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What are the consequences of impact of the polysiloxanes (silicones) on the skin barrier?

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Overcoming the barrier of the skin is dangerous especially in case of substances which are: toxic, potent or which have the ability to accumulate. An object of interest are polysiloxanes (silicones) with a linear and cyclic structure due to widespread of their use in medicinal products (e.g. Rozex Metronidazolum) and cosmetics (e.g. Penaten Baby Cream or Body Lotion Garnier), which are intended not only for adults and children, but also for infants. Justification for taking this research is no information in the literature that if these compounds have ability to overcome the skin barrier. Based on the results, it was found that human skin shows no barrier to low molecular weight polysiloxanes with cyclic and linear structure. All tested polysiloxanes have been identified in the stratum corneum due to the possibility of the penetration of this layer, and demonstrated the ability to penetrate into epidermis and dermis, in which are the blood and lymphatic vessels. Also there were found evidence of the presence of interactions of polysiloxane with components building blocks of all layers of the skin: silicone-stratum corneum, silicon-epidermis and silicon-dermis. We also found the cause of overcoming, contrary to the Lipiński rule, the skin barrier by low molecular weight polysiloxane (PDMS having a viscosity of 10 cSt), which has a molecular weight of 1250 Da. It was concluded that overcoming the barrier of the skin by this compound can be due to conformational relaxation of structure of the lipid bilayer of the stratum corneum, which could result in increased permeability of such modified lipid membranes. Also contemplated destruction of the skin barrier occurs due to the extraction of lipid matrix of the stratum corneum by the lipophilic polysiloxanes. To accomplish the objective of the research, Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIR) and fluorescence microscope were used.

Biography

Krystyna Mojsiewicz-Pienkowska PhD, DSc is an Assistant Professor in the Department of Physical Chemistry at the Medical University of Gdansk, Faculty of Pharmacy with Subfaculty of Laboratory Medicine, Gdańsk, Poland. She is also an expert in the National Centre for Research and Development. She has published more than 40 papers in reputed journals. She is an active reviewer for the scientific pharmaceutical and chemical journals. Currently, her scientific and research activity is related with: studies of the penetration and permeation of silicones and drugs through the human skin; development of analytical methods for drug analysis; silicones application in pharmacy, medicine and cosmetic products; pharmaceutical technology and; studies of a phenomenon of dissolution of poorly soluble drugs.

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