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Anti-inflammatory activity of **Cannabis sativa** L. extracts in an **in vitro** model of skin inflammation

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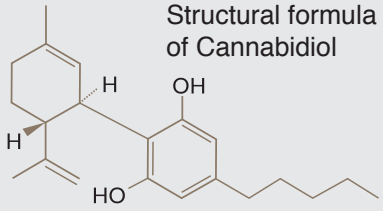
Skin is an important organ of human body with several functions, including the protection against different stressors, such as microbial pathogens, mechanical damage and UV irradiations. During cutaneous inflammatory diseases (such as psoriasis), keratinocytes, the most abundant cells in the epidermis, release a variety of pro-inflammatory mediators (for example IL-8 and MMP-9)[1][2] to amplify and prolong the inflammatory process. IL-8 and MMP-9 expression in human keratinocytes is regulated through the activation of different transcription factors, including NF-κB.

Cannabidiol (CBD) is one of the lipophilic cannabinoids occurring in Cannabis sativa L.; although previous study has demonstrated that CBD exerts anti-inflammatory effects in an in vivo model of skin inflammation[3], no studies on the anti-inflammatory and antioxidant effects in human keratinocytes have been reported so far.



Structural formula of Cannabidiol

Aim of the work

The aim of this work was to evaluate the anti-inflammatory activity of the Cannabis sativa L. extracts, standardized in CBD and cannabidiolic acid (CBDA), in human keratinocytes.

Linnea Cannabis Extract is obtained exclusively from the inflorescence of female plants. Linnea has selected a clone of Cannabis for its specific cannabinoids profile. Cultivation are done in Switzerland in greenhouses or in the field. Plants are cultivated in accordance to strict procedures that guarantee GAP application and compliance to national regulation.
Linnea staff is present on site to monitor all procedures and secure the quality standards.

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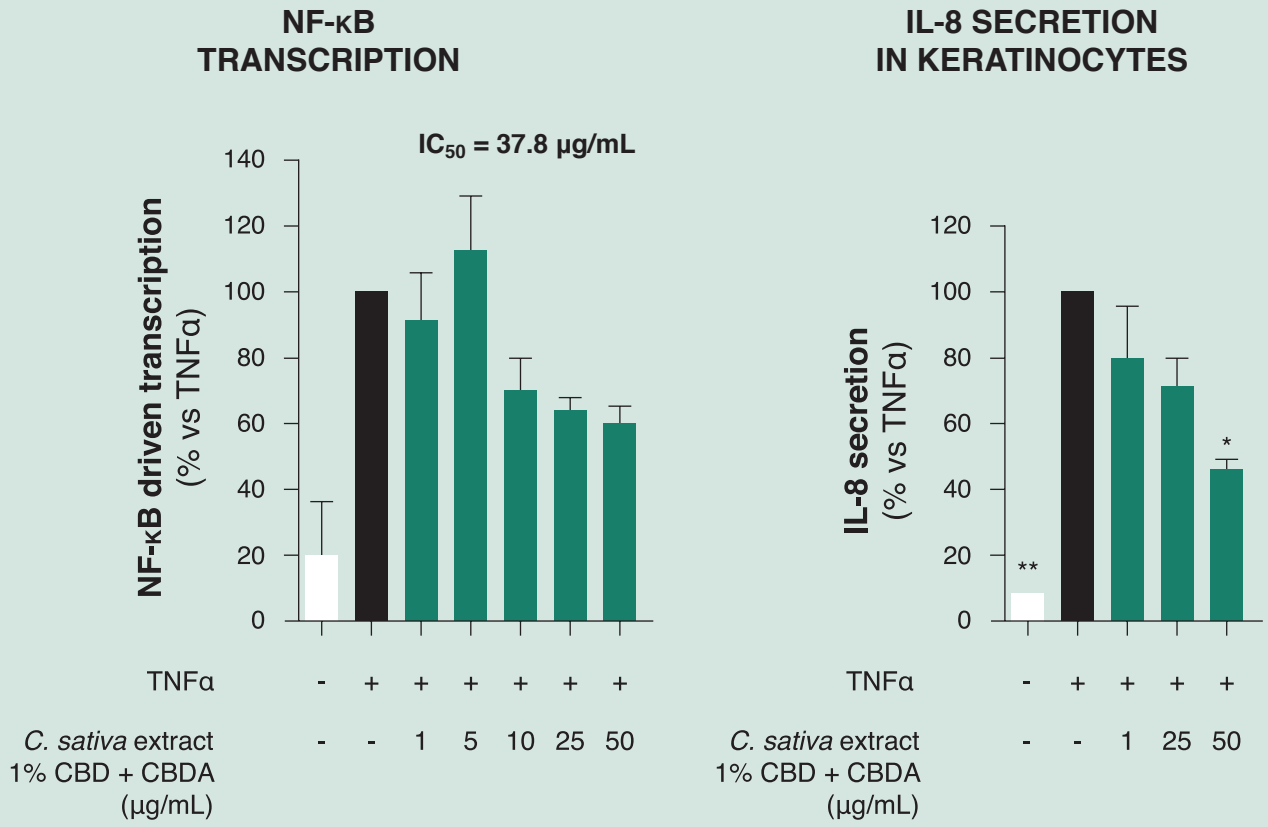
Methods

Two **Cannabis sativa** L. extracts, each containing 1% or 50.8% CBD+CBDA, were prepared and standardized by LINNEA SA (Riazzino, Switzerland). IL-8 and MMP-9 release were analysed by ELISA assays, whereas NF-κB driven transcription was tested using a reporter plasmid.

Results and discussion

Both extracts inhibited TNFκ-induced MMP-9 secretion in a concentration dependent manner with an IC_{50} of 5.54 and 1.78 µg/mL respectively; considering IL-8 secretion, only 1% extract reduced the chemokine release (IC_{50}: 34 µg/mL). The effect was ascribed to the impairment of the NF-κB pathway since both the extracts inhibited TNFκ-induced NF-κB driven transcription (IC_{50}: 37.8 for 1% extract, and 2.7 µg/mL for 50.8% extract).



Conclusions

These results suggest that **Cannabis sativa** L. containing CBD and CBDA may possess beneficial effects against inflammatory skin diseases.

Reference

[1] Barker J.N.W.N. et al., 1990. J Clin Invest. 85:605-08
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[3] Lodzki et al., 2003. J Control Release. 93(3):377-387

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