**Super-resolution in-depth imaging of single nanoparticles inside spheroids by Near-infrared Bessel-beam nanoscopy**

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Introduction.

Figure 1:(a) Schematic of different excitation beam setup for deep tissue fluorescence imaging,(b) The power dependence resolution of B-NIRS microscope

Aims. We report a nanoscopy strategy that applying “non-diffractive” beam and near-infrared imaging probe to minimize the light scattering and absorption inside the spheroid. In order to image single upconversion nanoparticles inside spheroids.

Methods. Adopting from the “non-diffractive” Bessel beam, Bessel-LG01 (B-LG01-VIS) nanoscopy can moderate the scattering from biological tissue achieving longer imaging depth.

Results. We further demonstrate that this method can image single upconversion nanoparticles inside spheroids, as deep as 50 µm, with a resolution of 98 nm.

Discussion.

Conclusion. In conclusion, we demonstrate that the NIRB1 can be used in 3D multicellular spheroid imaging. This method holds great potential to monitor the nanoscale cargo transportation in organoid. This technology holds great potential for the investigation of the behaviours such as the movement, inter-and intra-cellular trafficking and drug release of single nanoparticles in biological systems. It will provide new insight into nanomedicine product design and improve the efficacy of nano devices.

**References**

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