Non-Invasive Skin Cancer Detection using Raman Spectroscopy-OCT System

VANDERBILT UNIVERSITY
CTTC Center for Technology Transfer & Commercialization

Summary

Vanderbilt University researchers have designed a system for non-invasive discrimination between normal and cancerous skin lesions. The system combines the depth-resolving capabilities of OCT technique with Raman Spectroscopy's specificity of molecular chemistry. By linking both imagining techniques into a single detector arm, the complexity, cost, and size of previously reported RS-OCT instruments have been significantly improved. The combined instrument is capable of acquiring data sets that allow for more thorough assessment of a sample than existing optical techniques.

Addressed Need

» Raman spectroscopy excels at label-free detection of a sample's biochemical composition but is incapable of high-resolution microstructural mapping.

» Optical coherence tomography excels at acquiring micron scale cross-sectional images but lacks inherent sensitivity to compositional properties of the sample.

» Combined RS-OCT, invented and patented by the same researchers in 2009, brings together the biochemical composition detection of Raman spectroscopy with the microstructural imaging capability of optical coherence tomography.

Technology Description

This technology takes advantage of the unique properties of RS-OCT without the need for separate detection arms, a novel approach to RS-OCT systems. The utility of a common detector RS-OCT instrument is broad; any sample whose microstructural architecture and biochemical composition is worth evaluating can benefit from RS-OCT. Currently, a working prototype has been developed and the potential utility of the instrument in the skin, retina, and murine calvaria has been demonstrated.

Unique Features and Competitive Advantages

» More cost effective than the multi-sensor arms found in previous embodiments

» Less instrumentational complexity inherent in a single detector arm

» Smaller size of complete system

Intellectual Property Status

» The technology is currently protected by issue US patents 7,508,524 and 8,553,219 and 8,300,220

» List of Publications: http://research.vuse.vanderbilt.edu/bmeoptics/research/optical_diagnosis_RS-OCT.htm

CTTC CONTACT:
Ashok Choudhury, Ph.D.
615.343.2430
Ashok.choudhury@Vanderbilt.edu

VANDERBILT INVENTORS:
Anita Mahadevan-Jansen, Ph.D.
Professor, Biomedical Engineering and Neurosurgery

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Link to Vanderbilt technologies available for licensing