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Thiolated silicone oils as novel skin care agents with enhanced adhesiveness and reinforced occlusivity

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Aim: The purpose of this study was the evaluation of thiolated silicone oil as novel skin protectant with a prolonged residence time, enhanced barrier function and reinforced occlusivity.

Methods: Two silicone thiomers were synthesized with mercaptopropionic acid (MPA) and thioglycolic acid (TGA) as thiol ligands. Adhesion, protection against artificial urine as well as water vapour permeability with both a Payne cup setup and transepidermal water loss (TEWL) measurements on porcine skin were performed.

Results: Silicone conjugates showed pronounced substantivity on skin with 39.2 ± 6.7 % and 22.1±6.3 % remaining silicone after 8 h for silicone-MPA and silicone-TGA, respectively, whereas unmodified silicone oil and dimethicone were no longer detectable. Especially silicone-MPA strikingly shielded skin against artificial urine penetration for up to 6 h and showed a reduced TEWL by two third in comparison to control.

Conclusion: Thiolation of silicone oils leads to enhanced skin adhesiveness due to disulfide crosslinking, which is a major advantage compared to commonly used silicones, such as dimethicone. Depending on the thiol ligand, various degrees of occlusivity can be achieved. Thiolated silicone oils thus provide a protective layer and improve skin moisturization. Pharmaceutical targets might be hypertrophic scars and keloids, neurodermatitis, psoriasis as well as atopic, allergic or irritant contact dermatitis.

Biography

Alexandra Partenhauser is writing her PhD thesis on polymeric drug delivery systems under the supervision of Prof. Bernkop-Schnurch in Innsbruck, Austria and has already published one paper in a well reputed journal within her first year. She previously finished both her Master of Pharmaceutical Sciences and studies of Pharmacy in Munich, Germany, where she was part of a project on an ocular sustained delivery system in the research group of Prof. Winter for her Master thesis.

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