



First cosmetic active demonstrating proven efficacy on dermal stem cells

Human body tissue is subject to a continuous regeneration process and the ability of adult stem cells to self-renew and generate fast proliferating progenitor cells is absolutely imperative for tissue regeneration to successfully occur

Considerable research is currently being conducted regarding the mechanism of epidermal regeneration by stem cells embedded in specific niches located at the basal layer of the epidermis. The role of stem cells in the dermis, which delivers firmness and elasticity to the skin and where wrinkles originate, had not been addressed until recently as the dermal stem cell had yet to be identified.

It was only at the end of 2009 that the dermal papilla was found as a niche for dermal progenitor/stem cells. These dermal papilla cells expressed the stem cell marker gene Sox2 and showed the tendency to grow in colonies in the form of spheres. It was subsequently discovered that the Sox2-positive cells self-renew, induce the formation of hair follicles and migrate into the inter-follicular dermis. And it is in the inter-follicular dermis where they proliferated and differentiated into fibroblast cells that are capable of regenerating the extracellular matrix. Significantly, the identification of dermal stem cells now opens the door to the next generation of stem cell cosmetics: specifically, the protection and vitalisation of human dermal stem cells to deliver a deep-seated rejuvenation of the skin, which in turn will result in the restoration of the skin's firmness, as well as

wrinkle reduction. Furthermore, such treatments could also prove to be highly beneficial in the areas of both wound healing and the treatment of stretch marks.

In 2011, Mibelle Biochemistry succeeded in establishing a Sox2-positive human dermal papilla cell line as a new test system designed to evaluate active ingredients for dermal stem cell vitalisation. Mibelle Biochemistry's tests revealed that when the cells from a monolayer culture were transferred into hanging drops they would form a 3D sphere. Meanwhile, when these spheres were dissociated and the cells seeded back into classical cell culture dishes, it was observed that numerous secondary spheres were formed spontaneously. The number and size of these secondary spheres were identified as perfect parameters to evaluate the effect of cosmetic actives on dermal stem cells.

PhytoCellTec™ Argan, a cosmetic ingredient that is based on plant stem cells of the argan tree, was discovered to be able to clearly augment the number of secondary spheres. The

argan tree (*Argania spinosa*) is native in the southwestern regions of Morocco. The tree, perfectly adapted to the arid climate, has an important ecological role as a provider of wood and oil which is produced from its fruit kernels. Argan trees are an endangered species and as such they cannot be used as a raw material for a cosmetic ingredient. Instead, the plant tissue culture technique was used to produce vegetal raw material from argan. The technique is based on the propagation of plant stem cells to produce single cells in culture to harvest plant metabolites. This practice allows the production of plant material under sterile and standardised conditions independent of season and other environmental restraints.

**PIONEER
IN STEM CELL
ACTIVES**

Consequently, PhytoCellTec™ Argan is the very first cosmetic active that is capable of both protecting and vitalising human dermal stem cells. This will not only help to accelerate the skin's natural repair process, but also uniquely provide a second chance to every type of skin.