



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Vivian R. Feig	Project Number S1004
Project Title The Effect of Depriving Activity on Dendritic Spine Development	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project looked at whether or not blocking the sodium channels in neurons that are used for synaptic activity has an effect on the development of synapses in the brain.</p> <p>Methods/Materials Using cultured embryonic rat brain cells, we first established a positive correlation between time and synaptic growth. All cells were transfected with GFP, a protein that codes for a jellyfish gene that makes the cells take up fluorescent light, at 3DIV (days in vitro). The cells in part one grew up in normal conditions, and were fixed and stained at 7DIV and 16DIV. Then, we ran a test using three conditions: the first was a control, with the cells growing in normal conditions as in the first part of the experiment; the second group was treated with TTX (tetrodotoxin) from the time of GFP transfection, and the last was treated with TTX from 10DIV to the time it was fixed. All groups were fixed and stained at 12DIV. These were imaged using microscope imaging software, and density was found by dividing the number of spines on a dendrite by the dendrite length.</p> <p>Results We found that the chronic TTX and two day TTX groups were significantly less dense the group that grew up under normal conditions, but that there was a very small difference between both groups that had been treated with TTX.</p> <p>Conclusions/Discussion Activity deprivation in early development significantly reduces the strength of neural connectivity in the brain by decreasing the amount of dendritic spines present. Moreover, deprivation for temporary periods of time during early development are similar in terms of damage to long-term deprivation.</p>	
Summary Statement I tested the effect of activity deprivation on the generation of dendritic spines in the developing brain.	
Help Received Used lab equipment at UCSD under the supervision of Dr. Anirvan Ghosh; UCSD student Natalie Shanks taught me how to use lab equipment	