

A new tool for the evaluation of skin barrier overall wellbeing

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Agenda



- Rethinking Skin Biology
- Drivers of Barrier Function
- Measuring Exposure and Lifestyle
- From Biomarkers to SkinEudex
- Future Perspectives

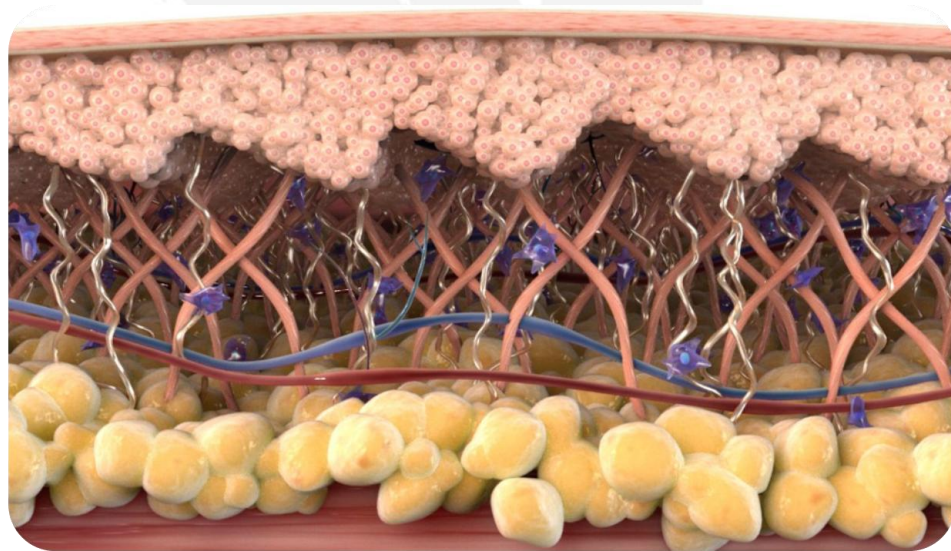


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Skin barrier: a dynamic biological system

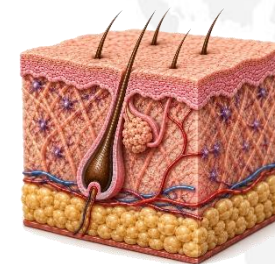


Complex and multifaceted ecosystem:

- ✓ **Structural components:** lipids, proteins, ceramides, fatty acids, NMF, and microbiota, all contributing to integrity.
- ✓ **Biological Functions:** homeostasis, immune regulation, prevention of passive water loss, environmental protection, and blocking the penetration of xenobiotics

Site-specific specialization: **the scalp**

- ✓ **microbiota**
- ✓ **sebaceous activity**
- ✓ **immune responses**
- ✓ **environmental exposure**



Drivers influencing Skin Barrier Health

AIR POLLUTION



**UV
RADIATION**



**CLIMATE
STRESSORS &
SEASONALITY**



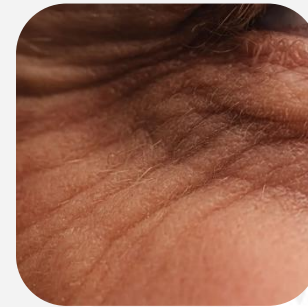
MICROPLASTICS



**MICROBIOTA
IMBALANCE**



**AGING &
GENETICS**



**HORMONAL
CHANGES**



NUTRITION



SLEEP



STRESS



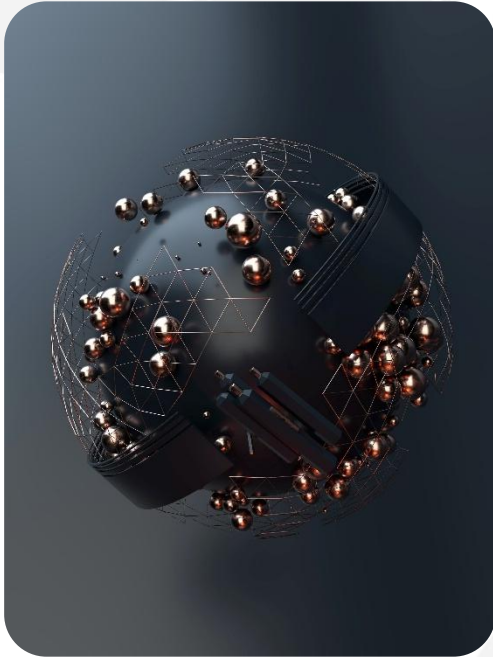
**PHYSICAL
ACTIVITY**



**CLEANSING &
PROCEDURES**



Rethinking Skin Approach



Traditional approach

- Single driver
- Single endpoint
- Static interpretation



Emerging approach

- Multiple interacting drivers
- Dynamic biological response
- Integrated interpretation

A Changing World. A Changing Skin.

Skin biology has **evolved** together with **environment, lifestyle, and biology.**

No single skin marker can fully describe skin barrier health.

From Understanding Drivers to Quantifying Them

Skin barrier biology has evolved in response to a continuously changing environment and modern lifestyles. Today, skin function is shaped by the cumulative interaction of environmental, behavioural and biological drivers, rather than by isolated factors, even in different types of skin



The research - Complementary tools to objectively characterize the main determinants of skin barrier function.

- ✓ Environmental Exposure: **Exposure Intensity Index (EII)** -
- ✓ Lifestyle & Behaviour: **Lifestyle Index (LI)**
- ✓ Skin biology: **SkinEudex®**

Each tool measures a different dimension of skin barrier.
Together they provide the foundation for integrated skin assessment.

ENVIRONMENT

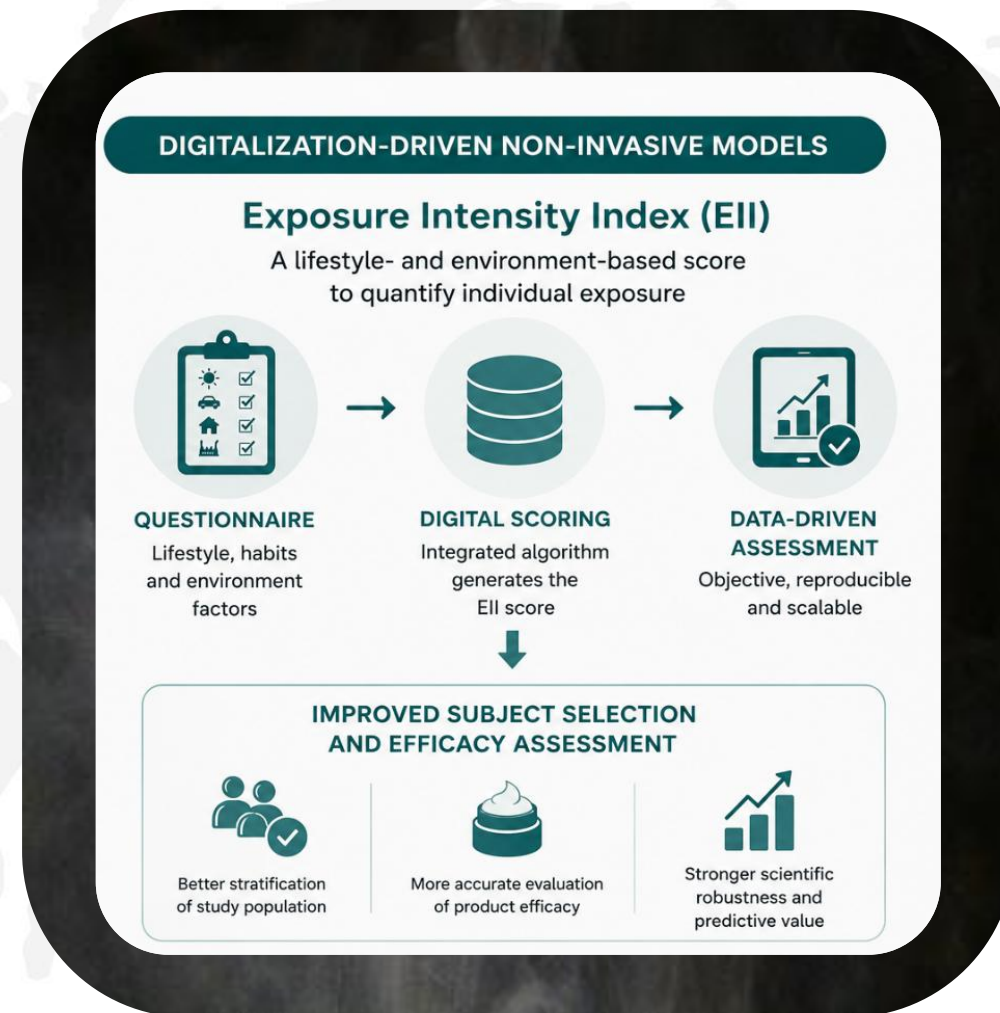
Air Pollution exposure

Environmental exposure is highly heterogeneous and cannot be adequately described by geographical location alone. Structured tools such as the **Exposure Intensity Index (EII)*** enable objective quantification of individual exposure profiles:

- objective exposure stratification
- study population selection
- exposure-driven efficacy testing
- improved real-life relevance of antipollution studies

Exposure Intensity Index (EII): A New Tool to Assess the Pollution Exposure Level of the Skin – Cosmetics – Sept. 2025

1,755 views (June 2026) – High audience engagement



LIFESTYLE

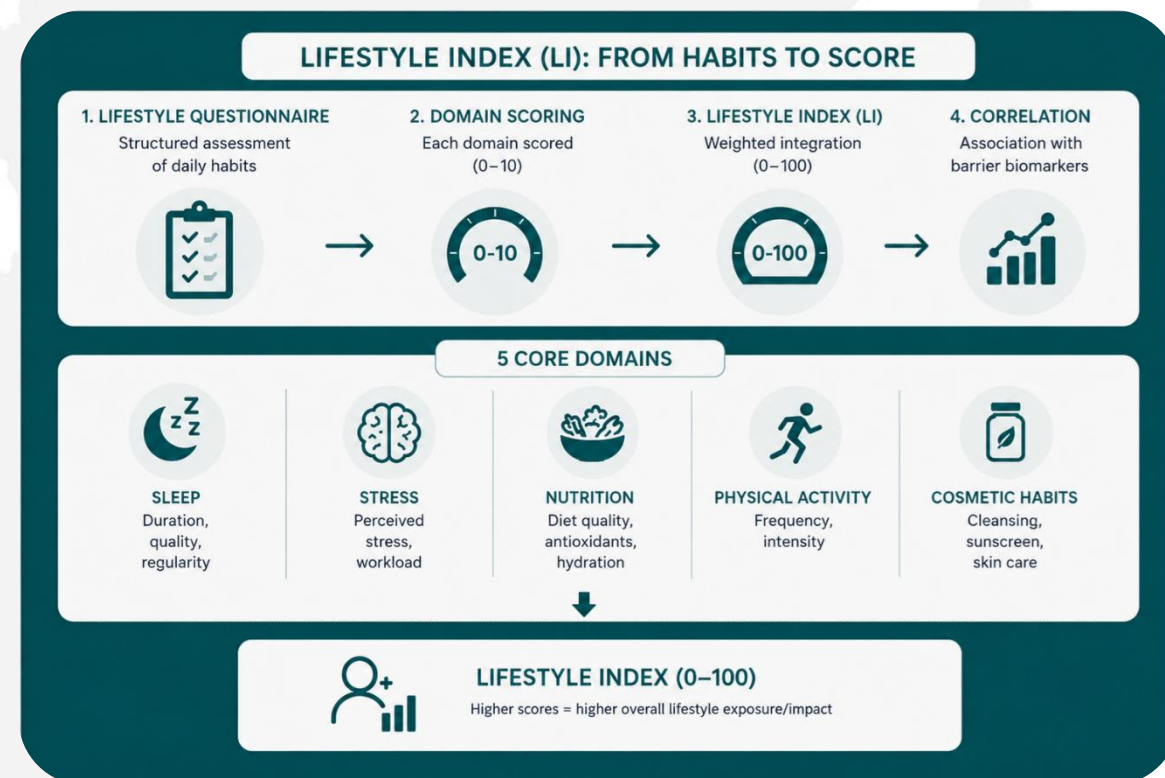
From habits to score

Lifestyle is a biological determinant of skin barrier function acting on barrier function, immune regulation, metabolic balance and skin resilience.

To objectively include lifestyle among skin barrier drivers, we developed a structured questionnaire generating a **Lifestyle Beauty Score – Lifestyle Beauty Index (LBI)***.

The score provides a quantitative descriptor of individual and behavioral habits, allowing correlation with objective barrier biomarkers.

Comprehensive – Quantitative – Integrated



**Under submission.*



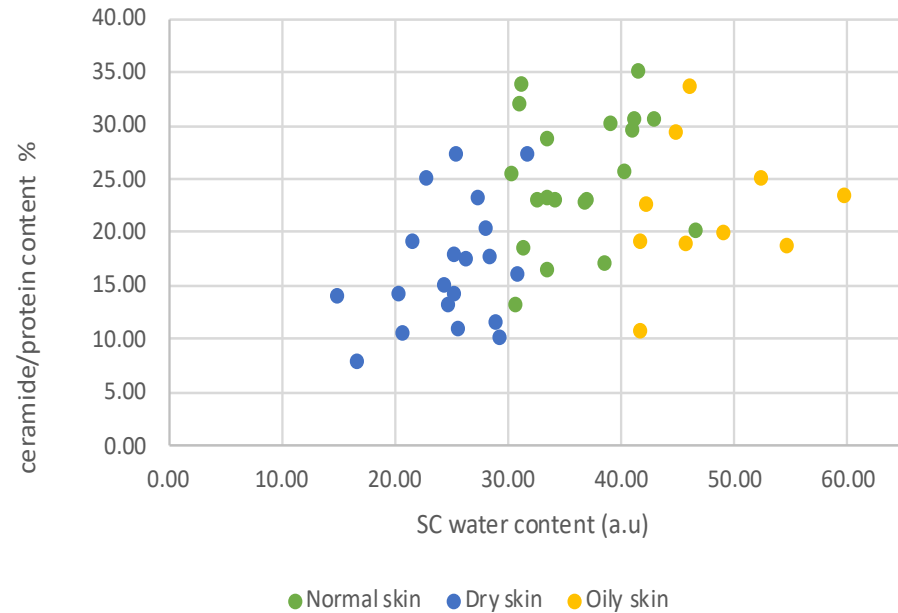
SkinEudex®

Integrating biology into a single Skin Barrier Health Score

- New comprehensive indicator to correlate **different aspects** of **skin barrier** providing a unified view of the skin barrier's **real-time condition**.
- A novel quantitative approach to assess skin barrier health, based on the ceramide NP/protein ratio correlated with biophysical parameters (hydration, TEWL) via objective skin classification.
- Developed from an in-depth in vivo characterization study on 90 Caucasian female volunteers (27–65 yrs).

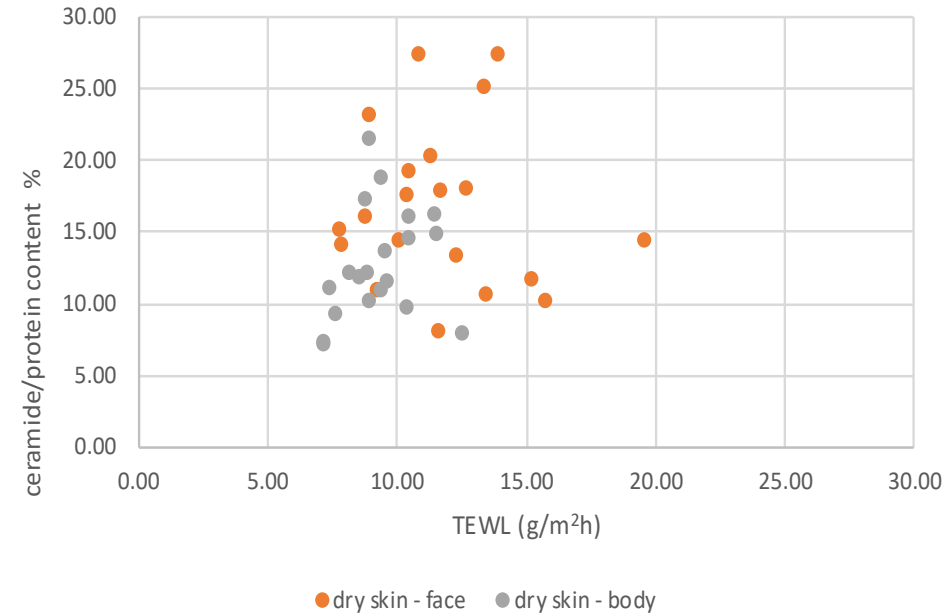
Biophysical Parameters vs Barrier constituents

50 subjects - face analysis



Stratum Corneum (SC) water content vs ceramide/protein content in different skin types*

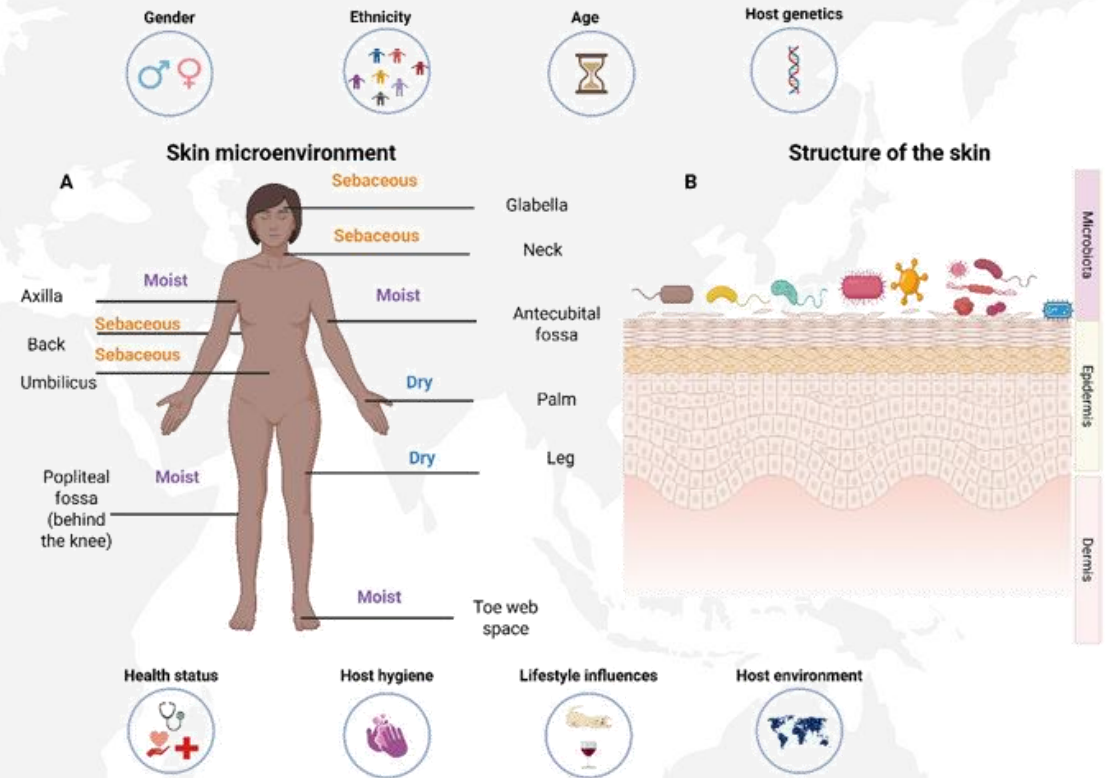
40 subjects - dry skin analysis (body)



Trans Epidermal Water Loss (TEWL) vs ceramide/protein content in different dry skin area*

Skin Microbiota diversity and Skin health

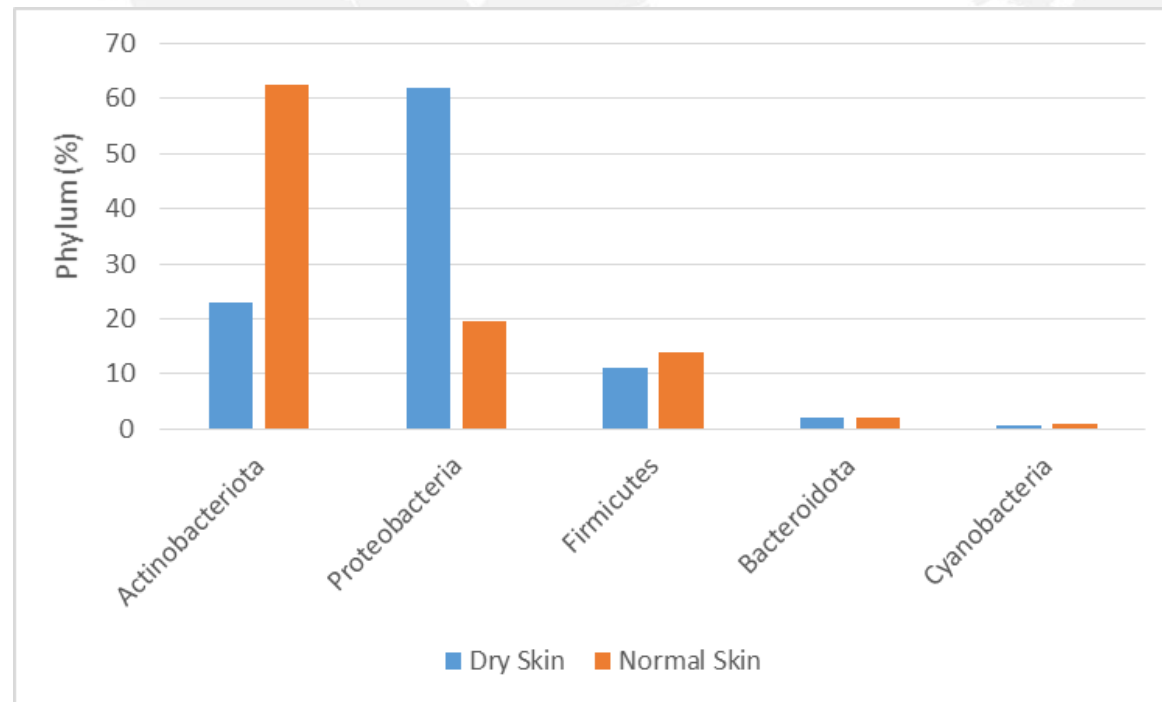
- **Classification of skin Bacteria:** Phylum, Class, Order, Family, Genus and Species depending on the level of analysis
- Microbiota heterogeneity often associated with greater skin health
- *Firmicutes*, *Bacteroidetes*, *Actinobacteria*, and *Proteobacteria*: most represented phyla in the skin microbiota
- Dysbiosis conditions of skin microbiota lead to alterations in the functionality of the skin barrier
- **High percentages** in *Staphylococcus aureus* genus and *Pseudomonas koreensis* specie proliferate **in both dry skin and rosacea**.



Microbiota distribution

Phylum distribution (%) in different forehead area

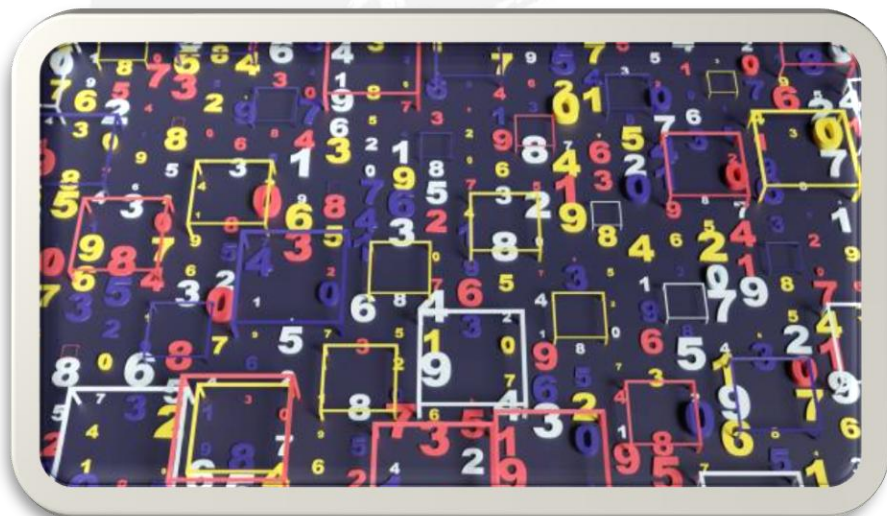
40 subjects - microbiota analysis



Phylum	
Actinobacteria	16.93%
Proteobacteria	69.67%
Class	
Actinobacteria	16.78%
Gammaproteobacteria	66.12%
Order	
Pseudomonadales	34.58%
Burkholderiales	30.43%
Family	
Corynebacteriaceae	3.70%
Propionibacteriaceae	9.33%
Neisseriaceae	25.69%
Pseudomonadaceae	32.83%
Genus	
Cutibacterium	9.33%
Pseudomonas	32.83%
Species	
Cutibacterium acnes	8.90%
Pseudomonas koreensis	27.78%

SkinEudex® results

Normal skin (between 2 to 4) vs Dry skin (between 0.1 to 1)



*Preliminary results on 90 subjects

- ✓ **Ceramide NP/protein ratio** shows a positive correlation with **SC hydration**.
- ✓ The results highlighted that the correlation among biophysical parameters and the amount of lipids and proteins is independent of **anatomical site** but strongly associated with **skin type**.

From Understanding the skin to Designing Better Products

The more complex skin biology becomes, the more integrated cosmetic development must be.

New cosmetic challenges

- Products adapted to different **lifestyles** & **behaviour** & **conditions**
- **Exposure-aware** solutions
- **User-centric** and dynamic skincare strategies
- New testing strategies according to **integrated assessment models** (meaningful biomarkers, relevant populations and appropriate study designs)



AI driven future

Artificial Intelligence will integrate these complementary datasets to:

- identify hidden relationships among environmental, behavioural and biological variables
- predict skin barrier status
- support personalized cosmetic development



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Thank you for your attention

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Skin Summer School

