

Glutathione (GSH) Distribution by Quantitative MALDI Imaging in Reconstructed Human Skin upon Activation of GSH Biosynthesis by Nrf2 Pathway Activator

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Skin is particularly exposed to oxidative stress, either from environmental insults such as sunlight or pollution or as a consequence of specific impairments in antioxidant status resulting from pathologies or aging. Traditionally, antioxidant products are exogenously provided to neutralize pro-oxidant species. However, another approach based on stimulation of endogenous antioxidant defense pathways is more original. Resveratrol (RSV) was reported to activate the Nrf2 pathway at nontoxic doses, from 20 μ M up to 100 μ M, in primary culture of NHKs or in full-thickness reconstructed human skin. In parallel, a significant increase in glutathione (GSH) content, assessed by LC/MS analysis, was observed in both models.

Following the development of a dedicated protocol for the reconstructed skin sectioning, a perfect visualization of the Stratum corneum, Epidermis was obtained on 10 μ m sections of some frozen samples. Thus MALDI-FTICR imaging at 20 μ m of spatial resolution was used to investigate the GSH distribution and relative quantification in both Stratum corneum and Epidermis of RSV treated reconstructed human skins at 20 and 100 μ M compared to a non-treated condition. GSH amount was confirmed to be significantly increased in the reconstructed tissues following a Resveratrol treatment at 20 μ M and 100 μ M.