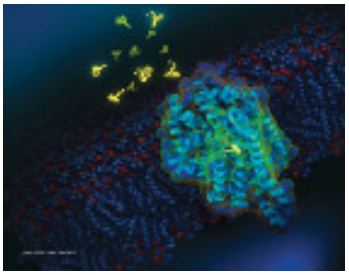

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Molecular mobility of added chemicals, lipids and proteins in intact stratum corneum

Despite the enormous potential for pharmaceutical applications, the molecular details of the changes in the stratum corneum (SC) associated with high permeability in the presence of different added chemicals are still not fully understood. Solvents in formulations or compounds that may facilitate transdermal drug delivery, called "penetration enhancers", are among these added chemicals. These different molecules likely influence SC molecular components in very different ways. The aim of the present study is to characterize the molecular effect of different classes of molecules on SC lipid and protein components.

At normal relative humidity and ambient temperature, the main fraction of SC lipid and protein components are solid and highly ordered, while there is a very minor co-existing fraction that is fluid/mobile. Changes in this minor fluid fraction is inherently difficult to detect in experimental studies, however, it is considered crucial to SC barrier and mechanical properties. Through recent developments, Polarization Transfer Solid-State NMR (PT ssNMR) method together with almost complete peak assignment of SC components permits the detection of small changes in the molecular dynamics of the minor fluid lipid and protein components upon the added chemicals. Simultaneously we are able to monitor changes in molecular dynamics of the added molecules inside SC, enabling us to draw conclusions on interactions and partitioning of these molecules in SC. By correlating the effects on SC molecular components and SC barrier function, we aim at depended understanding of diffusional transport in SC and how this is related to the fluidity of the SC molecular components.

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