

## **The role of early adolescence methamphetamine and nicotine exposure on MA craving behavior later in adolescence**

My research this summer was in Sewanee's Psychology Department under the direction of Dr. Siegel, the Neuroscience chair, and in collaboration with Jordan Buck (C'15). Our focus was on the role of early adolescent methamphetamine (MA) and nicotine exposure on locomotor activity, anxiety-like behavior, object memory, depression-like behavior, spatial memory, and methamphetamine craving. These areas required further research since there is a lack of literature addressing the effects of MA on adolescents. My part of the research focused specifically on bridging the gap in the literature on adolescence by researching how adolescent nicotine and MA exposure might affect MA craving and seeking later in adolescence.

Jordan and I shared lab responsibilities and each took turns checking on the mice and making sure their living space was clean and contained adequate food and water. During Jordan's part of the research I assisted him in performing the open field test, the novel object test, the Porsolt forced swim test, and the Morris water maze in order to assess the locomotor activity, anxiety-like behavior, etc. The later part of the summer was devoted to my part of the research, where Jordan assisted me in performing the conditioned place preference test (CPP) to assess if exposure to MA, nicotine, a mixture of both nicotine and MA, or saline during adolescence affects MA craving in late adolescence.

The summer research allowed me to develop many new skills and fine-tune old ones. First, simply learning how to treat the mice ethically and handle them was a great experience. Dr. Siegel taught me how to correctly pick up the mice and identify them by their ear punch number. Being allowed to handle the mice daily helped me to quickly learn the proper treatment

the mice require and how important it is to keep their living space clean. I was also given a lab notebook to keep up to date and accurate. Dr. Siegel showed me how important it is to keep a lab notebook organized in order to quickly and easily look up information. During the research I needed to look back at earlier test days sometimes, and by keeping my table of contents accurate I could quickly find what I needed and continue my work. The summer research also helped me work on basic lab skills such as setting up an experiment, calculating measurements, using a pipette, keeping the area sanitized and clean, and working with the Anymaze Tracking Software.

The beginning of the summer I spent assisting Jordan with his research, but my project began on June 23<sup>rd</sup> when thirty-six male C57BL/6J mice arrived on campus at post natal day (PND) 27. The two injection days helped me learn how to work together with others when dealing with live animals. Observing Dr. Siegel inject the mice exposed me to a part of research I had never experienced before, and later I began learning how to properly inject mice as well. After the two injection days, where four injections were administered two hours apart each day, I had a week to observe the mice's weight and make sure they remained healthy. This week was very helpful in allowing me to learn the best way to weigh a moving animal and quickly return them to their living space so I don't disturb them too long.

From PND 41 to 48 on July 7<sup>th</sup> to 14<sup>th</sup> CPP conditioning took place, where Dr. Siegel or Jordan would inject the mice with either MA or saline, and then I would place them in a compartment that had either a bar floor or hole floor. This conditioned them to associate each environment with either being high on MA or not. During this part of the research, I was able to see how important it is to maintain a similar environment and keep the room very quiet so the mice aren't disturbed during conditioning. Also, learning how to use Anymaze to track the mice's movements and dealing with general computer and technology problems helped me learn

how to stay calm and successfully troubleshoot difficulties during research.

After CPP conditioning, the CPP test occurred at PND 49 on July 15<sup>th</sup>, which measured the MA craving by allowing the mice to move freely between both environments (bar vs. hole floor) for thirty minutes. If a mouse spends more time on the MA-paired side of the chamber, this indicates CPP and MA craving. The hardest challenge occurred during this part of the research when the bar floor for chamber two broke. As I stated before, keeping the environment similar is very important for the experiment and the conditioning, so the floor breaking was a difficult problem to solve. Dr. Siegel left the decision up to me if I wanted to use the three working chambers and put the mice that had been in chamber two in a different chamber, or if we should test all the mice in chambers one, three, and four, then put a working floor in chamber two and test those mice last. The second option would take longer to do since we could only use three chambers at once and still have to test the mice from chamber two afterwards, but considering how important keeping the environment as similar as possible is, I decided that the second option would be the best, if not the easiest, course of action.

The floor breaking was definitely a low point, but there were many high points during the experience as well. One of the main things I learned was how much I enjoy leading an experiment and working in the lab. The experience also showed me how I am capable of working with animals, but also how important the outcome and meaning of the research was to me. We are currently analyzing the results of the experiment, but simply being able to perform this work over the summer allowed me to make a difference in drug/MA adolescent research. Helping add to the current knowledge and literature eventually in this way solidified my career goal of going to graduate school to pursue a Ph.D. in neuropsychology. I also now have the opportunity to attend the annual Society for Neuroscience conference with Dr. Siegel and Jordan

in November, which helps to continue my learning experience beyond my summer research.