what makes research so exciting.

This research opportunity has significantly contributed to my educational experience because it gave me a hands on approach as to how research is actually done. I've not only learned many research techniques, but by having a mentor, I have learned about applying for grants, the process towards getting a paper published, and how to form networks within a lab. I am looking forward to continuing my project during the fall semester, and I am thankful that PURM gave me the opportunity to get involved with research so early.