

CM-Glucan Forte to rebalance the skin

Soothed skin for improved skin comfort

The presence of allergies in the industrialised world has significantly increased in the past few decades. In the skin, this manifests itself through eczema, which is characterised by dry, itchy, and inflamed skin. While its occurrence is linked to genetic predisposition, genetics alone cannot explain the rise in eczematous skin diseases. Environmental factors play an important role and growing up in the sanitised urban way of life exacerbates the skin's hypersensitivity.

The hygiene hypothesis

Epidemiological research shows that people living in urban areas in smaller size families experience eczema and allergies far more often than those in rural communities, therefore the "hygiene hypothesis" was postulated in 1989. This hypothesis links reduced contact to viral and bacterial pathogens during childhood to a skewed immune system development – meaning that a too clean environment can lead to hypersensitivity and allergic reactions later on.

The Th1 / Th2 story

The hygiene hypothesis can also be explained on a molecular level – exposure to a pathogen can lead to two different immune response paths. The path involving the Type 1 T helper cell (Th1) activates macrophages as a defense against the pathogen. In contrast, the immune response path involving Th2 stimulates Immunoglobulin E (IgE) antibody production in B cells, ultimately leading to an allergic sensitisation. In individuals suffering from allergies such as skin eczema, this immune balance is skewed towards the Th2 response path. To correct this imbalance, the Th2 response has to be repressed by activation of the Th1 path.

It has been shown that the Toll-like receptors (TLR) in keratinocytes play an important role in the activation of the Th1 response. When the skin is exposed to allergens together with a TLR ligand, it helps to shift the immune response balance towards the Th1 path, preventing oversensitisation of the skin.

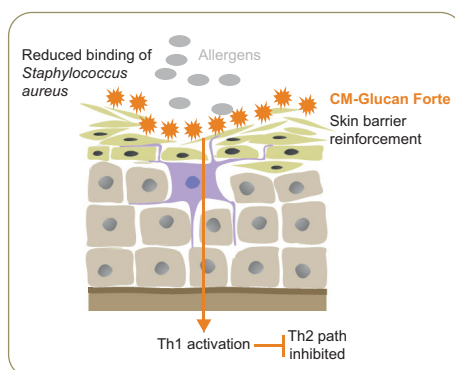
CM-Glucan Forte – designed to rebalance the skin

CM-Glucan Forte (INCI: Magnesium Carboxymethyl Beta-Glucan) is a modified water-soluble polysaccharide (β -(1,3)-Glucan) derived from cell walls of baker's yeast containing Magnesium as a counterion to increase stability. β -(1,3)-Glucan has been

reported to bind the Toll-like receptor TLR2 on keratinocytes and thereby evoking the Th1 immune response while repressing Th2 activation. This immune "training" by CM-Glucan Forte could counteract the skin imbalance and irritation.

CM-Glucan Forte reduces the inflammatory response in atopic dermatitis models

Atopic dermatitis (AD) is a skin disease associated with chronic skin inflammation and eczema. As with other allergies, AD has a higher prevalence in individuals growing up in more sanitised environments. AD is characterised by itchy dry skin with an impaired barrier function. On a molecular level, the immune response in AD is shifted towards Th2 activation and IgE-mediated sensitisation towards environmental allergens.



To test whether CM-Glucan Forte is indeed able to suppress the Th2 immune response, B cells were stimulated to produce IgE in the presence or absence of CM-Glucan Forte. The IgE production was reduced by 26% in CM-Glucan Forte treated B cells.

Another marker for AD is the overproduction of the pro-inflammatory cytokine IL-8. Reconstructed human epidermis (RHE) was treated with pro-inflammatory cytokines to stimulate an AD reaction and IL-8 expression

was monitored. In samples pretreated with CM-Glucan Forte, IL-8 was decreased by 53% compared to stimulated RHE without CM-Glucan Forte pretreatment.

Together this shows that CM-Glucan Forte is able to reduce the inflammatory responses typical for Th2 overactivation in AD.

CM-Glucan Forte impairs binding of bacteria to the skin

The impaired skin barrier function characteristic for AD leads to an increased risk for bacterial infection, mainly with the organism *Staphylococcus aureus*. To assess a possible influence of CM-Glucan Forte on bacterial adhesion to skin, RHEs were pretreated with either CM-Glucan Forte at different concentrations or a buffer control followed by incubation with *Staphylococcus aureus*. A strong concentration-dependent inhibitory effect of CM-Glucan Forte on the adhesion of *Staphylococcus aureus* on RHE was observed.

CM-Glucan Forte restores skin barrier, hydration and well-being

In order to test the efficacy of CM-Glucan Forte *in vivo*, a double-blind, placebo controlled clinical study was performed with volunteers that were diagnosed with AD. Topical application of CM-Glucan Forte in a cream formulation for 28 days significantly increased skin hydration and smoothness and reduced TEWL, resulting in less irritated skin and an improved barrier function.

CM-Glucan Forte is an active designed to rebalance the skin's immune system by repressing the Th2 path which can be overactive in our modern, clean world. As a result, CM-Glucan Forte improves the skin barrier and hydration to help those suffering from oversensitised dry skin to feel more comfortable in their own skin.

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