



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Wayne W. Zhong</b>	<b>Project Number</b> <b>S0424</b>
<b>Project Title</b> <b>Effects of Leukemia Inhibiting Factor Concentrations on the Pluripotency of Mouse Embryonic Stem Cells</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To identify the optimum concentration of Leukemia Inhibiting Factor (LIF) for maintaining Mouse Embryonic Stem Cells (mESCs) in the pluripotent state.</p> <p><b>Methods/Materials</b> A standard mESCs medium without the LIF was added to a 12 well plate containing 100,000 mESC in each well. A range of LIF was added (0 unit as a control, 30 units, 40 units, 50 units, 60 units, and 70 units) to the wells in duplicates. The stem cell cultures were incubated at 5% CO<sub>2</sub> and 37°C for up to 72 hours days and percent of pluripotent mESCs were counted every day. During 42 hours, 50 µl of the culture media from each well of the original 12 well plate was transferred to a new 12 well plate containing gelatin. Total number of pluripotent colonies was counted after 24 hours.</p> <p><b>Results</b> After incubation for 24 and 48 hours, 40 units of LIF yielded the highest percentage of pluripotent stem cells, with 71.85% and 75.60% of cells as pluripotent, respectively. However, for hours of 62 and 76, 50 units of LIF produced the highest percentage of pluripotent stem cells, with 46.70% and 62.00% as pluripotent, respectively. Our data concluded that 50 units of LIF provided the best results for long-term mESC culture and percent of pluripotent stem cells, whereas 40 units of LIF yielded the highest percent of pluripotent stem cells for up to two days.</p> <p><b>Conclusions/Discussion</b> The results from this experiment supported the hypothesis, for various concentrations of LIF affected the pluripotency of mESCs. This research has helped to understand how to culture mESCs using an effective concentration of LIF. The information from this project helped to expand our knowledge about mESCs by showing that LIF is critical in helping to keep mESCs pluripotent. It has also shown that various concentrations of Lif provide different percentages of pluripotent mESCs. 50 units LIF is the standard dose for mESC culture and that the results supported this conclusion for cultures in the long term, but in the short term a lower dosage is sufficient.</p>	
<b>Summary Statement</b> To identify the optimum concentration of Leukemia Inhibiting Factor for maintaining Mouse Embryonic Stem Cells in the pluripotent state.	
<b>Help Received</b> Used lab equipment at Humboldt State University under the supervision of Dr. Sprowles; Dad helped with grammatical errors.	