In vivo full range complex Fourier domain OCT

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Technology description

Technology Overview
OHSU has developed technology for optical coherence tomography (OCT) imaging that extends OCT’ s depth imaging range, enables real time flow imaging, and further enables optical coherence angiography.
In vivo three-dimensional mapping of biologic tissue and vasculature is a challenging proposition due to the highly-scattering and absorptive nature of biologic tissue. Some current imaging methods have slow scanning speeds making in vivo three-dimensional imaging difficult. Other techniques having faster scanning speeds are not able to scan deeply into biologic tissue without producing overlapped images, requiring the use of invasive procedures to scan the tissue of interest. Techniques aimed at deeper imaging generally cannot provide deep imaging of tissue having moving material (e.g., blood flow).
OCT is effectively optical ultrasound. It can provide tissue morphology at a much higher resolution than MRI or ultrasound, is fast and real-time label free (no radiation), and is non-invasive with no photo damage. OCT is current used clinically for high resolution retina imagery and has been commercially available since 1996 from Zeiss-Humphrey.

Application area

• All branches of medical imaging- dermatology, gastroenterology, cardiology, respiratory medicine, dental, etc.
• Imaging of small animal models for drug development, disease progression, and sensory stimulation (neural imaging) applications. • Industrial applications- microfluidics, tissue engineering, etc.

Advantages

• Solves the existing problem in OCT of background noise/signal limiting the quality of OCT images.
• Provides a cleaner OCT image signal. (OMAG allows for both measurable blood flow equivalent to capillary blood flow and enables deeper image depth (4mm vs. the 2mm standard in OCT).
• Performs full range complex OCT imaging in vivo in real time. The object motion artifacts are not

sensitive to the current technique.
• Provides flow imaging in vivo in real time. The flow measurement is extremely sensitive to blood motion in any direction.
• OMAG does NOT rely on the Doppler principle like all other flow imaging techniques. (Doppler is not sensitive to the flow that is perpendicular to the probing beam).
• Produces 3-D optical angiography without using any contrast agent. • System is extremely low cost without modifying any hardware.

Institution

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