Hand-held Collagen Imaging Device

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Technology description

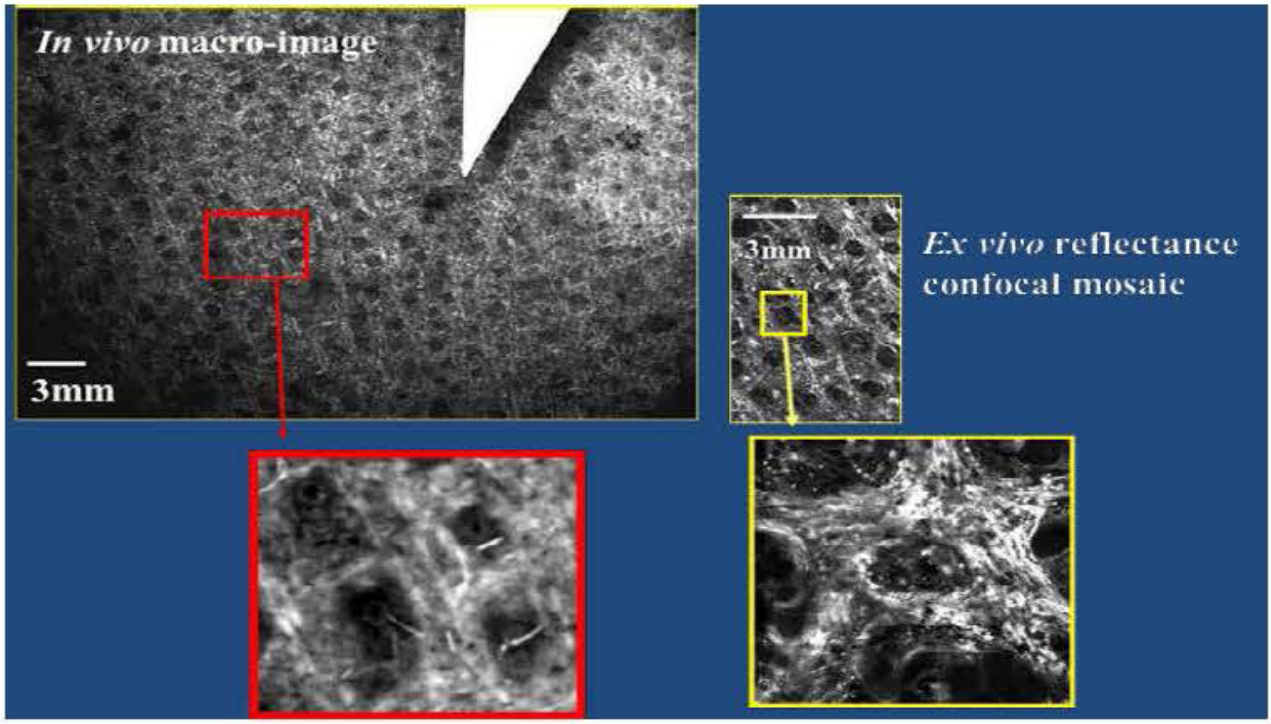
A Hand-held device for getting clear and distinct collagen images to check on the health of skin.
The present invention relates to systems and methods or wide-field polarized imaging of the skin. This technology provides quantitative characterization of collagen structures in the skin and can be used to monitor skin treatment. It can be used as a handheld imaging device that generates polarized images at different depths beneath a dermal surface and a data processor to process image data.

Background

Skin diseases and degeneration is related to sun exposure, working environment and personal habits, which can be observed in the change of internal structure of skin. Collagen, which is the major component of the dermal structure, is an important factor related to dermal changes.
It is critical to inspect collagen structure and quantitatively define status of skin. Histopathological and immune-histochemical studies are commonly used for diagnosing diseases and evaluating dermal changes. But these techniques require biopsy, which may cause scarring and infection and cannot be performed either in vivo or in real time. Collagen content is also a good marker for assessing clinical efficacy of non-ablative fractional treatment (for skin rejuvenation).

Technology

UMass Lowell researcher, Dr. Anna Yaroslavsky, has developed a polarization-enhanced wide-field reflectance imaging device and methods to image the collagen structure and dermal changes. This approach isin vivoand allows rapid assessment of large skin areas with optical sectioning capability.



Comparison of collagen structure revealed by in vivo noninvasive polarization reflectance macro-imaging (UML technology) and ex vivo reflectance confocal imaging
Thisin vivoimaging method provides good resolution with large field of view of 3 cm × 3 cm. with a good visibility to collagen bundles and detailed dermal structures.

References

Professor Anna Yaroslavsky has been conducting research into biomedical optics and medical applications of light for more than twenty years. Major focus of her laboratory is the development of technologies and methods for real-time, noninvasive, and accurate detection of human pathology. She has produced several patents in the medical imaging field and been successful in executing projects oriented towards development into commercial products.

Application area

Assess clinical efficacy of skin rejuvenation treatment.
Diagnose skin disease before clinical intrusive analysis
Assess status of skin aging

Advantages

Histopathological study is the gold test for clinical diagnosis, but requires biopsy and can neither be done in vivo nor in real time. UML imaging method is capable of rapid noninvasive assessment of large skin areasin vivoand is entirely harmless and nonintrusive.

Compared to microscopy techniques, such as confocal, two photon and second harmonic, UML imaging method provides orders of magnitude larger field of view combined with sufficient lateral resolution of 15 μm and excellent signal to noise ratio, does not require expensive components and high power densities of light exposure or laser sources.

Institution

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Inventors

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