

OPTICAL COHERENCE COMPUTED TOMOGRAPHY

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Optical coherence tomography (OCT) utilizes optical light to obtain an image of opaque or translucent objects, ie tissue. Because scattered light contributes to the blurring found in other optical imaging techniques, OCT filters out all the scattered light. An image is formed using only the back reflected light, producing a high resolution image, but it is limited to <1mm below the surface.

Diffuse optical tomography (DOT) senses absorbed and scattered light. Although the use of diffuse light allows DOT to visualize several centimeters deep inside turbid tissue, the achieved spatial resolution is poor, typically about a fraction of a centimeter. Thus, a gap exists between the two groups of imaging modalities.

An imaging technique is needed to image beyond 1 mm and retain high spatial resolution (~0.01 mm). Optical coherence computed tomography (OCCT) is developed to bridge this gap, by linking OCT and DOT. Potential applications of the present invention are broad, including, the diagnosis of cutaneous melanoma, the high-resolution imaging of small animals, the screening of breast cancer, etc. OCCT provides a novel method to image beyond 1 mm inside a highly scattering medium, such as biological tissue, with high spatial resolution. It is also flexible and has different embodiments of potential commercial value that are suitable for different applications in biomedical studies and clinical practice.

Benefits:

- High spatial resolution images
- Can be used non-invasively in vivo