



Review

Recent Advancements in Topical Anti-Psoriatic Nanostructured Lipid Carrier-Based Drug Delivery

Tulshidas S. Patil^{1,*}, Nayan A. Gujarathi¹, Abhijeet A. Aher¹, Hemal E. Pachpande¹, Charu Sharma², Shreesh Ojha³, Sameer N. Goyal¹ and Yogeta O. Agrawal^{1,*}

¹ Shri Vile Parle Kelavani Mandal's Institute of Pharmacy, Dhule 424001, Maharashtra, India

² Department of Internal Medicine, College of Medicine and Health Sciences, United Arab Emirates University, Al-Ain P.O. Box 15551, United Arab Emirates

³ Department of Pharmacology and Therapeutics, College of Medicine and Health Sciences, United Arab Emirates University, Al-Ain P.O. Box 15551, United Arab Emirates

* Correspondence: tulshidaspatil01@gmail.com (T.S.P.); goyalyogita@rediffmail.com (Y.O.A.); Tel.: +91-2562-297802 (T.S.P. & Y.O.A.) or +91-2562-297805 (T.S.P. & Y.O.A.)

Abstract: Psoriasis is linked with unusual differentiation and hyperproliferation of epidermal keratinocytes that significantly impair the quality of life (QoL) of patients. The present treatment options only provide symptomatic relief and are surrounded by various adverse effects. Recently, nanostructured lipid carriers (NLCs) have emerged as next-generation nanocarriers with better physicochemical characteristics. The current manuscript provides background information on psoriasis, its pathophysiology, existing treatment options, and its limitations. It highlights the advantages, rationale, and mechanism of the permeation of NLCs for the treatment of psoriasis. It further gives a detailed account of various NLC nanoformulations for the treatment of psoriasis. In addition, tabular information is provided on the most relevant patents on NLCs for treating psoriasis. Lastly, light is shed on regulatory considerations related to NLC-like nanoformulations. In the treatment of psoriasis, NLCs display a sustained release drug profile, an ability to incorporate both hydrophobic and hydrophilic drugs, an enhancement in skin hydration, penetrability, retention, and bioavailability of the drug, along with reduced staining potential as compared to conventional ointments, and decreased side effects of drug molecules. This affirms the bright future of NLC nanoformulations in the treatment of psoriasis. However, academic industry collaboration and more sound regulatory controls are required to commercialize the NLC nanoformulations for psoriasis treatment.

Keywords: nanostructured lipid carriers; psoriasis; physicochemical findings; pharmacological findings; regulatory aspects



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1. Introduction

Psoriasis is a chronic, noncontagious, excruciating, mutilating, and disabling papulosquamous skin disorder. As per the Global Report on Psoriasis by the World Health Organization (WHO), the overall existence of psoriasis ranges from 0.09% to 11.43% in different countries, in particular, varying from 1.5 to 5% in developed countries. There are a minimum of 100 million people suffering worldwide, which makes psoriasis a severe global issue [1]. In India, the incidence in adults ranges between 0.44 to 2.8% and is more prevalent in males (nearly twice as much) in comparison to females [2]. The disease significantly impairs quality of life (QoL) and further results in high physical, social, and emotional burden. Various types of psoriasis based on clinical manifestation and anatomical site, their percentage prevalence, and common symptoms are depicted in Figure 1A,B. On the basis of clinical manifestations, psoriasis can be categorized as psoriasis vulgaris, guttate psoriasis, erythrodermic psoriasis, or pustular psoriasis. Further, based on the involvement of anatomical region, psoriasis is classified as palmoplantar pustulosis, nail psoriasis, flexural (inverse) psoriasis, scalp psoriasis, or genital psoriasis [3]. The most common and frequent

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