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Stiefel Dermatology  
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DMS Eagosh Nov.2011 HWR
Statement

Conventional Creams or Lotions are not the optimum choice for Skincare and Skin Protection!

Why?
Because........

1. **They usually contain potential irritants resp. sensitizers**, i.e.:
   - perfume
   - preservatives
   and very often:
   - dyes
   - plant extracts
   - lanolins
   - etc.

2. **They usually contain non-physiological lipids**, i.e.:
   - mineral oil (paraffins, petrolatum)
   - silicones

3. **They contain emulsifiers**, i.e.:
   - Tween, Span, PEG’s etc.
Potential Irritants, Mineral Oil, Emulsifiers

Why are these ingredients not optimum for the skin?

Because they negatively influence the

⇒ Skin-Lipid- Barrier
Skin-Lipid-Barrier (in the Stratum corneum)

„Specific lipids“ in a „Specific structure“

Lipid bilayers forming a „lamellar intercorneal structure“
Skin-Lipid-Barrier (SLB)

„Specific Lipids“

generated in odland bodies of the corneocytes

- Cholesterol esters ~10%
- Cholesterol ~15%
- Ceramides ~40%
- Free Fatty acids ~20%
- Phospholipids ~5%
- Squalene ~10%

Don‘t mix up with surface lipids = „hydro-lipid-film“
(expressed from sebaceous glands)
Atopic Dermatitis = Neurodermitis

Best example for a chronically defective skin-lipid-barrier
Atopic Dermatitis

- Barrier-Defect
- Hypersensitive Immune System
- Trigger- Factors
„Hypersensitive Immune System“

Bauernkinder scheinen seltener an Allergien zu erkranken. Vermutlich ist ihr Immunsystem besonders gut trainiert.
Figure 3: Immunological pathways in atopic dermatitis

- Interleukin. Modified from reference 10 with permission from Mosby/Elsevier Science, St Louis.

To formulate an optimum Skincare or Skin Protection

What can we do better ????????

⇒ Avoid Trigger-Factors

⇒ Strengthen Barrier
  a. „L lipid Replacement Therapy“
  b. Avoid emulsifiers

⇒ Reduce Inflammation
Trigger Factors = Potential Allergens

Penetrate through the defective Skin-Lipid-Barrier and provoke irritation and immunological cascade (sensitization, inflammation etc.)
Most frequent allergenes

<table>
<thead>
<tr>
<th>Allergenes</th>
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</thead>
<tbody>
<tr>
<td>Nickel sulfate</td>
</tr>
<tr>
<td>Perfume-Mix</td>
</tr>
<tr>
<td>p-Phenylendiamin</td>
</tr>
<tr>
<td>Kalium dichromate</td>
</tr>
<tr>
<td>Lanolin (Wool wax)</td>
</tr>
<tr>
<td>MDBGN/PE</td>
</tr>
<tr>
<td>Thiuram-Mix</td>
</tr>
<tr>
<td>MCI/MI</td>
</tr>
<tr>
<td>Formaldehyde-donator</td>
</tr>
<tr>
<td>Parabenes</td>
</tr>
<tr>
<td>Epoxid resin</td>
</tr>
</tbody>
</table>

... typical allergens in cosmetics:

Perfumes and Preservatives

⇒ only avoiding helps!

1) Methyldibromoglutaronitril/Phenoxyethanol
2) Methylchloroisothiazolinon/Methylisothiazolinon

nach AMWF-Leitline 11-2008
Message No.1

All Physiogel / A.I. and Sensiprotect Products are free of potential trigger factors (sensitizers, irritants) like:

- Perfume
- Preservatives
- Lanolins
- Dyes
- Plant extracts
- etc.
To formulate an optimum Skincare or Skin Protection

What can we do better ?????????

⇒ Avoid Trigger-Factors

⇒ Strengthen Barrier
  a. „Lipid Replacement Therapy“
  b. Avoid emulsifiers

⇒ Reduce Inflammation
Lipid Replacement Therapy

Replacing missing Barrier-Lipids with „Skin-related-Lipids“ rather than with Mineral Oil:

- Free fatty acids
- Triglycerides
- Ceramides
- Cholesterol

„Although emollient moisturizers decrease steroid use through moisturization, they usually consist of non-physiologic lipids, such as petrolatum and lanolin, which actually impede rather than correct the underlying biochemical response to a defective barrier in AD.“

Message No. 2

All Physiogel/A.I. Creams and Lotions and Sensiprotect contain:

- Skin related lipids only
- No mineral oil ingredients, like paraffins or petrolatum
- No lanolins
- No silicones
To formulate an optimum Skincare or Skin Protection

What can we do better ?????????

⇒ Avoid Trigger-Factors

⇒ Strengthen Barrier
  a. „Lipid Replacement Therapy“

  b. Avoid emulsifiers

(WHY?)
Emulsion stability

Mixtures of water and oil are inherently unstable Systems

⇒ Stabilization of the o/w or w/o interface with emulsifier is mandatory
Skin-Lipid-Barrier Damage

Emulsifiers, Surfactants

Dry skin

TEWL↑

Lipogenesis?

Cytokines

Barrier damage

Extraction

Lipids

Inhibition enzymes

Structural changes

Eczema

Cytokines

Penetration of other products
De-lipidised Skin-Lipid-Barrier

Vortrag Roger Wepf, El. Microscopy ETH Zürich
Where do we find Emulsifiers?

a) In Cleansers
   Soaps, Syndets, Shower gels, foam baths etc.

b) In Emollient creams
   O/W-Creams, W/O- Creams, Lotions, Sunscreens etc.

The most challenging task:
A formulation without emulsifier!
Derma-Membrane-Structure (DMS®) vs. conventional Emulsion
DMS® - Concentrate Manufacturing

High-Tech Method:
very high pressure (< 1400 bar)
long homogenization (< 8h)

What is resulting?

⇒ very stable cream-like concentrate
    with lamellar structure
Structure: DMS® vs. conventional Cream

- O/W- Cream -vesicular-
- Skin-Lipids -lamellar-
- DMS® - Cream -lamellar-
Message No. 3

All Physiogel/A.I. Creams and Lotions and Sensiprotect are:

⇒ free of emulsifiers !!!

(almost) unique in cosmetics and barrier creams!
DMS® (Physiogel®) – Cream

Summary

- „true“ hypoallergenicity
- skin related lipids only
- lamellar structure
- no emulsifiers!
DMS vs. konventional Creams
Corneometry - Study (n=20)

Conventional O/W Emulsion
Physiogel Cream
Barrier protection study: Sensiprotect vs. conventional barrier creams

Subjects: 20 healthy volunteers
Application: volar side of forearm
Test Products: 4 conv. barrier creams vs. DMS ®-Cream
Duration: 14 days, 2 x 30 min occlusive/day
Irritants used: diesel, used lubricant, toluene, SLS
Method: TEWL, 48 h after appl.
Barrier protection study (TEWL): Sensiprotect vs. conventional barrier creams

- **SLS 5%**
- **Used Lubricant**
- **Diesel**
- **Toluene**
Lipid-Penetration-Study
DMS® vs. Emulsifier-Cream

„Emulsifiers increase the permeability of the system“.  
„The interaction of lipids with vital cells (keratinocytes, dendritic cells, lymphocytes) could be a reason for inflammation“.

Wohlrab et al. Skin Pharmacol Physiol 23, 298 (2010)
Interaction of Epicutaneously Applied Lipids with Stratum Corneum Depends on the Presence of either Emulsifiers or Hydrogenated Phosphatidylcholine

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How do we differentiate Physiogel from other Emollients?

<table>
<thead>
<tr>
<th>Conventional Emollients</th>
<th>Physiogel/Sensiprotect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trigger Factors</strong></td>
<td><strong>„hypoallergenic”</strong></td>
</tr>
<tr>
<td>perfumes, dyes,</td>
<td>no perfumes dyes,</td>
</tr>
<tr>
<td>preservatives, lanolins</td>
<td>preservatives, etc.</td>
</tr>
<tr>
<td><strong>High no. of Ingredients</strong></td>
<td><strong>Low No. of Ingredients</strong></td>
</tr>
<tr>
<td><strong>Non-physiological lipids</strong></td>
<td><strong>Skin related Lipids only</strong></td>
</tr>
<tr>
<td>Mineral oil (paraffinum,</td>
<td>Triglycerides, Ceramides,</td>
</tr>
<tr>
<td>petrolatum), silicons</td>
<td>Phytosteroles, Phospholipids</td>
</tr>
<tr>
<td><strong>Emulsifyiers</strong></td>
<td><strong>No Emulsifiers</strong></td>
</tr>
<tr>
<td><strong>Vesicular system</strong></td>
<td><strong>Lamellar Structure</strong></td>
</tr>
<tr>
<td>(O/W; W/O)</td>
<td>(DMS)</td>
</tr>
</tbody>
</table>
Physiogel A.I. Sun Cream

- Effective UVB and UVA-protection
- Contains physiological radical scavenger PEA
- Without emulsifiers
SPF and absorbed UVB radiation

With UV-B Factor 25, 96% of UVB is absorbed!
SENSI PROTECT®
Protection and Skincare

- 1 product only for skin protection & skincare
- protection against water- & oil-soluble irritants
- without perfume, preservatives, mineral oil, silicon
- without emulsifiers
- with DMS® - Ceramide Complex (skin related lipids)
Physiogel/Sensiprotect - DMS®

1. Highly innovative skincare and protection
2. Strengthening the skin-lipid-barrier
3. „hypoallergen“
4. Skin-related lipids only
5. Without emulsifiers