



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Vinay Tripuraneni	Project Number S0426
Project Title Systems Genetics of the Hippocampus: A cis-QTL for Tmem19 on Chromosome 10 May Modulate Hippocampal Size and Function	
Abstract Objectives/Goals The hippocampus is involved in many neurological processes as well as disorders. The hippocampus is known to have a direct effect on spatial orientation; it significantly atrophies in pathologies such as Alzheimer's Syndrome and Schizophrenia. Methods/Materials In this study, hippocampal volume was estimated in 216 BXD RI genetic reference population of mice using stereological techniques. The data obtained from the stereological analysis was then subjected to bioinformatical analysis. Results It was found that hippocampal volume is a highly heritable trait ($h^2 = .30$), suggesting that a genetic mechanism must modulate hippocampal size. Interval mapping and cluster mapping revealed suggestive Quantitative Trait Loci (QTLs) on chromosomes 9, 10 and 13. Conclusions/Discussion Alternatively, more than 2 genes could modulate hippocampal size, and quantitative trait analysis may not be computationally powerful enough to identify the epistatic interactions that are occurring. Data correlation to microarray and phenotype databases revealed that hippocampal volume correlated to Protein Kinase C (PKC) activity and spatial orientation as measured by the Morris water maze. Tmem19, a highly expressed gene transcript, revealed a strong cis-QTL on chromosome 10, suggesting that it is not only modulating its own expression, but may modulate and be the transcription factor for other genes that control hippocampal size and function.	
Summary Statement This project investigates the genetic basis of memory.	
Help Received Used laboratory equipment at Beth Israel Deaconess Medical Center under the supervision of Dr. Glenn Rosen.	