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## Hyaluronic acid decorated tacrolimus-loaded nanoparticles: Efficient approach to maximize dermal targeting and anti-dermatitis efficacy

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topic Dermatitis (AD) is a chronically relapsing eczematous skin disease characterized by frequent episodes of rashes, Asevere flares and inflammation. Till date, there is no absolute therapy for the treatment of AD. However, Topical Corticosteroids (TCs) are the majorly prescribed class of drugs for the management of AD. However due to numerous local and systemic adverse effects associated with the use of TCs, Topical Calcineurin Inhibitors (TCIs) have alternatively been well prescribed agents. Though, topical route is most preferable however, a limited penetration of therapeutics across the Stratum Corneum (SC) is one of the major challenges to topical formulations. Owing to excellent biomedical achievements of nanomedicines in the last few decades, nano-delivery systems have gained remarkable recognition for targeted delivery of therapeutic payload, reduced off-target effects and improved biopharmaceutical profiles of drugs. Therefore, we aimed to fabricate polymeric Nanoparticles (NPs) to deliver Tacrolimus (TCs) to deeper layers of the skin in order to alleviate its systemic toxicity and improved therapeutic efficacy for treatment of AD. To further optimize the targeting efficiency, TCSloaded NPs were coated with Hyaluronic Acid (HA). HA plays multifaceted role in regulating the various biological processes and maintaining homeostasis into the body. Plenteous researches have evidenced the biomedical implications of HA in the skin repair, wound healing, tissue regeneration, anti-inflammatory, and immunomodulation. Following the various physicochemical optimizations, the prepared HA-TCS-CS-NPs were tested for *in vitro* drug release kinetics, drug permeation across the stratum corneum, percentage of drug retained in the epidermis, dermis and anti-AD efficacy. Results revealed that HA-TCS-CS-NPs exhibit sustained release profile, promising drug permeation ability, improved skin retention and pronounced anti-AD efficacy. Conclusively, we anticipated that HA-based modification of TCS-CS-NPs could be a promising therapeutic approach for rationalized management of AD, particularly in children as well as in adults having steroid phobia.

### **Biography**

Zahid Hussain is currently working as an Assistant Professor in the Department of Pharmaceutics, Faculty of Pharmacy, Universiti Teknologi MARA, Malaysia. He is also the Executive Head of Quality Control Department of Good Manufacturing Practices Unit at Universiti Teknologi MARA, Malaysia. He has authored more than 50 peer-reviewed research/review articles with high impact factor, well-ranked international journals and 3 book chapters. He is recipient of several prestigious honors and awards. He is the Editorial Board Member for 3 international journals and is also the Official Reviewer of more than 30 well-reputed peer-reviewed international journals. His research interests include fabrication, characterization and formulation of nanotechnology-based topical, percutaneous and transdermal drug delivery systems for the efficient management of skin inflammatory disorders including psoriasis, atopic dermatitis and acute-to-chronic wound.

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