Optical Coherence Tomography System For Cancer Diagnostics

A newly developed Optical Coherence Tomography (OCT) system uses a time-lapse frame averaging approach to acquire high resolution, in-depth optical images of living tissue samples. This system is ideally suitable for endoscopic imaging applications, such as cancer diagnosis and grading.

Background:
Optical Coherence Tomography (OCT) works by projecting a laser into tissue. When the light is reflected back, the OCT microscope uses an optical interferometer to detect a proportion of the light that is least back scattered. The system discards the multiple scattered light and uses depth-resolved and intensity information to generate an image. Unfortunately, most biological tissue, such as urinary bladder tissue, is optically opaque. Not only does it absorb the light but scatters it in the optical and near-infrared wavelength range, which makes it almost impossible for existing OCT systems to acquire high resolution, in-depth optical images.

Technology Description:
Yingtian Pan, Ph. D., associate professor in Biomedical Engineering at Stony Brook University, has developed an OCT system that can acquire high resolution, in-depth optical images of a living tissue sample with a specifically chosen time-lapse frame averaging approach. His breakthrough is in the way the ultrahigh-resolution OCT technique takes advantage of micromotion in living biological tissue to effectively reduce speckle noise. This simultaneously reveals the sub-cellular details and imaging of the underlying tissue morphology — connective tissue and muscle in bladder — at up to 700 micrometers of depth without focal tracking. Dr. Pan’s OCT system is ideally suitable for endoscopic imaging applications, such as cancer diagnosis and grading.

Patents / Publications:
- Patent Pending