Introduction

Aged skin is characterised by the thinning of the epidermis, the impaired proliferation and differentiation of keratinocytes, the flattening of the dermo-epidermal junction and a marked atrophy and loss of elasticity of the dermal connective structure. Several studies suggest that the progressive loss of dermal connective tissue in ageing is associated with the diminished expression of the matricellular connective tissue growth factor (CTGF/CCN2) [1,2], a gene target of the TGFβ signaling, dependent on transcription factors of the Smad family. The TGFβ/Smad/CTGF axis is pivotal to fibroblast function, activating the transcription of a repertoire of genes participating in the extracellular matrix homeostasis. Crithmum maritimum, also called samphire or rock samphire, is one among these unique plants able to adapt to hostile environments. This plant can indeed grow in contact with high salt concentration such as seawater and in arid soil and climate, and synthesises large amounts of antioxidants. Totipotent dedifferentiated cells from C. maritimum (dCMC) display a high capacity for regeneration and defense. These properties could have beneficial effects by counteracting degenerative alterations in skin ageing.

Material and Methods

The effect of the long-term systemic administration of a dCMC extract was evaluated on a skin equivalent (SE) [3-6].

- The proliferative capacity of keratinocytes (Ki67) and the expression of terminal differentiation markers (fillagrin, claudins); 
- on the level of the activated form of Smad2 (phospho-Smad2) and the deposition of proteoglycans within the neosynthetised dermal matrix of the SE.

Results

dCMC accelerates the regeneration and improves the differentiation of the epidermis.

The Crithmum Maritimum extract induces an improved epidermal homeostasis by delivering a beneficial balance between proliferation and differentiation.

dCMC stimulates the expression of fibrillin-1 at the dermo-epidermal junction

A better organization is observed upon Crithmum maritimum administration, with fibrillin microfibrils appearing perpendicular to DEJ, similarly to oxytalan fibres in normal human skin.

dCMC activates Smad2 and stimulates the deposition of an abundant extracellular matrix

Proteoglycans deposited within the SE are much more abundant upon treatment by dCMC.

Conclusion

Our data clearly show that dedifferentiated cells from C. maritimum induce an improved epidermal homeostasis by delivering a beneficial balance between proliferation and differentiation, and stimulate the production and organisation of fibrillin1 at the DEJ. These multipotent vegetal cells may also trigger the TGFß/CTGF signalling pathway through p-Smad2 and stimulate the dermal matrix renewal.

References