The effect of sCBD on skeletal muscle cells

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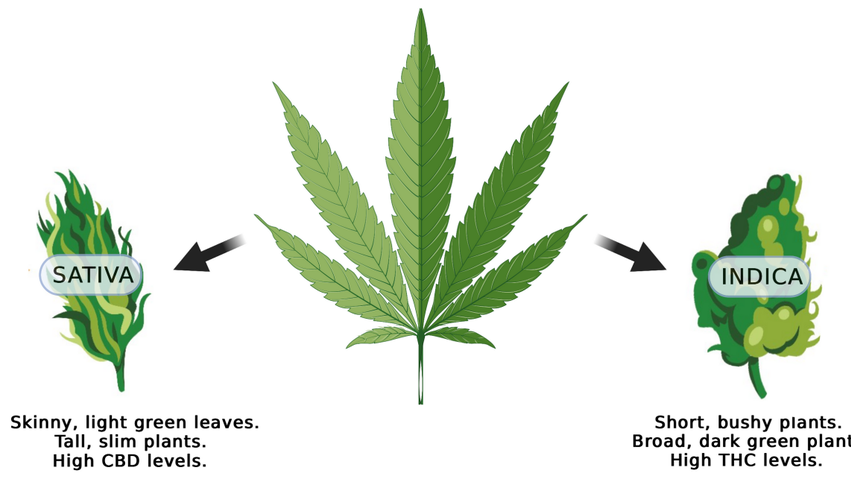
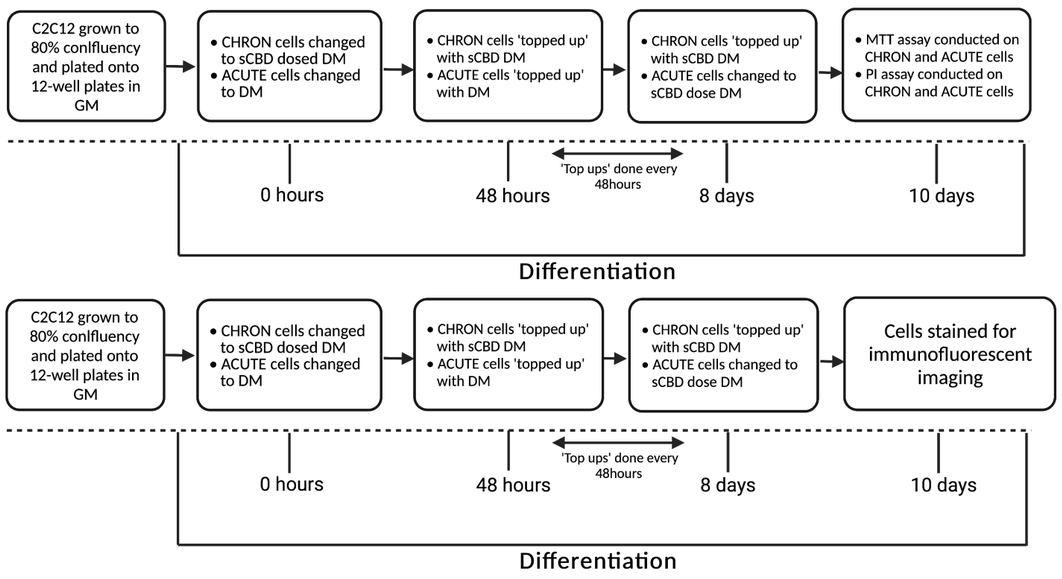
Introduction

Cannabidiol is one of >140 cannabinoids derived from the Cannabis Sativa. Since its isolation in 1940, CBD has been attributed for its anti-inflammatory and pain relief properties. Following its removal from WADA's prohibited list in 2018, it has since become a desirable supplement to athletes. However, there is a potential risk of an ADRV due to other cannabinoids present. Synthetic cannabidiol offers an alternative to CBD and also reduces the risk of an ADRV, however, its effect on muscle cells is unknown. Therefore, our research aims to examine the effects of sCBD on muscle cells.



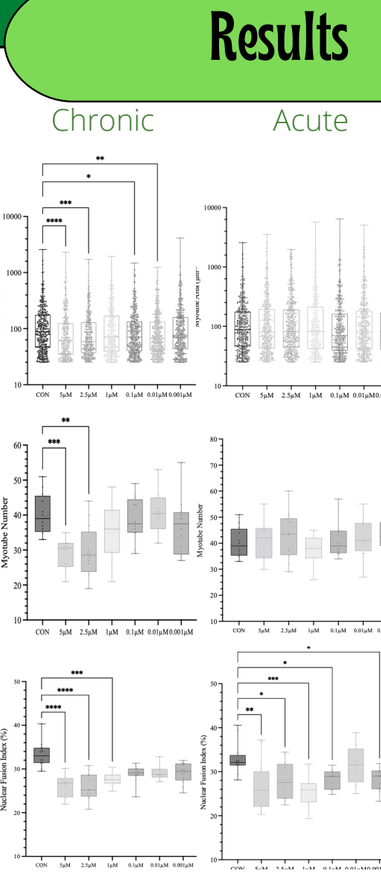
Two different strains of cannabis (C. sativa & C. indica) and their respective properties

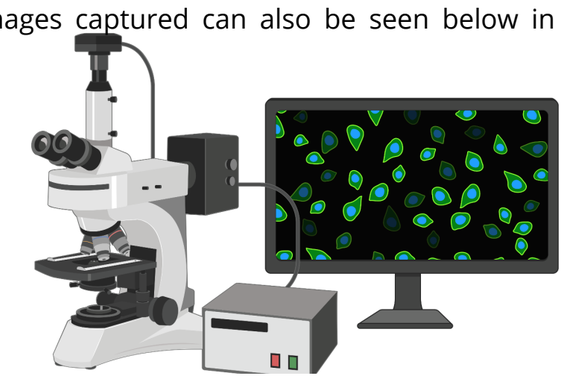
Methods



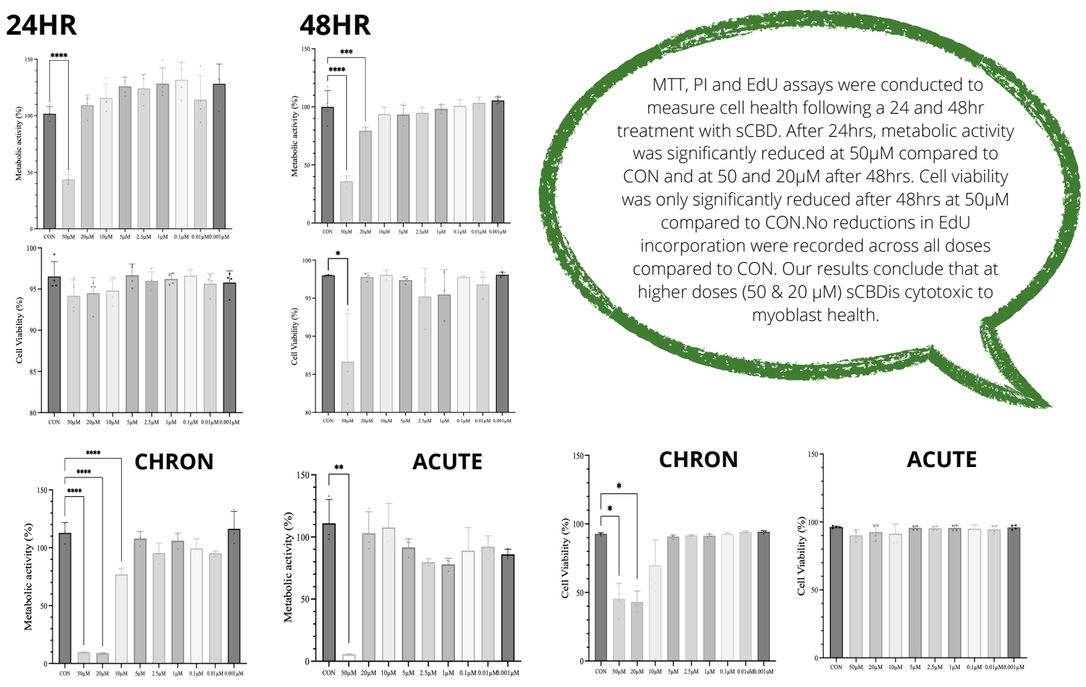
Methods

Schematic designs for studies can be seen to the left. Following on from the cell-based assays (MTT, PI and EdU Assay) after 24 and 48-hours, the remaining studies were terminated at 10 days. Two different dosing techniques, chronic and acute were implemented to determine if the stage of differentation upon administration had any effect on cell viability and myotube formation. To examine myotube morphology, a fluorescent microscope was used which can be seen below. Immunostained images captured can also be seen below in the results section.



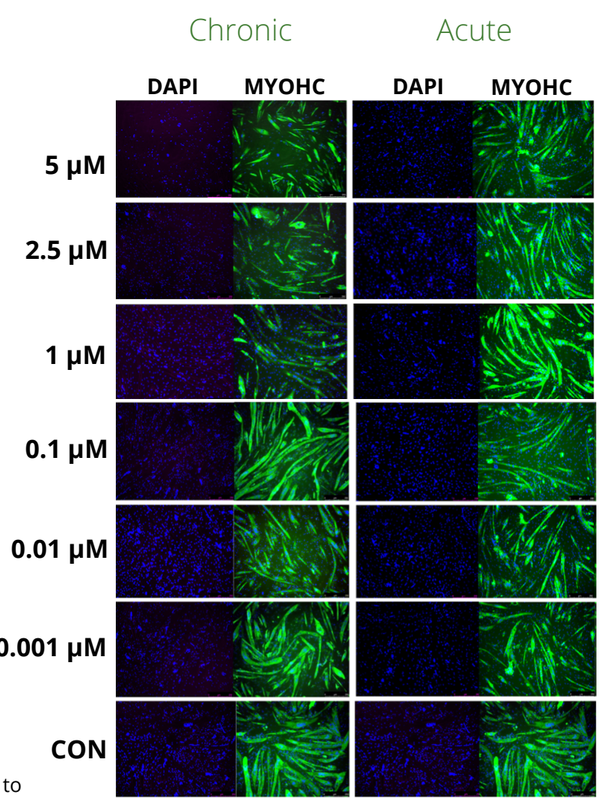


Results



Results

*Indicates level of significance compared to CON



Conclusions

The primary finding from this research is that synthetic cannabidiol confers no beneficial effects to myoblast proliferation and differentiation and is cytotoxic to myoblast and myotube health at a high in vitro dose of 50 μM. This effect was exaggerated following chronic treatment, where monolayers received repeated sCBD doses, as significant reductions in metabolic activity were reported at 50, 20 and 10 μM and cell viability reduced at 50 μM and 20 μM respectively. Morphological changes were reported after chronic treatment, with reductions in myotube area, number and NFI all recorded following administration of sCBD at certain doses, only NFI was reduced in the acute treatment at certain doses. Whilst our research suggests sCBD might not have much of an impact on skeletal muscle cells under normal conditions, previous research has demonstrated CBD to have no detrimental effects at lower doses, especially when compared to substances used for similar purposes, such as NSAID's. Therefore, to reduce the risk of any adverse effects of NSAID's, athletes should consider supplementing with CBD, as it appears to have no adverse effects on anabolic and inflammatory signalling.