# Moving Towards the Cure: The Effects of LPS-Induced Inflammation Response on the Regulation of the MAPT Gene in Alzheimer's Disease, a Novel Second Year in vitro Study

Chandar, Jay

The purpose of this experiment was to investigate the effects of an inflammation response on the synthesis of transcription factor CREB in MAPT gene regulation and hyper-phosphorylation of tau protein. The researcher hypothesized that an inflammation response would cause increased synthesis of CREB protein which would subsequently result in the increased hyperphosphorylation of tau through MAPT gene regulation. Using many processes, including BCA protein assay and Western Blot, positive results were obtained. In multiple trials, the levels of phosphorylated tau and CREB protein were significantly higher in the experimental than in the control. This strongly supports the researcher's hypothesis by showing increased levels of CREB led to increased levels of phosphorylated tau. T-tests showed extremely high statistical significance between the experimental values and the control within the CREB and phosphorylated tau samples. An ANOVA test proved the direct correlation between the levels of CREB protein and hyper-phosphorylated tau in the experimental samples. These results clearly demonstrate that CREB is directly responsible for the hyperphosphorylation of tau in Alzheimer's disease. This research has discovered the cellular and molecular interactions that make up the crossroad between neuro-degeneration and neuro-inflammation. This information can be used to develop prevention methods and cures through immuno-modulatory therapy and gene-silencing. Based on the discoveries made in this research , further experimentation can be based on more specific knowledge about the disease to find an effective prevention method or cure.

**Awards Won:**