

Application of Nano Optical Tools to Single Cell Imaging

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Key words: nano particles, nano probes, FRET, live cell imaging

We have developed a real-time live single-cell imaging technology platform capable of sensing/mapping biological macromolecules with nanometer spatial resolution. Using this platform we can potentially, simultaneously examine expression of proteins through use of novel enhanced Raman spectroscopy and metallic nanoparticle-enhanced fluorescence resonance energy transfer (FRET) imaging.

This unique capability is the result of our ability to fabricate metallic nanoparticle coated tapered optical-fiber probes with tip diameters of several tens of nanometers. Excitation of these nano-features by light transmitted through the coated optical fiber gives rise to; (a) enhanced Raman scattering and, (b) highly selective FRET excitation of acceptor molecules. These nano-features act as size-tunable donor molecules.

In this talk the recent advances in use of nano particles and nano probes to intracellular imaging will be reviewed. In particular the recent results from our research group will be discussed in some details.