A Pharmacokinetic/Pharmacodynamic Analysis of delta-9-Tetrahydrocannabinol and Cannabidiol

Hanley, Cooper (School: Monarch High School)

Shown to ameliorate the symptoms or even target the root pathology of conditions ranging from cancer to chronic pain, cannabis and its derivatives have the potential to improve the quality of life of almost a fifth of the global population. However, there is currently little known about the effects of marijuana, specifically its phytocannabinoids such as delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD), on the body's innate endocannabinoid system. For the scientific community to evaluate the safety of administering marijuana for clinical purposes, further research must determine whether cannabis enhances or suppresses the blood concentration of key endocannabinoids. Thus, this study investigates data obtained from blood plasma samples collected during two clinical trials of pharmaceuticals containing varying ratios of THC and CBD in order to examine their specific and differing effects. Non-compartmental pharmacokinetic (PK) analysis will track the metabolism of the two phytocannabinoids, while pharmacodynamic (PD) modeling will map the percentage of the trial participants who experienced suppression of endocannabinoid levels at each administered dosage. Preliminary results have yielded several noteworthy findings, with data suggesting that higher doses of THC and CBD may saturate transport proteins and enzymes in the gut, inhibiting their function. The completed PK/PD analysis may offer further valuable insights into the biochemical consequences of marijuana use, whether deleterious or beneficial.