PULSUS
WWW.PULSUSCONFERENCE.COM
39 YEARS IN ASSESSING THE IMPACT OF HEALTHCARE RESEARCH

12th WORLD NURSING FORUM

April 17, 2023 | Webinar

Received date: 19-12-2022 | Accepted date: 21-12-2022 | Published date: 27-04-2023

Dermal delivery of cannabidiol by lipid-stabilized nanoparticles: ın vitro and ın vivo evaluation

Mark Zamansky[1,2], Na'ama Zehavi[2], Amnon C Sintov[1,3], and Shimon Ben-Shabat[3]
[1]Ben Gurion University of the Negev, Israel
[2]Laboratory for Biopharmaceutics, E.D. Bergmann Campus, Ben-Gurion University of the Negev, Be'er Sheva, Israel
[3]Department of Biochemistry and Pharmacology, Ben Gurion University of the Negev, Be'er Sheva, Israel

Dermal and transdermal delivery of poorly soluble actives poses a significant formulation challenge. We have developed a nanoparticle (NP) template for encapsulation of the poorly soluble actives, using stabilization by lipids to enhance entrapment and permeability and to allow control over their release rate. Using two model actives – Cannabidiol (CBD) and Curcumin we developed NPs preparation process and defined the parameters influencing on size and distribution of NPs. We showed that incorporating different lipids in the NPs allows different release rates of CBD in-vitro and different release and skin permeation in ex-vivo experiments. Notably, the NPs stabilized with cetyl alcohol (CA) showed a significantly higher permeation compared to NPs stabilized with Stearic acid (SA). CBD has been shown as an effective possible treatment for psoriasis, suggesting that lipid stabilized NPs (LSNs) loaded with CBD might be more effective. In a study on TNF-α induced HaCaT cells, the LSNs showed significantly lower cytotoxicity compared to free CBD (in the same nominal concentrations), indicating its gradual release from the LSNs in the cell culture medium. The LSNs significantly suppressed the release of psoriasis-related interleukins, IL-6 and IL-8, confirming applicability for psoriasis treatment. Further, the LSNs were tested in an Imiquimod (IMQ)-induced psoriasis model in mice. The study was conducted on 8-11 week old C57BL/6 mice. In this study, we have shown that the LSNs loaded with CBD effectively prevented external manifestations of IMQ-induced psoriasis. The LSNs applied in a silica-gel formulations were significantly more effective than a similarly formulated emulsion of CBD, suggesting enhanced delivery of CBD by the SLNs. In contrast, their external effect was comparable to that of the positive control, a commercial clobetasol cream 0.05%.

markzam@post.bgu.ac.il