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## **Understanding the Cellular Metabolic Processes Regulated by Extracts of Hemp**

**Presenter: Susan Trapp, Ph.D., Senior Research Scientist, Southwest College of Naturopathic Medicine & Health Sciences**

**Abstract:** Optimal strain selection of Cannabis (hemp varieties) for medical treatments has been difficult to decipher due to variability and cannabinoid levels as well as other active constituents – terpenes and flavonoids. Aside from THC and cannabidiol (CBD, few of the cannabinoids have been characterized. It has been established that other molecules including terpenes and flavonoids contribute the effects of utilizing Cannabis, although therapeutically much less is known and even less with regard to synergy between molecules. Different strains of Cannabis produce differing profiles of chemical constituents. As a result, medical properties of Cannabis strains vary due to the effects between the different compounds. Because of the number of constituents to be considered, it has been challenging to study how the chemical composition of Cannabis strains as it relates to clinical effects. The goal of this research is to develop an in vitro cell culture system to screen Cannabis samples for their optimal therapeutic use for the conditions of anxiety, pain, sleep, and anti-inflammatory activity, which have been demonstrated to have clinical benefit. Herein we report results from a preliminary in vitro study on 2 cell lines (neuroblastoma, Hs27; colorectal, Caco2) treated with 2 strains (strain 1: 9.7%, 0.0%; strain 2: 22%, 0.60% CBD:THC, respectively) of Cannabis sativa ethanol extracts (1:8 wt:vol in 95%). RNA was isolated from treated cells, RNAseq was performed and analyzed to examine comparative gene expression between the two strains to identify and validate biomarkers of interest for each therapeutic condition – anxiety, pain, sleep, and anti-inflammatory.