Protection of Very Dry, Sensitive and Atopic Skin

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Keywords: Immune response modifier, anti-inflammation, lipid barrier repair, interleukin 8 (IL-8), hyperproliferation, atopic dermatitis

Introduction

The human body has its own protective system: Human skin acts against negative environmental impacts and pathological insults. This specific system depends on an orchestrated interaction of specialized cells that provide specific and non-specific immune supervision and make the skin the largest immuno-competent organ of the body. Skin with heightened neurosensory input which has low tolerance for irritants and shows hyperreactive responses is classified as sensitive [1]. An enhanced immune responsiveness of the specific, acquired system and the non-specific system as an immediate first defense line fortify the immediate contact reactions, i.e stinging, tingling, itching and burning sensations.

In the case of allergic contact dermatitis, invading substances (antigens) are memorized by the specific immune system and a set of pre-determined cells will respond. Sensitive skin shows a heightened antibody response to antigen presentation.

Irritant contact dermatitis is an immediate response of the non-specific immune system [2]. Invading toxins which reach living cells or induction of oxidative processes will cause damage to the cell membranes. Unsaturated fatty acids (e.g. arachidonic acid) as constituents of the membrane phospholipids are released to serve as crucial precursors for prostaglandin and leukotriene synthesis. The system of the prostaglandin cascade ensures an immediate response to the damage.

Sensitive skin is prone to hypersensitivity and hyperreactivity, caused mainly by the skin‘s defective barrier functions of the Stratum Corneum. Thus heightened neurosensory input results and contributes to enhanced immune responsiveness, which is always accompanied by inflammation. Individuals with sensitive skin include those with pathological skin changes such as atopic or seborrhoic dermatitis, rosacea and ichthyosis. Pathologic skin can be chronically inflamed, with increased epidermal thickness, showing hyperkeratosis, impaired barrier function and severe pruritus [3].

Cosmetic actives designed to fight the consequences of sensitive skin must cover the following activity spectrum:

Stimulation of cellular protective functions, modulation of immune responses, interruption of the inflammatory cascade and repair of the lipid barrier.

Mode of Action

The treatment of hyperreactive sensitive skin with enhanced immune responsiveness suggests the use of biological cell response modifiers which are able to interrupt the inflammatory cascade by stabilization of the immune system.

Apart from serving as a complete nutrient, milk can also be regarded as a special liquid extracellular matrix. Breast milk contains a variety of cell types, among them immunocompetent cells (e.g. macrophages, B- and T-lymphocytes, neutrophils) at densities of more than 106/ml [4, 5]. By autocrine or paracrine responses cells secrete peptide growth factors, or cytokines, which are of crucial importance for signal transduction between extracellular matrix and cells. Understanding that milk is an immunogenic tissue was essential for the development of our product Modukine. The activity spectrum of Modukine was proven by in vitro tests and in vivo studies on humans to cover the demand for fighting the consequences of sensitive skin.

Efficacy Studies in Cell Cultures

External insults leading to immune responses are always accompanied by inflammatory reactions. In vitro tests on immune relevant cells (keratinocytes and lymphocytes) were conducted to prove the ability of Modukine to interrupt the inflammatory cascade. In chronically inflamed skin proinflammatory mediators, specifically interleukin 8 (IL-8), are responsible for maintenance of the inflammatory status [6, 7].

Inhibition of IL-8 Expression in Human Keratinocytes

Inflammation in human keratinocytes (HaCat) was induced by addition of 10 ng/ml Tumor Necrose Factor alpha (TNF-α). The resultant IL-8 secretion with and without Modukine was determined after 24 hours.