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Improving Nano-Biology Interaction Studies with Multi-Modal Raman & Enhanced Darkfield Optical Hyperspectral Microscopy

Effective studies at the nano-bio interface require that researchers can easily observe and measure how nanoparticles interact with a targeted in-vitro cell or ex-vivo tissue environment. HORIBA Scientific and CytoViva, Inc. now provide a new multi-modal Raman and enhanced darkfield hyperspectral microscopy system that is highly effective for nano-biology related research. This system includes patented enhanced darkfield optics that enable label-free observation of nanoparticles as small as 10nm when isolated in solution and in cells and tissue. The optical hyperspectral imaging capability enables rapid capture of large-area hyperspectral images for spectral characterization and spectral mapping of nanoparticles or their drug load. Pixel-level optical hyperspectral data is captured based on the nanoparticle's surface plasmon resonance, fluorescence emission or Rayleigh scatter. Additionally, Raman measurements from the identical field of view can be captured, which provides quantitative molecular fingerprint confirmation of the nanoparticles or other sample elements. Finally, Raman mapping of unique sample elements can also be performed when required. This presentation will provide a detailed overview of this new multi-modal imaging and spectral measurement capability. Specific illustrations of plasmonic, metal oxide, polymer and lipid-based nanoparticles interacting with cells and tissue will be presented.