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

Raphaël LEGOUFFE1; David BONNEL1; Christophe Jones2, Nükhet CAVUSOGLU2; Guillaume Léreaux2, Joan Eilstein2; Alain HERON1; Jonathan STAUBER1 and Jérémie SOEUR2.

1: ImaBiotech, France
2: L’Oréal, France

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 µM up to 100µM, 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 10µm sections of some frozen samples. Thus MALDI-FTICR imaging at 20µm 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 100µM compared to a non-treated condition. GSH amount was confirmed to be significantly increased in the reconstructed tissues following a Resveratrol treatment at 20 µM and 100µM.