PrimalHyal 300: Reinforce Your Natural Defences

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Introduction

The skin is one of the most important organs of the body. It is well known to be an active part of the immune system. Different types of cells in the dermis participate in this system. It has been recently showed that keratinocytes also play a key role in the immune response. The healthy skin is able to defend itself against external aggressions, but the immune system is less and less effective while ageing. The skin is permanently subject to environmental aggressions or to chemical products. These aggressions weaken the immune system and lead to the acceleration of skin ageing. Other reasons may weaken the skin. It gets more fragile and vulnerable: operations, mechanical irritation, etc. A wide range of people have a more fragile skin. Therefore sensitive skin, teenager's skin, aged skin, or baby's skin will need specific care. These examples show that it is essential to protect the epidermis by helping the immune system, naturally present in the skin. Boosting the immunity in a targeted way may:

- improve natural defences of the skin;
- prevent ageing;
- strengthen fragile skins.

Our company offers an innovative cosmetic solution by developing a different approach to skincare: the active ingredient targets the innate immune system. PrimalHyal 300 is a biomimetic hydrolysed hyaluronic acid, Ecocert-approved. It reinforces our cutaneous immune system by stimulating the release of specific anti-bacterial molecules: the β-defensins.

Skin and Immune System

The horny layer of the skin is the first physical barrier that helps to prevent pathogen bacteria to enter the body. The innate immune system is essential to this epithelium. Keratinocytes in the epidermis have a key structural role in the physical structure of this barrier to fight against external agents such as micro-organisms. They also release soluble factors with antibacterial properties: the β-defensins.

Among them, β-defensin 2 (DEFB2) is well-known to present a strong antimicrobial activity against the Gram negative bacteria and a good bacteriostatic activity against Gram positive bacteria.

Defensins are a family of peptides involved in the non specific, or innate, immunity. They are small cationic peptides with natural antimicrobial properties. In humans, they have a wide spectrum of antibacterial and fungicidal activities, with strong efficacy. They are divided into two groups: α-defensins and β-defensins. These are present on all *epithelia*, such as cutaneous epithelium and oral mucous membrane, and in various organs where they play an important role in reacting against infections. β-defensins are released after specific receptor activation: the Toll like Receptors (TLR).

Studies have shown that commensal bacterial flora and pathogen flora use different signalling pathways to enhance β-defensin production. The skin thus has its proper molecular systems to differenciate and fight against bacteria.

Toll like receptors (TLR) are membrane receptors expressed by the TLR gene family. They are responsible for pathogen recognition and activate the innate immunity. They modulate the cytokine production that is necessary for the immunity's efficacy.

TLR4 and TLR2 are activated when lipopolysaccharides (LPS) present on the Gram negative bacteria. LPS is a bacterial endotoxin which has pro-inflammatory effect. TLR2 recognises the peptidoglycan of Gram positive bacteria more particularly, while TLR4 recognises the LPS from Gram negative bacteria. In the skin, TLR2 and TLR4 are expressed on keratinocytes and TLR2 on sebaceous glands.

Genes coding the TLR and defensins are remarkably well preserved during evolution. From drosophila to human beings, they share many structural and functional similarities.

Defensins play the innovative role of biological elicitors of the innate immunity in the skin. The β-defensins, naturally present in the skin, are stimulated to reinforce fragile skin protection.