Investigation of the skin barrier properties of healthy subjects and atopic eczema patients

Published: 06-11-2009
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The objective of tje study is to investigate the lipid organization and composition in the SC of AE patients and healthy subjects in relation to the water and nmf-content in the SC.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Epidermal and dermal conditions
Study type	Observational invasive

Summary

ID

NL-OMON33171

Source
ToetsingOnline

Brief title
Skin barrier properties of healthy subjects and AE patients

Condition

- Epidermal and dermal conditions

Synonym
Atopic dermatitis, neurodermitis

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Leiden
Source(s) of monetary or material Support: NWO-Technologiestichting STW

Intervention

Keyword: Atopic eczema, Lipids, Stratum corneum

Outcome measures

Primary outcome

- Lipid organization by Infrared and Raman spectroscopy and electron

diffraction;

- Lipid composition by LC/MS.

Secondary outcome

- Transepidermal water loss (TEWL)

- Water levels in the SC

- NMF level in the SC

Study description

Background summary

Atopic eczema (AE) is one of the most common skin diseases. It has been related to factors such as allergens and irritants and is associated with red and dry skin. The occurrence of AE is increasing rapidly. For many years it has been thought that these allergens and irritants initiate the disease via the airways. However, in recent years there is strong evidence that the disease is triggered by an impaired barrier function of the skin. As a result of this impaired barrier function, the transport of allergens across the skin is facilitated, which increases the risk of developing eczema.
The skin barrier is located in the outermost layer of the skin, the stratum corneum (SC), which consists of dead cells embedded in lipid regions. The corneocytes are almost impermeable for compounds and the lipid regions are the only continuous structure in SC. For this reason the transport of substances applied onto the skin is mainly directed along the tortuous pathway of the intercellular lipid regions. This demonstrates that the hydrophobic lipids are considered to play a crucial role in the barrier function of the skin. The major lipid classes in SC are ceramides (CER), cholesterol (CHOL) and free fatty acids (FFA) in an approximately equimolar ratio.
In this project, we will use confocal Raman spectroscopy, electron diffraction

(ED) and infrared spectroscopy in order to determine the lateral packing of the SC lipids in AE patients and healthy subjects in vivo. In addition, we will study the lipid composition of SC lipids in AE patients and healthy subjects by liquid chromatography/mass spectrometry (LC/MS). Lipid organization and composition will be related to water and NMF-levels in the SC and will be measured as a function of depth in SC, since it is known that the lipid organization may alter as a function of depth. This is of interest since an altered lipid composition may result in an change in lipid organization, which may lead to a reduced barrier function of the skin.
This in vivo study will be the first in which various bioanalytical techniques are combined to thoroughly investigate the lipid organization and composition in SC of AE patients and healthy subjects.

Study objective

The objective of tje study is to investigate the lipid organization and composition in the SC of AE patients and healthy subjects in relation to the water and nmf-content in the SC.

Study design

Etiological

Study burden and risks

Measurements wil take place during one day. At the end of the day, a biopsy will be taken. There are no risks involved in participating in the study.

Contacts

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Universiteit Leiden

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Age between 18-40 years
- Caucasian

Exclusion criteria

- Aged under 18 or over 40;
- Non-Caucasian;
- Abundant hair presence on the upper ventral forearms;
- Unnatural abnormalities on one of their ventral forearms (e.g. skin lesions, tattoos);
- Subjects using any systemic drug therapy (e.g. cholesterol-lowering drugs, insulin related drugs, steroids) or subjects who received phototherapy in the past 2 years.;Additional exclusion criteria for healthy subjects
- No chronically inflammatory disease;
- No dermatological disorders or a history of dermatological disorders;
- No use of dermatological products (e.g. creams) on a daily basis.

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled

Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-03-2010
Enrollment:	42
Type:	Actual

Ethics review

Approved WMO

Date:	06-11-2009
Application type:	First submission
Review commission:	METC Leids Universitair Medisch Centrum (Leiden)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL29232.058.09