



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Phillip Y. Zhang	Project Number S0430
Project Title Immunohistochemical Identification of Early Disease Markers in Amyotrophic Lateral Sclerosis	
Abstract Objectives/Goals Amyotrophic Lateral Sclerosis (ALS or "Lou Gehrig's Disease") is a neurodegenerative disease characterized by the death of motor neurons, causing complete paralysis and death by respiratory failure within three to five years in human patients. The exact cause of motor neuron degeneration remains unknown. My project attempted to develop a means for the early detection of ALS. Methods/Materials Thus far, scientists have identified a number of genes that differ in mRNA expression between healthy and ALS mice, even before they show symptoms. As proteins are the base for cellular functions and changes at the mRNA level do not necessarily cause changes in the expression of corresponding proteins, I selected three specific proteins coded by previously identified genes for further examination. Through the application of immunohistochemistry, I compared the level of these proteins in spinal cord tissue taken from healthy and diseased mice. Results My experimental results showed that expression levels of all three proteins correlate with the known mRNA expression increase, but their temporal patterns were different. Two of the proteins tested, GFAP and Urocortin, showed significant changes only in the late stages of the disease, and may therefore not be useful for early detection of the disease. However, the remaining protein, TGFalpha, showed significant difference between healthy and diseased mice at a relatively early age. Conclusions/Discussion As TGFalpha protein is secreted from cells, it has the potential to be used for the early detection of ALS using relatively non-invasive methods. Additional research is warranted, as detection of early disease markers will be critical for the diagnosis and treatment of ALS.	
Summary Statement My project attempted to find a means for the early detection of amyotrophic lateral sclerosis (ALS or "Lou Gehrig's Disease").	
Help Received Used equipment and facilities of the Burnham Institute for Medical Research under the supervision of Dr. Rengang Wang.	