Mast Cell Infiltration of Cannabigerol Treated Methionine/Choline Deficient Diet Induced Mice NASH Model

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Background Information

- Mast cells are immune cells that interact with any antigens, allergens, or pathogens, releasing mediators that regulate inflammation, smooth muscle contraction, vascular permeability, and initiate proliferation of epithelial cells and fibroblasts.
- Non-alcoholic fatty liver disease (NAFLD) is the accumulation of fat in pathological amounts unrelated to alcohol consumption due to excess fatty acids and sugars in and individual's diet.
- Non-alcoholic steatohepatitis (NASH) is the advances stage of NAFLD characterized by cell injury and fibrosis, which can lead to cirrhosis.
- Multiple studies have found that mast cell numbers correlate directly to levels of fibrosis, as they are mediators to inflammation.
- Cannabigerol (CBG) is a cannabinoid that is being researched as a medical treatment that acts as a regulator of endocannabinoid receptors CB1 and CB2, providing potential antiproliferative effects.

Research Aims

- Does mast cell infiltration change under a MCD induced NASH model?
- Does CBG treatment help reduce mast cell infiltration?

Hypothesis: Mast cell infiltration will increase under the MCD diet and low CBG treatment will have the greatest impact on reducing mast cell infiltration.

Methods

- 7-8 week-old C57BL/6 mice were fed a control (CTR) diet or the MCD diet for 3 weeks
- CBG treatment was injected for 2 additional weeks while fed the same diets
- Dosages: High CBG (24.6 mg/Kg/day), Low CBG (2.46 mg/Kg/day)

Mast Cell Infiltration in Control vs MCD Livers

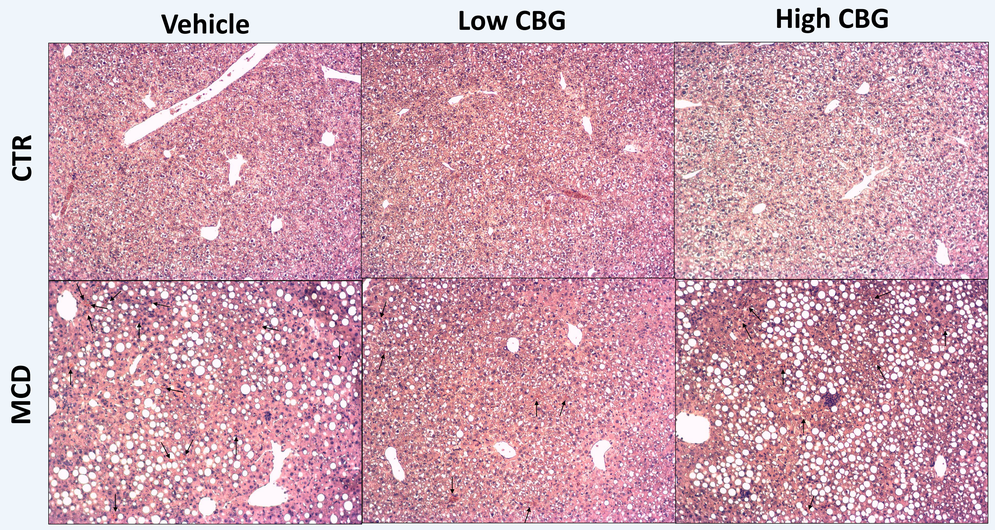

Figure one. Results from the CAE staining of paraffin slides. Liver samples were from female mice. Arrows point to mast cells found within the hepatic tissue. No mast cells were observed in the CTR group, and the highest mast cell counts were observed in the control (vehicle) MCD group. Lowest mast cell numbers were observed in the low CBG treatment group.

Mast Cell Immunofluorescence

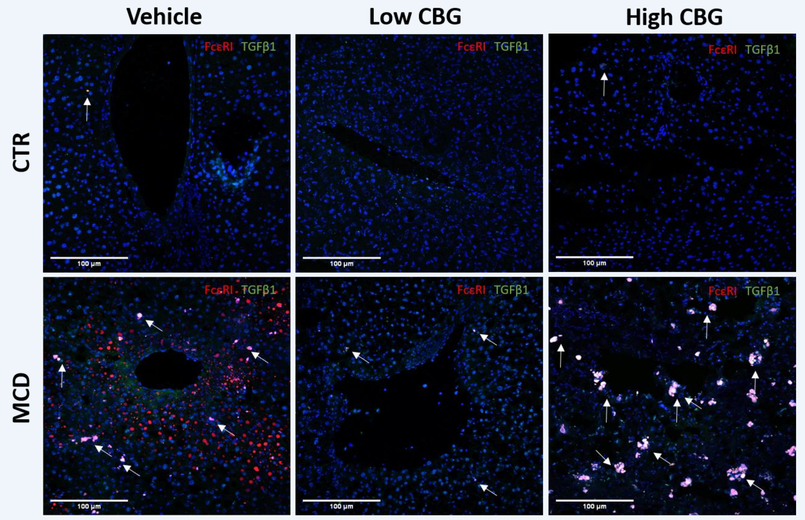

Figure Two. Results from the FcεR1/TGFβ1 Immunofluorescence. Liver samples were from male mice. Red indicates FcεR1 positive staining, or presence of mast cells. Green indicates TGFβ1 positive staining. Arrows point to colocalization, indicating presence of mast cell activity.

Results & Conclusion

- CAE staining shows there are no mast cells present in CRT groups
- Mast cells appear in larger number in the control MCD group
- There are a lower number of mast cells in the experimental group treated with low CBG
- Visual observation shows lower levels of adipose, supporting theory of NASH reversal
- FcεR1/TGFβ1 Immunofluorescence shows low mast cell numbers with low CBG treatment, and higher numbers with no treatment
- Immunofluorescence results aligns with CAE staining results
- Treatment with low CBG decreases mast cell immune response

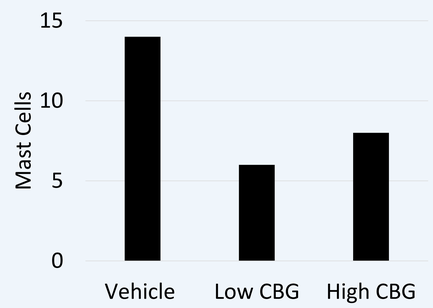

Figure three. Quantification of mast cells in CAE stained MCD livers under control, low and high CBG treatment. Mast cell count decreases with CBG treatment.

Future Directions

- Repeat study with larger sample group
- Further exploration of CBG's role in potential NASH reversal
- Explore potential off-target effects of CBG throughout body and other long-term effects of usage

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