



DERMOSCOPY AND SKIN IMAGING

## SECOND HARMONIC GENERATION IMAGING FOR COLLAGEN-REGENERATING EFFICACY OF SELETINOID G ON UVB-IRRADIATED HUMAN SKIN EQUIVALENTS

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**Introduction:** Ultraviolet (UV) radiation is a main cause of skin damages including structural and functional alterations of the extracellular matrix. A number of chemical compounds have been developed for the purpose of improving extracellular matrix disruption-associated skin problems. However, the qualitative evaluation about three-dimensional architecture of collagen fibrils has been less studied due to a lack of appropriate measurement techniques.

**Objective:** In this study, we examined the collagen-regenerating efficacy of seletinoid G, a novel synthetic retinoid, on UVB-irradiated human skin equivalents.

**Materials and Methods:** We employed the second harmonic generation (SHG) imaging technique to visualize collagen fibrils in a full-thickness human skin equivalent with high resolution and high penetration depth in a label-free manner.

**Results:** We found that seletinoid G (20  $\mu$ M) downregulates secretion of MMP1 in UVB-irradiated normal human dermal fibroblasts (NHDF) and skin equivalents. In human skin equivalent models, we successfully visualized the spatial distribution of collagen fibers in the dermis up to 200  $\mu$ m in z-depth using en face SHG imaging and found that density and arrangement of collagen fibers were significantly improved by seletinoid G treatment.

**Conclusions:** Our results suggest that SHG imaging technique can be a promising measurement tool to evaluate collagen-regenerating efficacy of ingredients on a 3D biological environment and seletinoid G could be helpful to improving the collagen regeneration in skin.

