

Precise Evaluation of Oxygen Nanobubbles

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- Biomedical Engineering
- Medical/Health

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- Biomedical Engineering
- Cancer
- Cancer Screening
- Cancer Therapy
- Light Scattering
- Medical Imaging
- Medical/Health
- Microscope

There is not a way to effectively identify the relationship between oxygen nanobubbles (ONBs), e.g. size distribution, diffusion coefficients within a single cell, biodistribution and pharmacokinetic distribution in ex vivo tumor tissues. Conventional imaging techniques are unable to provide any of these and do not provide a very good signal-to-noise ratio for high-resolution biological imaging with the microscope and image analysis.

Researchers at Purdue University have developed a method of determining the precise location of ONBs and quantifying the single-cell absorption in ex vivo tumor tissues. Because of their strong light-scattering property, ONBs are seen as promising contrast-generating imaging agents. Researchers were able to determine the trajectories and quantities of ONBs in cells, and were able to demonstrate the relationship between the size and diffusion coefficient. The use of a HSDFM in this research makes it possible to detect and measure the nanoparticles, which allows for the assessment of their dynamics and trajectories. The contrast agent used has the potential to benefit ex vivo tissue histology, pharmacokinetic/pharmacodynamics studies, along with clinical diagnosis and targeted therapy. This development demonstrates single nanobubble tracking in the field of nanoparticle localization and targeting in single cells effectively identifies the previously mentioned relationships of ONBs.

Advantages:

- Precise
- Strong light-scattering of ONBs
- Effectively identifies many different characteristics and relationships of ONBs

Potential Applications:

- Precisely localize and track a single ONB
- Using ONBs for contrast-generating imaging agents
- Demonstrate the relationship between the size and diffusion coefficient
- Quantify the single-cell absorption in ex vivo tumor tissues in ex vivo tumor tissues

People:

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Intellectual Property:

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