In Vivo Retinal Imaging via Improved Visible Light Optical Coherence Tomography (OCT)

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Technology description

Recently, visible light optical coherence tomography (vis-OCT) has emerged as an imaging technique for ultrahigh resolution and multi-color functional imaging of biological tissues. In the retina, vis-OCT potentially offers micrometer-scale axial resolution and the ability to perform depth-resolved, multi-color retinal imaging with the same wavelengths of light that initiate visual phototransduction. As a result, OCT can be essential for screening and progression monitoring of eye conditions such as glaucoma. However, vis-OCT poses many technical challenges – including limited exposures and photon counts, high light scattering and absorption, excess noise in light sources and chromatic aberrations. Vis-OCT also requires some fundamental re-thinking of basic imaging equipment design parameters. However, OCT technology has dramatic upsides if some of these challenges can be addressed successfully.

Researchers at the University of California, Davis have improved visible light OCT technology by integrating rapid spectral shaping, axial eye motion tracking, and spatially dependent dispersion (SDD) correction. Spectral shaping improves the contrast of retinal images, while fast axial motion tracking maintains the high axial resolution. SDD correction prevents degradation in the performance of OCT and improves its accuracy. These innovations in vis-OCT allow for improved imaging of the inner plexiform layer (IPL) of the retina, and enable more effective screening for multiple eye diseases and degenerative conditions.

Researchers at the University of California, Davis have developed a technique that integrates multiple technological innovations to use visible light OCT for improved retinal imaging.

Additional Information

Additional Technologies by these Inventors

Dynamic Contrast Optical Coherence Tomography (DyC-OCT): An Improved Method to Quantify Blood Flow Dynamics in Deep Tissue and Microvasculature

Non-Invasive Blood Flow Monitoring

Application area

Retinal imaging
Visualization and analysis of laminations in the IPL

Advantages

Improved image quality
Improved vis-OCT accuracy

Institution

University of California, Davis

Inventors

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