UWM RESEARCH FOUNDATION Technology Overview

Spectral Resolution Add-on Device for Two Photon Microscope

OTT ID #1105/1242

APPLICATIONS

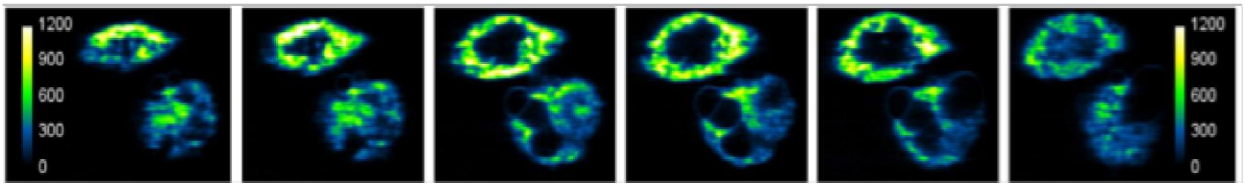
Live Cell Imaging, 3D Imaging, Deep Tissue Imaging, Long Term Imaging without compromised tissue viability, Whole Organ or Slice Imaging

TARGET PROBLEMS

- Typical two photon microscopes scramble dynamic spectral information in living cells
- Sample scanning limitations and spectral bleed are most common problems that severely limit the imaging capabilities in most of the microscopes

KEY FEATURES

- **Single Scan Capture** – No need for multiple scans to resolve spectrum and no photobleaching
- **Easy Installation (Add-on Device)**– Can be integrated into variety of microscopes with fluorescence and either brightfield or phase contrast
- **High Resolution –** Delivers high spatial and spectral resolution in real time
- **Unsurpassed Detection Capability** – Provides spectral information upto 100x magnification
- **Speed and Sensitivity –** Has the sensitivity and speed of competing systems, and is similar to that of broadband microscopes
- **Wide Wavelength Range** – Large numbers of fluorescent markers are easily resolvable spectrally
- **Proven Technology** – Based on well-established quantitative FRET imaging



Fluorescence intensity maps of Chinese Hamster Ovary cells expressing rhodopsin labeled with SCFP3A.

TECHNOLOGY

Inventors at University of Wisconsin-Milwaukee have developed a state-of-the-art imaging tool that uses a single scan multiphoton excitation (425 to 650 nm wavelength range) to deliver pixel level spectral resolution of complex, multi-color fluorescence samples. This technology can upgrade the imaging capability of variety of microscopes, enabling it to achieve multi-photon microscope grade with 3D spatial resolution. The add-on device may be attached to the existing research microscope via side port that incorporates a femtosecond laser (as shown in the picture). This will be the only scanning system that permits real-time quantitative analysis of a single molecule, molecular complexes and their spatial distribution in living cells. Additionally, this technology allows fluorescence signals from co-localized molecules in a three-dimensional sample to be resolved spectrally by parallel detection of tens or hundreds of wavelengths using an EMCCD camera without the need of Confocal setup. The optical sectioning capability of the device is as shown in the picture above.

INTELLECTUAL PROPERTY

US7,973,927, US8,094,304, US9,103,721, US8,982,206 and EP20120782796 validated in Belgium, France, Germany, United Kingdom, and Ireland.

INVENTOR(S)

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Please reference: OTT ID. 1105/1242