

STSM report

Title STSM: Biomarkers of the skin barrier

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Host: Coronel Institute (AMC) Sanja Kezic, STANDERM MC member

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Background

A defective skin barrier is characterized by increased transepidermal water loss (TEWL) as well as enhanced percutaneous penetration of skin irritants and allergens. The causes of the impaired skin barrier are not sufficiently understood but often impaired skin barrier is associated with altered composition and structure of the stratum corneum lipids, reduced levels of natural moisturizing factors (NMF) and aberrant activity of skin proteases. Better understanding of relevant biomarkers of skin barrier function would be of great value in identification of susceptible individuals in high risk jobs or to enable assessment of the effect of therapy or protection measures.

Work plan and description of STSM program

I have fulfilled the planned work plan.

I have learned and practised the following techniques:

1. Skin bioengineering techniques including TEWL, erythema, pH, hydration
2. Skin stripping technique used for the determination of inflammatory mediators, lipids and filaggrin degradation products (Natural moisturizing factors, NMF)
3. HPLC method for the determination of NMF including preparation of the samples
4. How to set up an intervention study in occupational skin disease
5. Clinical scoring methods used in the Netherlands

The main aim of this STSM project was to practice with various bioengineering techniques used for the assessment of the skin barrier like TEWL, skin hydration, pH, and morphology by using confocal reflectance microscopy.

During my stay at the Coronel Institute in AMC, I have practiced tape-stripping method which is used for skin sampling for analysis of NMF and lipid analysis.

I participated actively in laboratory procedure of determination of NMF. I have been involved in the clinical assessment, measurements of the skin barrier function at different time points and collection of the samples of the stratum corneum (SC) by using tape stripping techniques. I have participated in preparation of the tape strip samples for the analysis of NMF, SC lipids and cytokines.

During my stay, I was enrolled in a large clinical study on the effect of topical treatment with different emollients on the skin barrier in atopic dermatitis patients. In this study role of ceramides on skin barrier and inflammation was studied.

I have discussed the diagnostic criteria for contact and atopic dermatitis which are used by the dermatologists of two large academic hospitals in the Netherlands (AMC and VUMC).

Benefits:

This visit will help me in setting up clinical study at my hospital which will be a major part of my PhD project. The project aims at evaluating biomarkers of skin barrier in patients with atopic and contact dermatitis. The project will be a cooperation of three STANDERM members:

- KBC (Clinical Hospital Centre) Zagreb,
- PBF Zagreb (I. Jakasa) and
- AMC (S. Kezic).

As a result of successful STSM and collaboration which has been established, I am at this point finishing with registering PhD project under the name “ Biomarkers in atopic dermatitis” and I am very glad that Dr. Sanja Kezic will be co-mentor in my PhD project. We have also agreed to collaborate in epidemiologic study of filaggrin prevalence and NMF determination in general population in Republic of Croatia, and also determination of filaggrin mutation in patients with occupational contact dermatitis. Since dr Kezic is also a member of Working group 1, we also agreed to write a review article on emollients in contact dermatitis.