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Systematic investigations into the role of ceramide subclass composition on lipid organization and skin barrier

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STELLINGEN

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Systematic investigations into the role of ceramide subclass composition on lipid organization and skin barrier

1. Seborrheic dermatitis is characterized by a significantly impacted skin barrier function and several ceramide compositional changes, similar to other inflammatory skin diseases. (*This thesis*)
2. The molar ratio between ceramide NS and ceramide NP, which is altered in several inflammatory skin diseases, contributes to the impaired skin barrier function. (*This thesis*)
3. The location of the acyl chains of ceramide NS and ceramide NP in the inner layer of the unit cell of the long periodicity phase is not influenced by the ceramide subclass composition of the lipid model, indicating a strong adaptability of the lamellar organization. (*This thesis*)
4. Ceramide chain length, rather than the ceramide subclass composition, has an important role in the impaired skin barrier function. (*This thesis*)
5. Reduction of the free fatty acid chain length in atopic dermatitis skin has a greater impact on the barrier function than changes in the ceramide profile, most likely due to a change in packing density, which does not occur when shortening the ceramide chain length. (*Uche, L.E. et al. Langmuir (2019) 35: 15376–15388*)
6. Great similarity has been observed in the stratum corneum lipid lamellar organization in several species (human, porcine, mouse and canine skin), while the ceramide subclass composition of each species is very different. This indicates that the lamellar organization has a large capacity to accommodate changes in the ceramide subclass composition. (*Bouwstra, J.A. et al. Prog. Lipid Res. (2023) 92: 101252*)
7. Topically applied fatty acids may enhance the skin barrier function by the intercalation of these fatty acids in the stratum corneum lipid matrix. (*Berkers, T. et al. Exp. Derm. (2017) 26(1): 36-43*)
8. Treatment with Dupilumab may normalize stratum corneum lipid composition thereby improving the barrier function in atopic dermatitis patients. (*Berdyshev, E. et al. Allergy (2022) 77: 3388–3397*)
9. If we knew what we were doing, it would not be called research, would it? (*Albert Einstein*)
10. If I have seen further, it is by standing on the shoulders of Giants. (*Isaac Newton*)

Andreea Nădăban
Leiden, 16th of May 2024