

LIGHTderm



Natural Lightening turnkey
solution

Biomimicry approach

Why do palms of hands and soles of feet are lighter than the rest of the body skin?



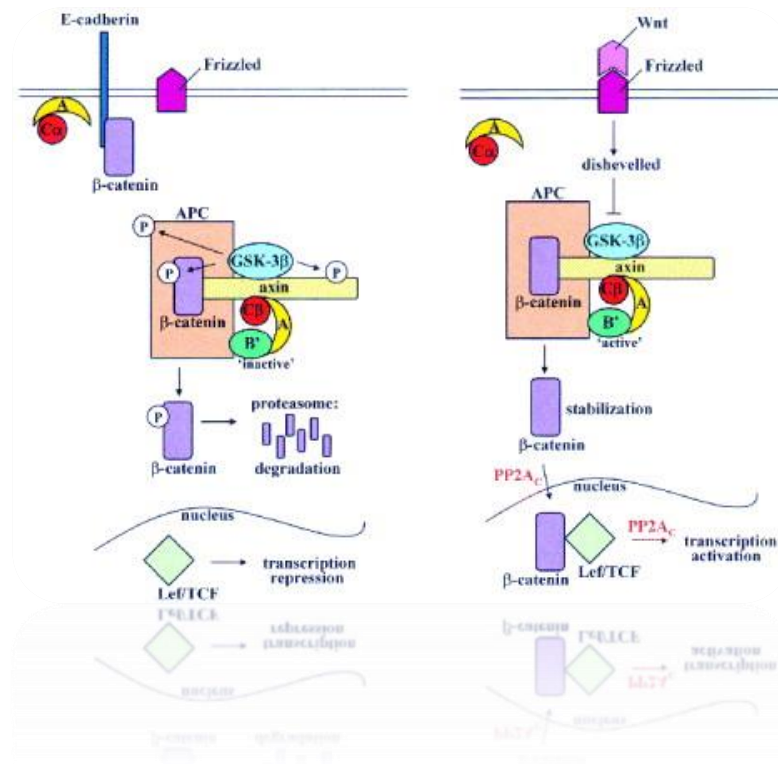
New Response Elements

- The implication of the interactions between melanocytes and keratinocytes in the regulation of melanogenesis is now well known and studied. Even if these interactions are not yet completely elucidated, they are widely exploited in cosmetics for the development of depigmenting products.
- Other types of interactions, with mesenchymal cells for example, also exist. Widely less studied, they are nevertheless at the origin of the "whiteness" of the palmo-plantar regions.
- Yamaguchi & All. Have demonstrated that a soluble messenger produced by the fibroblasts of the palmo-plantar regions was capable of modifying the melanocyte differentiation program of these regions in order to lead to a very low production of melanin. This messenger was identified by the Yamaguchi team as a protein called Dkkopf-1 (DKK-1)



Signal pathways and mechanisms

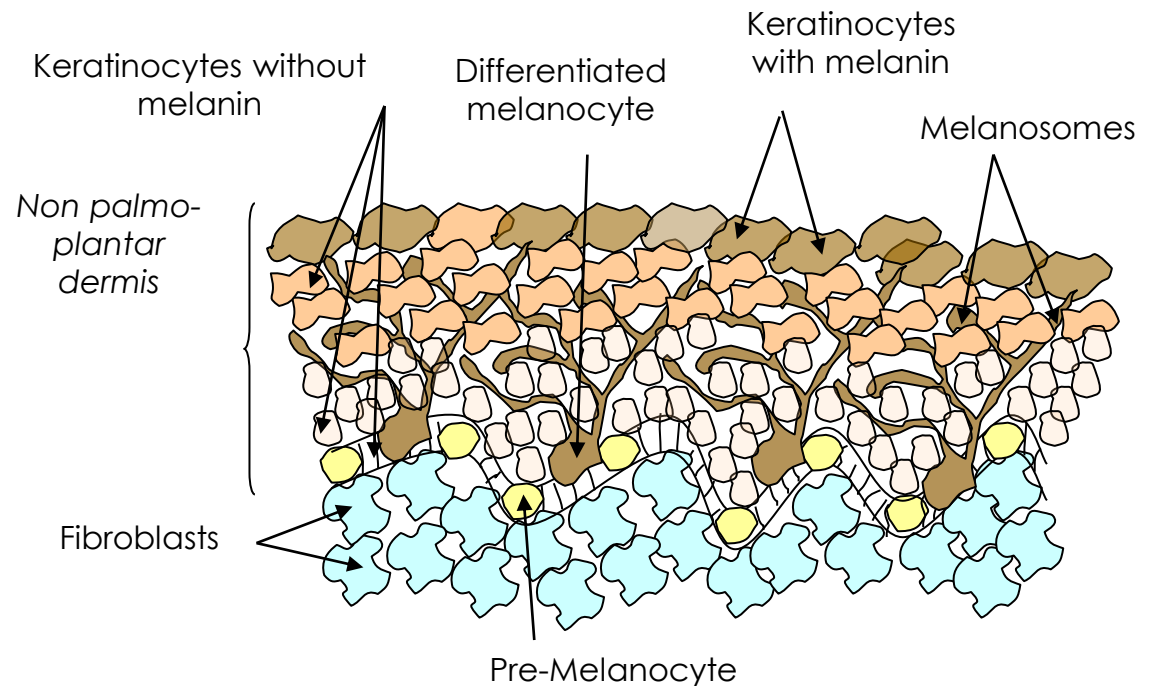
- Through its antagonist action on the Wnt receptor, DKK-1 is capable of "shunting" intracellular signaling pathways activated by β -catenin, normally responsible for the regulation of genes involved in melanogenesis.



Role of DKK1 and DKK3 expressed in fibroblasts

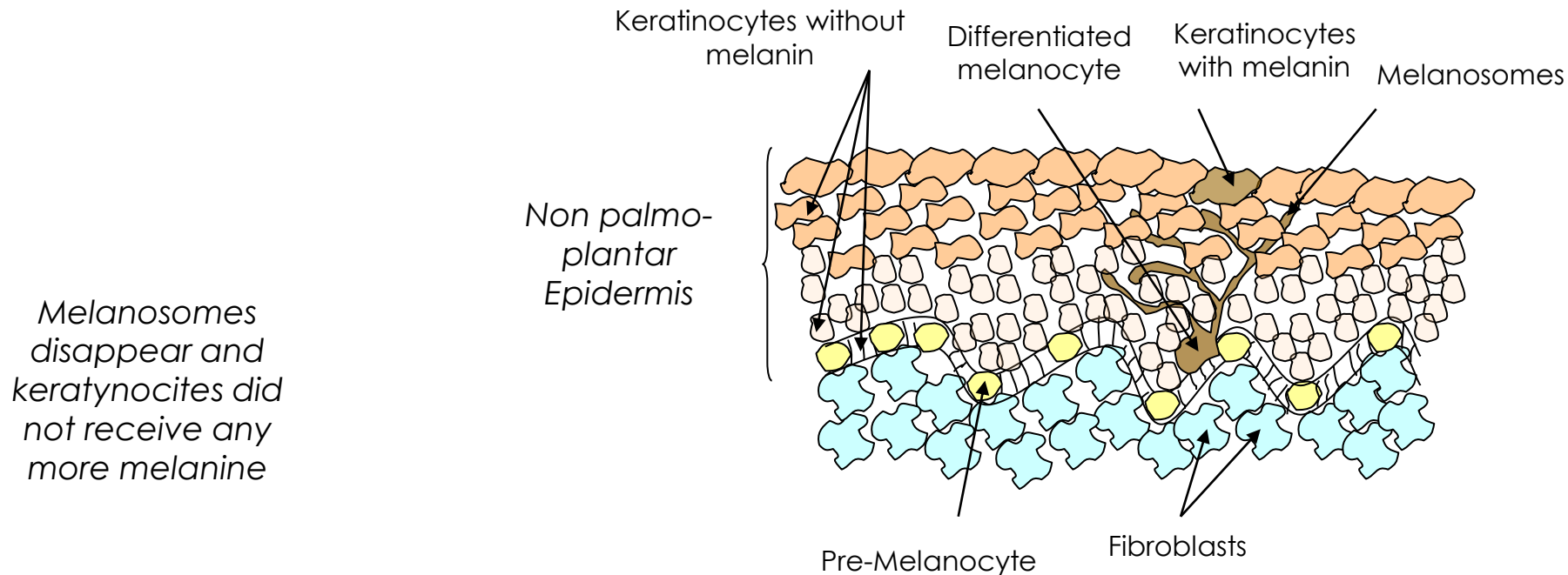
For weak DKK1/DKK3 ratio: melanocyte differentiation takes place

Yamaguchi and all. Have also demonstrated that DKK-3, a neighboring molecule of DKK-1 but with no effect on the Wnt receptor, could play a regulatory role on the effect of DKK-1. Indeed, the greater the quantities of DKK-3 closed to the Wnt receptor, the lower the interactions between the DKK-1 and the same receptor. The inhibitory effects of DKK-1 on melanogenesis will then be reduced.



Increasing DKK1/DKK3 ratio expressed in Fibroblasts

Increasing DKK1/DKK3 ratio: melanocyte differentiation does not take place



Natural de-pigmentation of the skin

In Vitro:

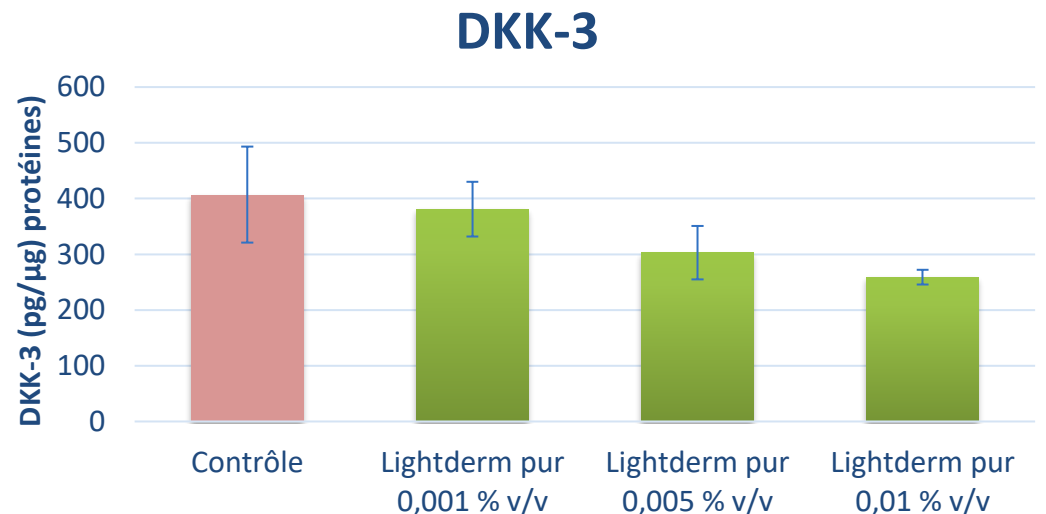
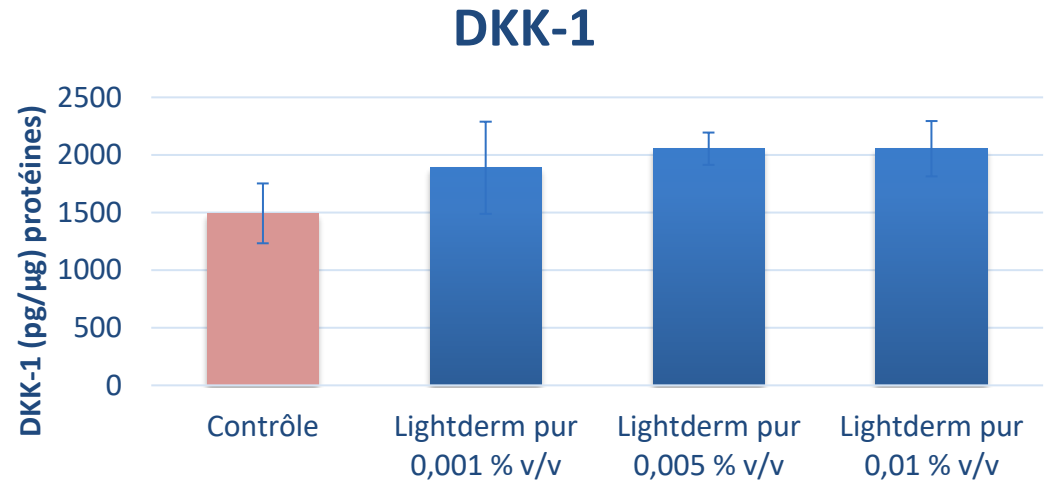
MATERIAL AND METHOD :

On a model of confluent monolayers of normal human dermal fibroblasts obtained by cultivating cells resulting from an abdominal plasty performed on a 33 year old woman.

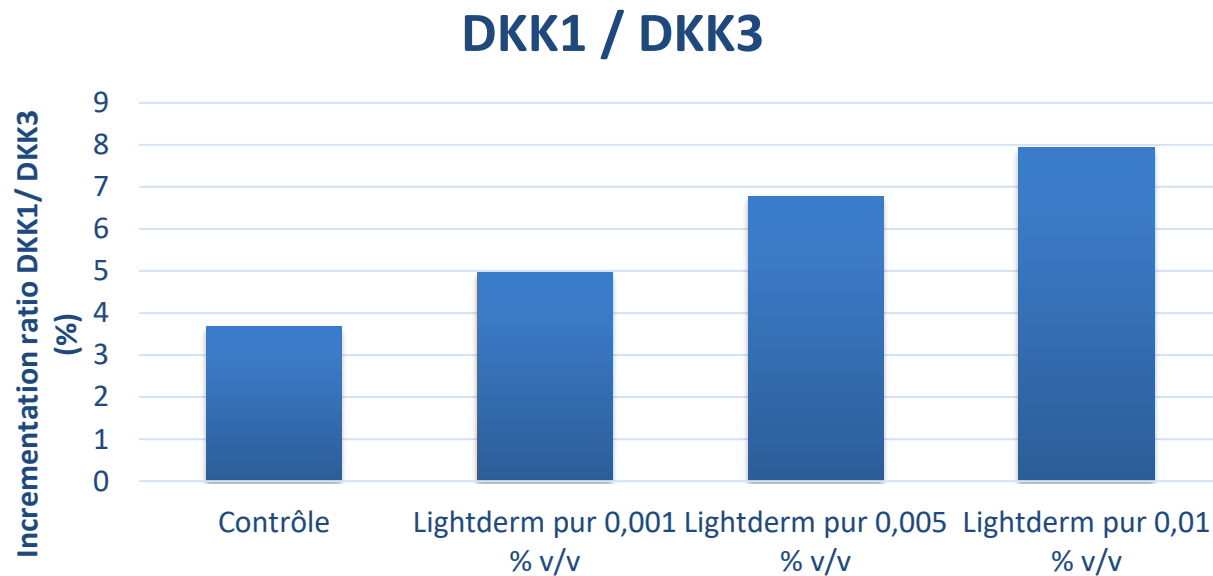
The fibroblasts were incubated 24, 48 and 72 hours at 37 ° C in a humid atmosphere and 5% CO₂ in the absence (culture medium alone) or in the presence of increasing concentrations of the active ingredient.

Each active molecule was solubilized directly in the incubation medium.

At the end of the incubation period, the DKK-1 and DKK-3 contained in the culture media were quantified using E.L.I.S.A. Sensitive and specific kit.



In Vitro:



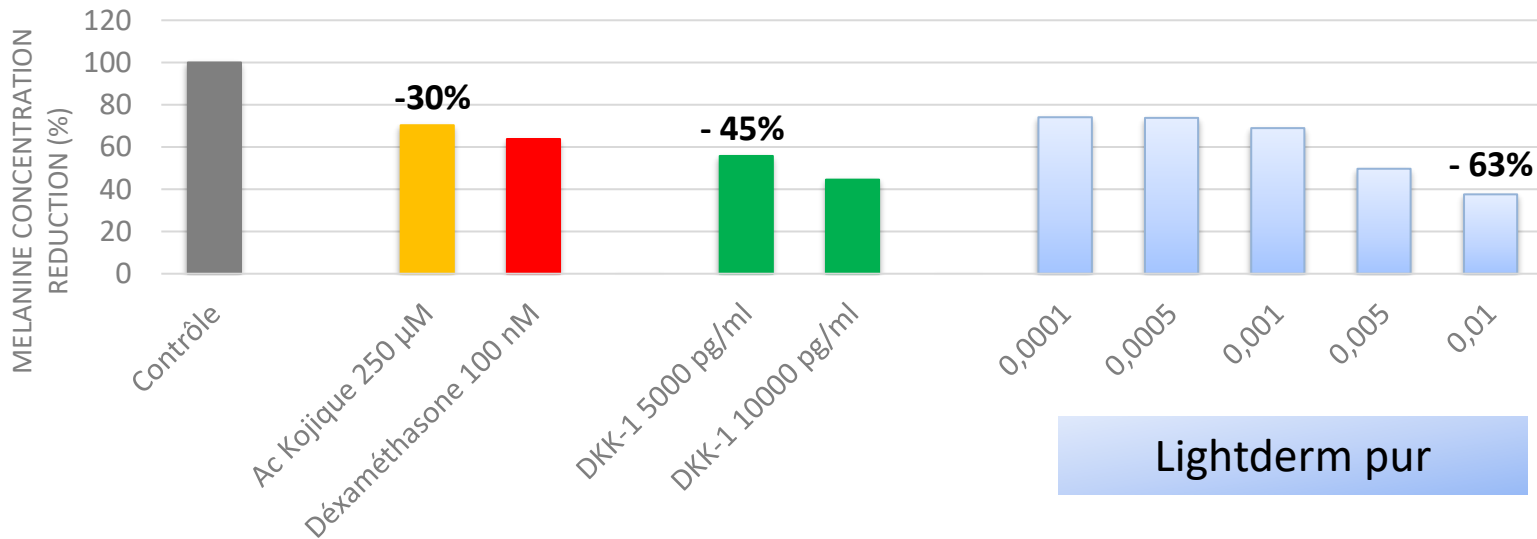
Increasing DKK1/DKK3 ratio: melanocyte differentiation does not take place

In Vitro: melanin production

MATERIAL and METHOD:

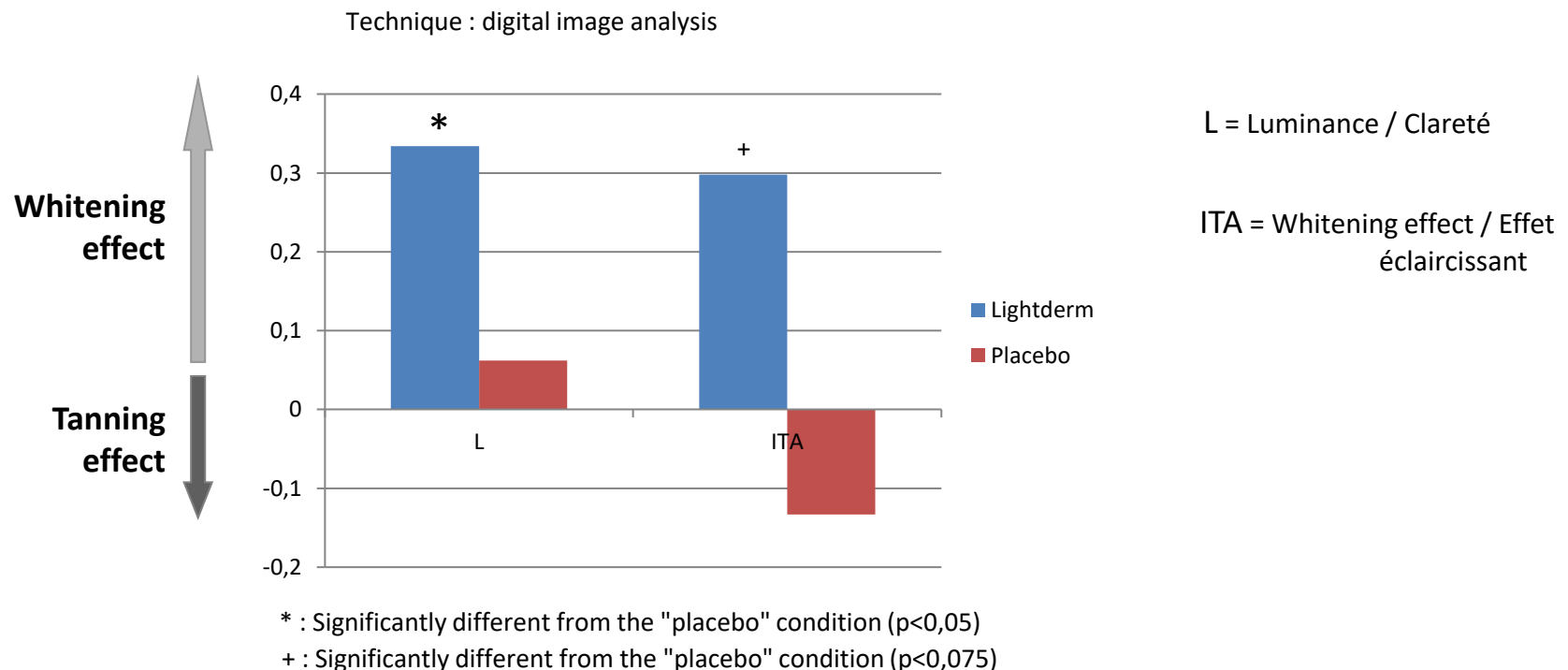
Melanogenesis on confluent melanocytes

The culture media of the fibroblasts, which produced Dkk1 on melanocyte culture, were subcultured in order to evaluate the impact of the production of Dkk by the fibroblasts on the melanocytes (and their capacity to produce melanin)



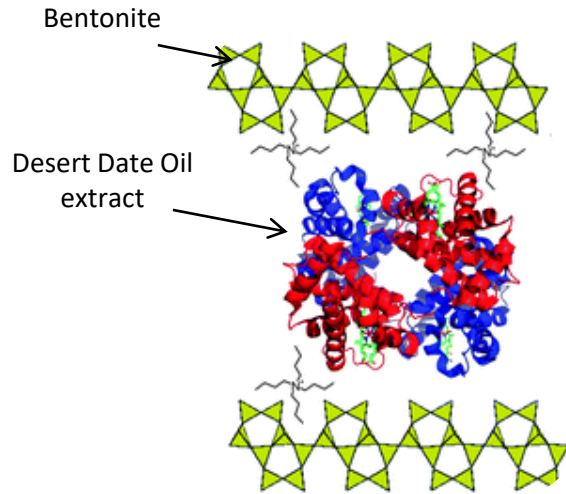
In Vivo, clinical effects at 28 days

Human *In vivo* study on 15 subjects tested under dermatological control.
Double-blind half-face versus placebo study at 28 days using Lightderm at 1%



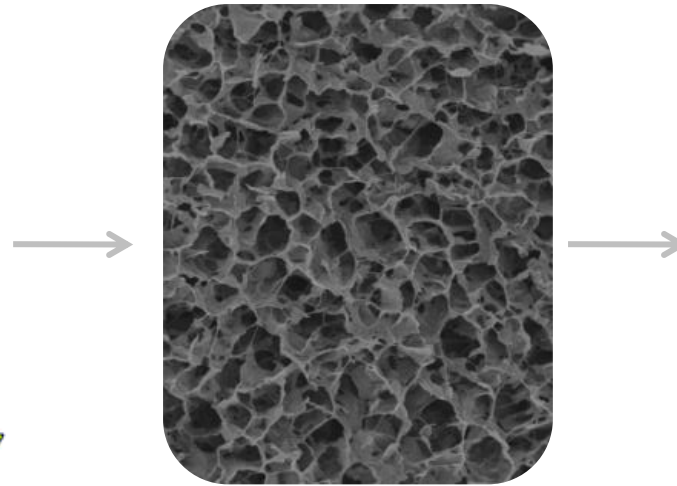
PROTECTION and DRUG RELEASE mechanism

Protection and stability of active ingredients



Active ingredients as raw material in powder from:

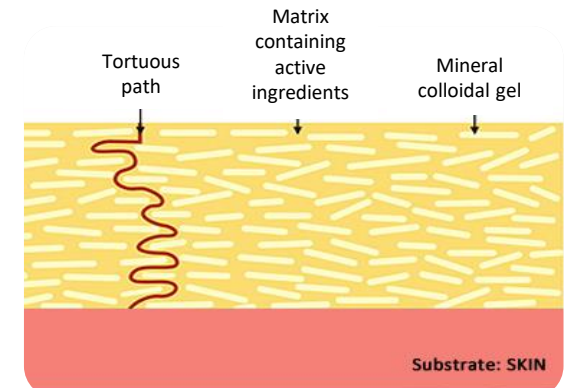
Biological active ingredients are integrated in bentonite sheets as a dehydrated form without preservatives.



Active ingredient as finished products:

In aqueous environment, bentonite creates a 3D structure as « honeycomb » able to protect biological active ingredients.

Drug release mechanism



Once on the skin:

Creation of a scaffolding structure type « second skin » able to release biological active ingredients in a controlled way.

Lightderm, technical specifications

- INCI: Bentonite & Balanites roxburghii seed oil
- CAS: 1302-78-9 & ND
- EINECS: 215-108-5 & ND
- COSMOS ready ; CHINA Compliant
- APPEARANCE, beige powder without preservatives
- FORMULATION: hydrodispersible, lipodispersible
- STORE CONDITIONS: 18 months in a ventilated area
- DOSAGE : 1%
- TOLERANCE:
 - Cutaneous: non-irritant (tested at 1%)
 - Ocular: moderately irritant (tested at 1%)
 - Genotoxicity: non-mutagenic
 - Cutaneous skin sensitization test: non-irritant and non-sensitizing (tested at 1%)
- Certified estrogen-like endocrine disruptors free



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