Counteracting Ageing Phenomena by New Pure Tetrapeptides with Targeted Efficacy

Authors: Anne-Laurie Rodrigues, Isabelle Benoit, Dr. Torsten Clarius, M.D. Gilles Pauly,
Laboratoires Sérobiologiques – Cognis, France

Keywords: Anti-ageing peptides - Cosmeceutical – Proteoglycans – Mature skin – Pure tetrapeptides

Abstract

Skin ageing is a global process resulting from alterations in the level of many skin components. These modifications affect both the quality of the dermal extracellular matrix (ECM) and epidermis cohesion, inducing wrinkles and skin fragility, respectively. Proteoglycans (PGs) take a strategic part in dermis and epidermis homeostasis. The lumican plays an important role during the collagen fibre formation in the dermal ECM. In addition, syndecan are strongly implicated in keratinocyte activation and cohesion. The evolution of lumican and syndecan-1 levels with ageing was studied and a decrease in the synthesis of these two PGs was observed. Skin cohesion is also mainly dependent on the quality of the dermo-epidermal junction (DEJ). Basal keratinocytes of the epidermis adhere to this junction via specific structures: the hemidesmosomes. One of its components, collagen XVII is very important for the cohesion between the epidermis and dermis.

Lumican, syndecan-1 and collagen XVII represent original important targets for cosmetology in fighting against ageing of the main skin layers. Two synthetic acetyl-tetrapeptides (Acetyl Tetrapeptide-9 and Acetyl Tetrapeptide-11) have been selected by exploratory research and evaluated in vitro on different original models. Acetyl Tetrapeptide-9 stimulates in vitro the synthesis of lumican and collagen I to increase the quality of dermal ECM. Acetyl Tetrapeptide-11 boosts the synthesis of both syndecan-1 and collagen XVII in keratinocytes to reinforce global skin cohesion.

Introduction

Cosmeceuticals or so-called 'doctor' brands have recently enjoyed increasing appeal to consumers because they offer anti-ageing benefits without the need to undergo invasive procedures. To achieve this, a growing number of active ingredients is being incorporated into skincare products.

This trend holds out the possibility of sustainable growth for cosmeceutical products but also poses challenges to suppliers of active ingredients. Cosmetics manufacturers are seeking ever more effective and innovative cosmetic ingredients, such as enzymes, amino acids and peptides, with identified and specific mechanisms of action and demonstrable benefits that perfectly fit into the growing cosmeceutical trend.

Small proteoglycans in the skin: new targets to fight against skin ageing

The phenomenon of skin ageing and the identification of its biological pathways remain a constant focus of many research programmes. We have recently undertaken a fundamental research study targeting one specific family of molecules, small proteoglycans.

Small proteoglycans are characterised by glycosaminoglycan chains fixed to a linear core protein by covalent bounds. They are present both in the epidermis and the dermis and act as biomechanical supports, tissue organisers and biological filters, thereby playing an important role in skin homeostasis. However, knowledge of their synthesis and structure during skin ageing has always been rather limited.

Our research programme has identified two specific proteoglycans – lumican and syndecan-1 - whose synthesis counteracts the ageing process in the skin and has been demonstrated to decrease with ageing.