

A Glycerol Containing Leave-on Scalp Care Treatment to Improve Dandruff

**Dr Shengjun (Meggie) Luo
Unilever R&D**



Hair as the Ultimate Personal Beauty Tool of Self-expression



**More
malleable
than skin**



**Nothing more authentic than hair to
express and project who you are or
want to be**



**More
personal
than clothes**



Dandruff Is a Common Cosmetic Condition



- Dandruff is characterised by the appearance of white flakes both on the scalp surface, and in the hair.
- The dandruff scalp is particularly prone to pruritis.
- The severity of dandruff can range from a mild scaling of the scalp surface to the more severe condition of seborrhoeic dermatitis (SD).
- The differential diagnosis of dandruff and SD remains a clinical one.
- No absolute agreement on the symptomatic and aetiological links between dandruff and SD.

***Malassezia* Is a Key Contributor to Onset and Exacerbation of Dandruff**



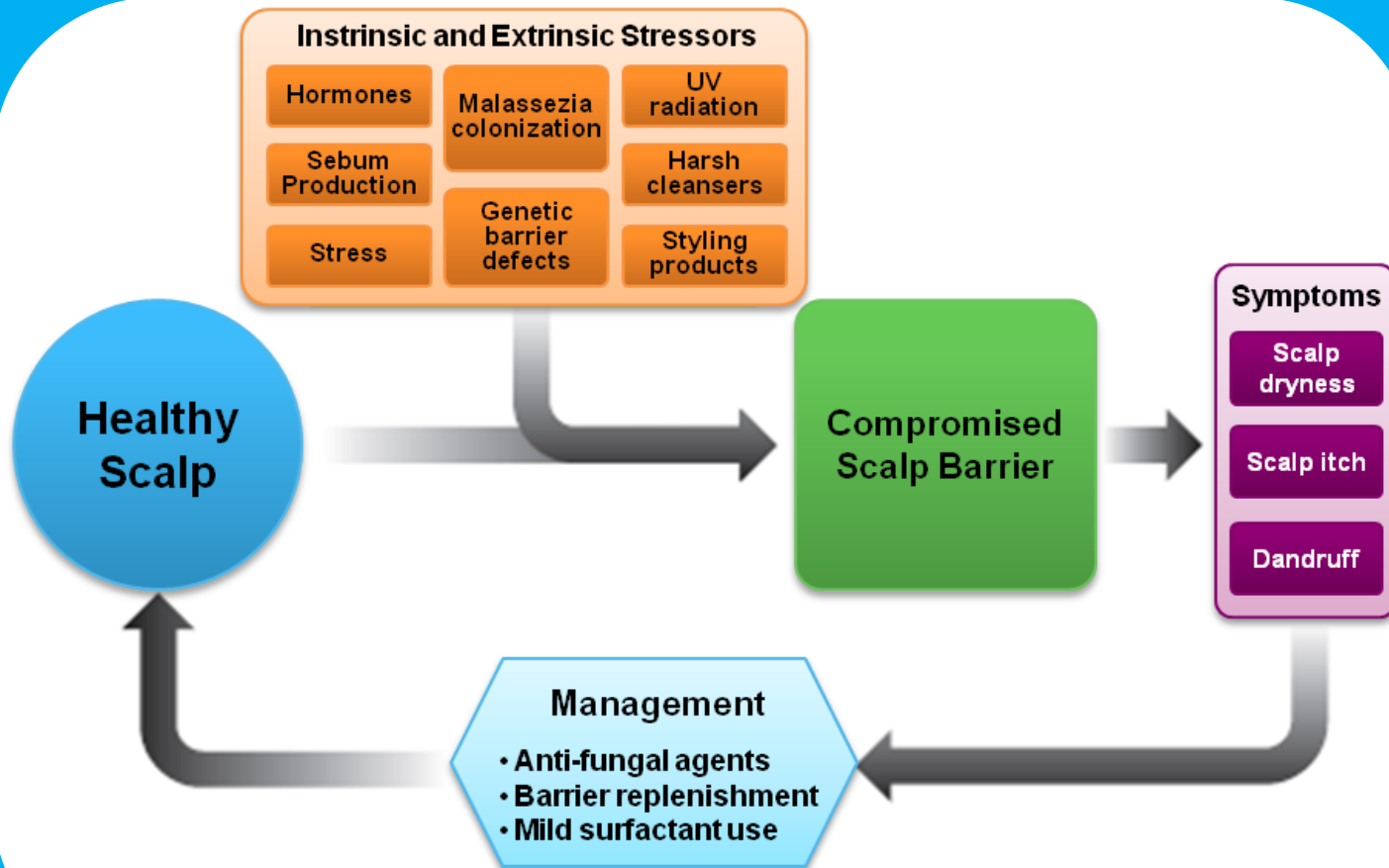
- **A range of anti-fungal technologies as treatments to dandruff have well established efficacy.**
- ***Malassezia globosa* and *Malassezia restricta* are the dominant species present on the human scalp and both are implicated in the development of both dandruff and SD.**
- **The precise role of the microbial contribution remains unclear.**
- **Dandruff is more likely a condition linked to the balance between bacteria and fungi present on the host scalp surface .**
- **There are factors beyond these yeasts that make certain individuals more prone to the development of dandruff.**

Dandruff Development Is Influenced by the Interplay between Factors



- **Dandruff development is influenced by the interplay between three major factors:**
 - Malassezia* colonization,
 - Sebum production,
 - An individual sensitivity that predisposes to the condition
- **At puberty the sebaceous glands mature and produce greater amounts of sebum and these sebaceous lipids represent a vital nutrient supply to support the growth of *Malassezia*.**
- **The dramatic onset of sebum production may provide the ideal microenvironment in which *Malassezia* and other microbes proliferate and can trigger the development of dandruff.**

Stratum Corneum Dysfunction in Dandruff



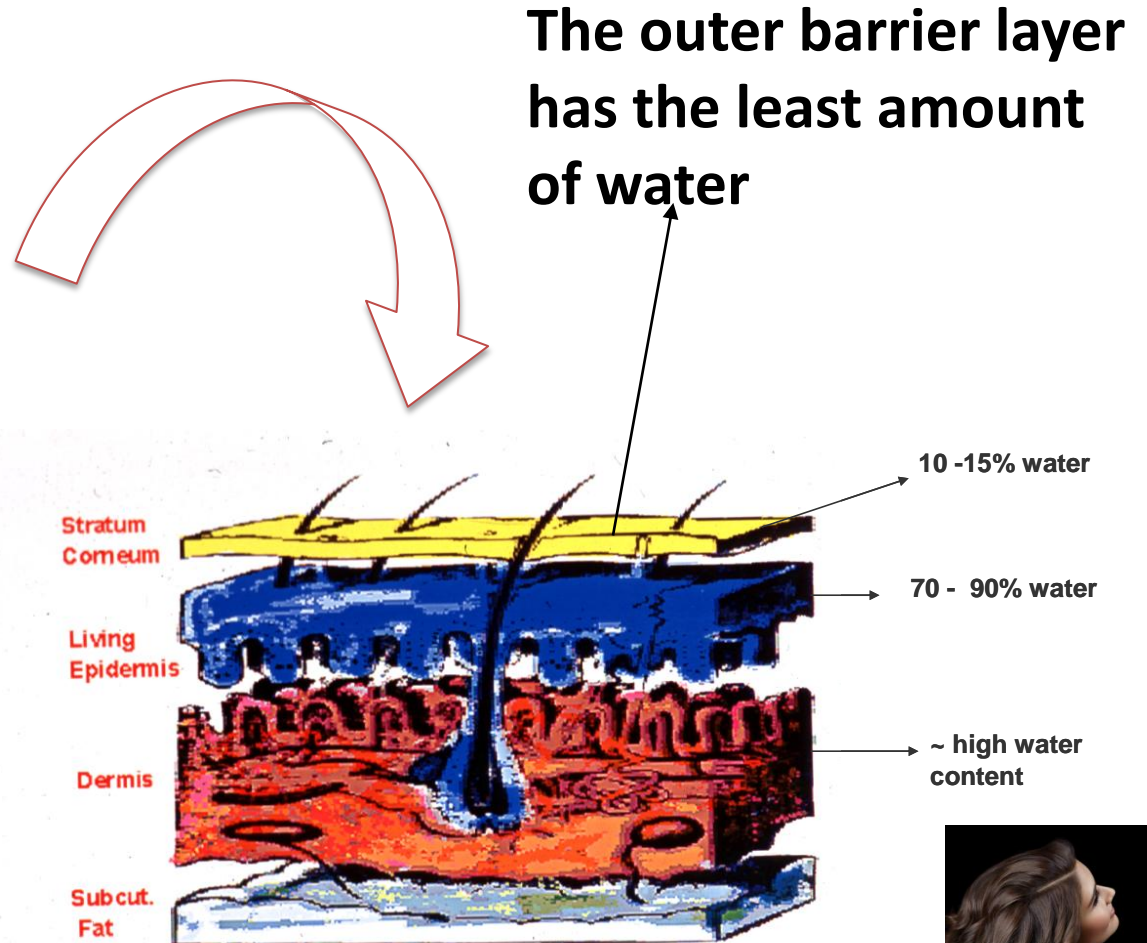
From: Stratum corneum dysfunction in dandruff. Turner, Hoptroff, Harding, 2012.

Recently we have proposed that a critical factor that may underlie the individual susceptibility to dandruff is the intrinsic quality of the scalp stratum corneum (SC).

Stratum Corneum



With the thin outermost layer providing a critical protective function

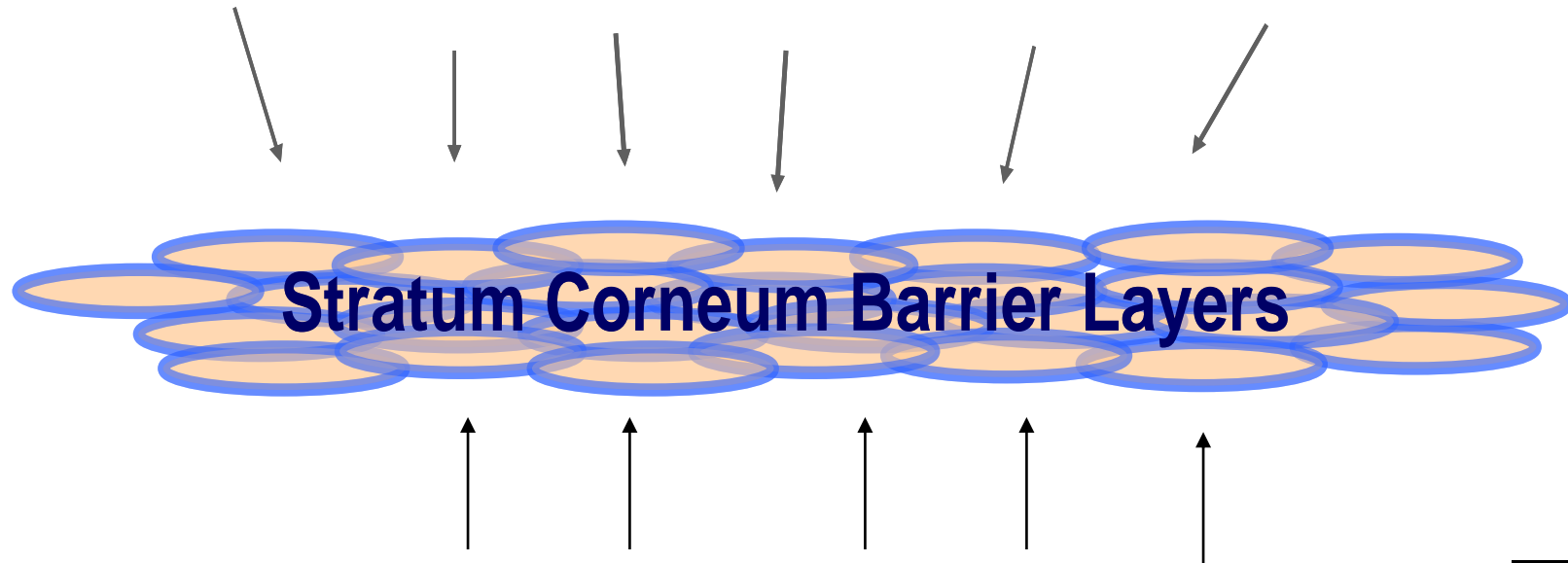


Stratum Corneum



It protects the body

----- from penetration of irritants and other pollutants
from the outside



Stratum Corneum Barrier Layers

And the body from losing excess amounts of water



Stratum Corneum Integrity Is Compromised in Dandruff Scalp



- The levels of essential SC barrier lipids are reduced in dandruff leading to a loss of structural organization within the intercellular space of the tissue, associated with an elevated transepidermal water loss (TEWL).
- Studies in other pathological scaling conditions have emphasised that the loss of integrity of the SC barrier is a key factor contributing to a hyperproliferative and inflammatory phenotype.
- There is a growing realisation that effective moisturisation regimes and mild cleansing have a significant role to play in improving the quality of the SC and treating these pathological scaling conditions.

Could Directly Addressing the Quality of the SC Deliver a Scalp Benefit?



In an attempt to investigate the relative contribution of SC quality and integrity in impacting the dandruff condition, either from a pre-disposition or a severity perspective, we have sought to understand the impact that traditional moisturising technologies (i.e. non-antifungal technology) can have on treating dandruff condition.

Study Details



The aim of the study was to demonstrate that a moisturising leave-on lotion (MLOL), containing no anti-fungal ingredients, could decrease visible flakes and that the benefit could be maintained after withdrawal of the MLOL.

Materials



- **Three formulations (1 shampoo and 2 leave on lotions) were used.**
- **A standard beauty shampoo containing no anti-fungal ingredients was used in all 3 phases of the study: run-in, treatment and post-treatment (regression)**
- **The test formulation (MLOL) contained skin care benefit agents: glycerol, stearic acid, and sunflower seed oil.**
- **The placebo leave on lotion (PLOL) was based on the same formulation with all of the skin benefit (humectant/emollient) ingredients removed.**

Study Design



The study was conducted in a randomized, double-blinded, placebo control, half-head design.

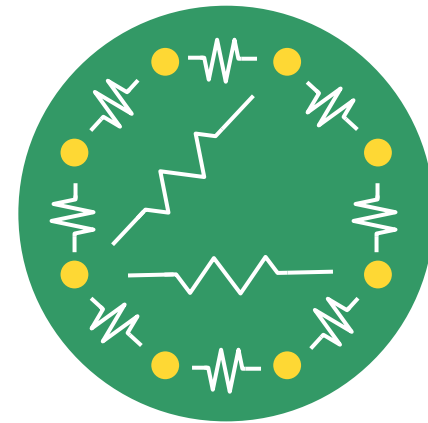
End points:

- Anti-dandruff efficacy, TWHS AF;
- Scalp barrier benefit, TEWL;
- Scalp moisturizing benefit, hydration level

Scalp Moisture Measure



DERMALAB[®] MOISTURE CONDUCTANCE PRINCIPLE



Pin probe

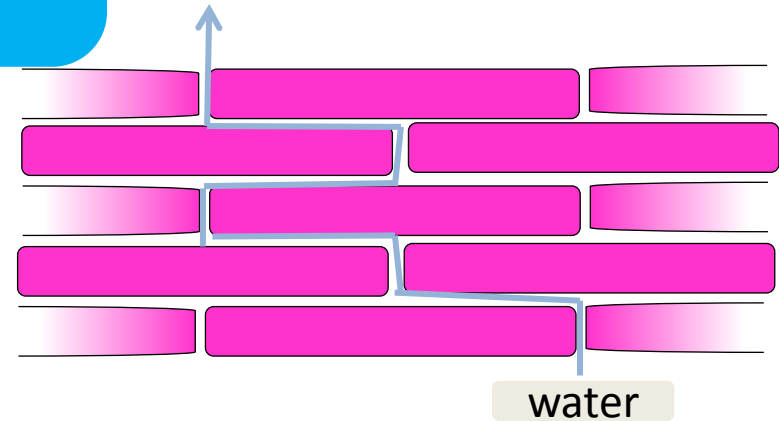
Pin probe electrode design is ideal for scalp applications.



TEWL (Transepidermal Water Loss) Primer



TEWL is the water loss through the intact SC.
Not through sweat glands
Not through follicles
etc



The barrier is not perfect.

Some water can diffuse through it, from wet to dry.

This transepidermal water can therefore be used as a measure of barrier function.

Scalp Barrier Measure



BARRIER RESISTANCE CAN'T BE MEASURED DIRECTLY

To get the skin barrier property, we need to:

- ❖ Measure Water Vapour Flux Density
- ❖ Infer TEWL (Transepidermal Water Loss) from Water Vapour Flux Density
- ❖ Infer Barrier Resistance from TEWL



We use AquaFlux to measure Flux Density

Study Conclusions



- **The use of a glycerol-rich leave-on lotion, designed to directly improve the quality of the SC barrier, can have a significant impact upon dandruff**
- **The use of conventional skin care actives such as glycerol, emollients and lipids, can achieve a significant improvement in dandruff, even in the absence of anti-fungal or anti-inflammatory agents**
- **Direct improvement in scalp SC quality may help delay the return of dandruff and potentially reduce susceptibility to the condition**
- **The opportunity exists to use skin benefit agents to *directly improve the quality of the SC barrier and to improve the overall anti-dandruff benefit***

REFERENCES

1. Harding CR, Moore AE, Rogers JS, et al. Arch Derm Res. 2002;294;221-230.
2. Warner RR, Schwartz JR, Bolssy Y, et al. J Am Acad Derm 2001;45;897-903

THANK YOU

