

Nano-Therapeutics to Treat Acne Vulgaris: Improved Therapeutic Efficacy and Skin Tolerability

Venesa Lupçi¹

Toskë Kryeziu^{1,2,3}

1 University of Prishtina, Faculty of Medicine, Bulevardi i Dëshmorëve, Prishtina, Kosovo

2 University of Trakya, Faculty of Faculty of Engineering, Edirne, Turkey

3 University of Graz, Institute of Pharmaceutical Science, Universitätsplatz 1/EG, Graz, Austria

venesa.lupci@gmail.com

Nano-therapeutics for treating Acne Vulgaris represent a cutting-edge approach in dermatological care, leveraging the advancements in nanoscale drug delivery systems (NDDS) to enhance therapeutic efficacy and skin tolerability. This abstract outlines the exploration of novel nano-based treatments for acne, focusing on their development, mechanisms, and potential to improve patient outcomes significantly.

The core of this exploration is the innovative use of nano-therapeutics, including liposomes, nanoemulsions, solid lipid nanoparticles, and polymeric nanoparticles, specifically tailored for combating Acne Vulgaris. These systems offer unprecedented advantages in drug delivery, such as increased penetration of active ingredients into the skin, targeted action on acne-causing bacteria and inflamed tissues, and controlled release of therapeutics, thereby minimizing systemic absorption and associated side effects.

Critical to the advancement of these nano-therapeutics is the emphasis on biocompatibility and skin tolerability. The presentation delves into the selection of materials and design principles that ensure compatibility with skin physiology, reducing irritation and enhancing patient compliance. Innovative strategies for improving the stability and efficacy of active ingredients against the harsh skin environment are also discussed, including encapsulation techniques and surface modification of nanoparticles.

The challenges of quality control and safety in the development of nano-therapeutics for acne are addressed comprehensively. We analyze the methods for characterizing nanoparticle formulations, assessing their physical stability, skin permeability, and biodistribution, as well as the importance of conducting rigorous toxicological evaluations to ensure safety for topical use.

In conclusion, nano-therapeutics hold great promise for revolutionizing the treatment of Acne Vulgaris, offering improved therapeutic efficacy and skin tolerability. This research underscores the need for a multidisciplinary approach, involving collaboration among dermatologists, pharmaceutical scientists, and regulatory bodies, to overcome the challenges in quality control and safety assurance, paving the way for their successful integration into dermatological practice.

Venesa Lupçi and Toskë Kryeziu are members of NANOALB research group.