Cyclosporine investigated for external treatment of psoriasis and atopic dermatitis

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Human skin structure. Credit: Wikipedia

A research team from the University of Valencia, DrugBiOp, coordinated by professors Teresa Mª Garrigues and Ana Melero (Department of Pharmacy and Pharmaceutical Technology and Parasitology), has studied the skin penetration of cyclosporine A (CyA), a principle active ingredient formed by eleven amino acids and which

has immunosuppressive properties. Psoriasis and atopic dermatitis are two chronic inflammatory ailments related to the immune system and that need easier-to-administer, less economically expensive, more efficient and less toxic treatments to be developed.

The principal investigator of the project funded by the Ministry (GV2015-054), Ana Melero, explains that they have designed "ultra flexible lipid vesicles that are able to administer through the skin a small peptide, which is cyclosporine. It is an immunosuppressive drug that at the moment can only be administered orally or injected, because its high dimensions make it impossible to administer through the skin."

In the research, in which students Adrián Sala, William Tapia-Ramírez, Juan José Carreras, and Antonio Guilot García have taken part, the team has prepared and characterized stable lipid vesicles, such as liposomes, transpheromes and ethosomes, and their penetration into the skin has been evaluated. "If our nanocarriers are used, it can be applied topically to damaged skin because it is absorbed into the layers of the affected skin locally, without spreading throughout the body," Melero says.

As proposed by the research team, topical administration is easier to apply and makes it possible to reduce the dose and risks of infection and other serious effects associated with the distribution of the drug throughout the body. "The novelty is that it enables the absorption of a drug of greater size than usual through the skin and opens a route of administration of other substances for therapeutic, diagnostic or even vaccination purposes through the intact skin, without having to be injected," the researcher points out. The aim of this work is to open up the possibility of using cyclosporine A topically, directly on the skin and as an alternative to the current oral or parenteral routes.

Cyclosporine A

Cyclosporine A is a medicine that has been used orally since 1997 to treat ailments such as psoriasis and atopic dermatitis. Two chronic inflammatory ailments related to the immune system and that need easier-to-administer, less economically expensive, more effective and less toxic treatments to be developed. Being a powerful immunosuppressant, it depresses the patient's immune system, and its side effects and risk of systemic use are very high, that is why, it is given to acutely ill patients and who do not respond to other therapies.

More information: Juan J Carreras et al. Ultraflexible lipid vesicles allow topical absorption of cyclosporin A, *Drug Delivery and Translational Research* (2019). DOI: 10.1007/s13346-019-00693-4

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