



SEMINAR

Potential Benefits of Chronic CBD Treatment in a Model of Metabolic Syndrome

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ABSTRACT

Metabolic syndrome (MetS) is a cluster factor condition that includes elevated arterial pressure, impaired glucose tolerance with or without insulin resistance, dyslipidemia, and increased adiposity. Each of these cluster conditions independently is a significant contributing factor to the onset of cardiovascular disease and frank type 2 diabetes (T2D). The prevalence of MetS continues to increase globally and requires multiple pharmaceutical interventions to address the multiple conditions, which is challenging. Cannabinoids have the potential to ameliorate each of the cluster factor conditions associated with MetS individually; however, its potential collectively during MetS remains elusive and unresolved. We have established a program to examine various mechanisms by which CBD (both naturally occurring phytocannabinoid and synthetic compounds) may alter the MetS cluster factors in a rat model, the Otsuka Long-Evans Tokushima Fatty (OLETF) rat. Collectively, our data demonstrates that 5 weeks of CBD treatment in various aged-rats, representing early- and late-onset MetS, has the potential to ameliorate most of the MetS cluster conditions. Both natural and synthetic CBD reduced the MetS-associated hypertension during the early-onset condition, but neither were effective once the late-onset elevation in arterial pressure was established. CBD also reduced the adiposity and hypertriglyceridemia associated with MetS regardless of age. Interestingly, CBD also preserved the degeneration of brown adipose tissue in the advanced MetS condition, which was associated with elevated levels of β -aminoisobutyric acid (BAIBA). These findings provide insight to the potential benefits of CBD and its derivatives in ameliorating most of the MetS-associated cluster factors and suggest that early intervention has the greatest potential for beneficial effects.

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