



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

| | |
|--|---------------------------------------|
| Name(s) Chloe S. Lalonde | Project Number J0320 |
| Project Title The Effects of Environmental Complexity and Exercise on Learning in Mice | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Previously, I have done projects concerning human behavior. I found people to be difficult subjects to use because the many variables involved with them. I moved into a subject I could better control: mice. During reference studies, I found that there is an ongoing discussion between animal welfare proponents and animal researchers about laboratory animal housing conditions. The animal welfare proponents want lab animals to have access to enrichment in order bring out more natural behavior. Researchers are worried that this will affect comparisons to all previous data. I chose to base my project on an aspect of this debate. My goal was to find what effects environmental enrichment has on the learning of young mice.</p> <p>Methods/Materials 20 BALB/c mice were separated into four groups. The Control group was housed in a standard cage, the Exercise group had a running wheel, the Complexity group had a house, and the Additive group had a wheel and a house. Housing conditions were otherwise identical. The mice lived in these conditions for six weeks and were then tested in a Morris Water Maze. The object of the test was to find the relief of a platform submerged in a baby pool. The mice had to learn to associate a visual cue with the location of the platform. The mice were introduced to the task by entering the pool directly across from the platform. After repeated trials the task was made more complex by changing the location of the platform, and/or where the mice entered the water. Time to reach the platform was used as a measure of performance.</p> <p>Results The times of the individual mice as well as the group averages were analyzed. Results indicate that the best performing group was the Complexity group followed in order by the Exercise, Control, and Additive. It is difficult to tell whether the mice were learning by association or navigating by some other method.</p> <p>Conclusions/Discussion Results showed that some enrichment has a positive affect on learning in mice. Surprisingly, there seems to be a limit to this, as shown in the Additive Group. This study suggests that too much enrichment detracts from learning. Returning to the debate between the researchers and the animal welfare proponents, this experiment suggests that providing enrichment does seem to alter learning behavior in mice. This could affect comparisons to previous data if enrichment becomes standard housing for mice.</p> | |
| Summary Statement In this project I explored the effects of environmental enrichment on the learning of mice. | |
| Help Received I received help in obtaining the articles in the reference studies. My mice were donated to me by Charles River Laboratories. I received help in obtaining the housing materials. I also discussed my experimental procedure with an expert in the subject, Dr. Mary Wolff. I received assistance in the graphing of my data. | |