

The Effects of Phytocannabinoids and HIV-1 Tat on Animal Behavior and Microglia-Mediated Neurotoxicity

Benjamin Gorman

Human immunodeficiency virus type-1 (HIV-1) is associated with high rates of cognitive impairment, anxiety, and pain, likely related to the neuroinflammatory and neurotoxic effects of HIV transactivator of transcription (Tat). Activation of the anti-inflammatory and neuroprotective cannabinoid system, including by the phytocannabinoids Δ^9 -tetrahydrocannabinol (THC) and cannabidiol (CBD), may reduce HIV symptoms. However, the specific *in vivo* and *in vitro* effects of THC and CBD in the context of Tat require further investigation. We measured the cognition, anxiety, pain sensitivity, and motor activity of male and female Tat-transgenic mice administered varying acute doses of THC and CBD. As microglia-mediated neuroinflammation helps drive Tat toxicity, we also measured the indirect neurotoxicity of microglia treated in primary culture with Tat and CBD. Notable behavioral findings include anxiogenic effects of THC and antinociceptive effects of Tat and THC. Results from cell culture are inconclusive (low sample size) but suggest potentially profound reductions in Tat-induced, microglia-mediated neurotoxicity in the presence of CBD. Other findings and sex differences are discussed.