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Study of the cosmetic efficacy of plant active ingredients by using a 3D dermal equivalent model

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Prolonged and chronic exposure to UV radiations can cause serious alterations and damages to the different cell layers which compose the skin, leading to an increase of inflammation, connective tissue degradation and oxidative stress, all accompanied by a decrease of cellular metabolism and functionality. While the monolayer tissue culture model can be a suitable system to evaluate the response to stress insults at cellular level, it does not allow to observe an overall skin response to UV treatment. Several dermal equivalent models have been proposed to analyze the entity of UV damages in more details, and to detect the protection/repairing capacity of specific compounds, but they present several limitations and most of the times they cannot reproduced the scenario occurring when real skin is exposed to UV radiations.

By using a proprietary dermal skin model, developed by inducing primary fibroblasts to synthetize their own ECM proteins and organize them in a 3D architecture, we measured the capacity of a plant extract (obtained by *Dolichos biflorus* cell suspension cultures through a biotechnological process) to assembly and correctly organize the collagen fibers in the ECM. Besides confirming all the data previously obtained by the cell based *in-vitro* bioassays, the skin equivalent model allowed to measure the entity of damages to the ECM protein organization caused by UV treatment, and the amount of damage recovery produced by the treatment with the plant cell extract.

Together with the studies on skin cultured cells and *in vivo* tests, the proposed 3D dermal equivalent model represents a very useful tool to completely characterize new compounds or extracts for cosmetic and dermatological activities, and thus to provide always more effective and safer products for the market.

Biography

Fabio Apone graduated in Biology in 1994 and obtained his Ph.D. title in Protistology (Biology of Unicellular Organisms) in 1998 at the University of Pisa, Italy. He worked for 3 years as Researcher in Italy and at the University of California San Diego, studying signal transduction mechanisms and Cell Biology. Later he was a Research Scientist at Arena Pharmaceuticals Inc., a Biotech Company located in San Diego, California, studying receptors and cell physiology in plants. Since 2004, he has been the Scientific Director and Project Coordinator at Arterra Bioscience, Italian Biotech company focused on the development of novel agrochemicals and innovative active ingredients for cosmetic and dermatological applications.

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