

Scientists convert microbubbles to nanoparticles

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Biomedical researchers led by Dr. Gang Zheng at Princess Margaret Cancer Centre have successfully converted microbubble technology already used in diagnostic imaging into nanoparticles that stay trapped in tumours to potentially deliver targeted, therapeutic payloads.

The discovery, published online today in *Nature Nanotechnology*, details how Dr. Zheng and his research team created a new type of microbubble using a compound called porphyrin - a naturally occurring pigment in nature that harvests light.

In the lab in pre-clinical experiments, the team used low-frequency ultrasound to burst the porphyrin containing bubbles and observed that they fragmented into nanoparticles. Most importantly, the nanoparticles stayed within the tumour and could be tracked using imaging.

"Our work provides the first evidence that the microbubble reforms into nanoparticles after bursting and that it also retains its intrinsic imaging properties. We have identified a new mechanism for the delivery of [nanoparticles](#) to tumours, potentially overcoming one of the biggest translational challenges of cancer nanotechnology. In addition, we have demonstrated that imaging can be used to validate and track the delivery mechanism," says Dr. Zheng, Senior Scientist at the Princess Margaret and also Professor of Medical Biophysics at the University of Toronto.

Conventional microbubbles, on the other hand, lose all intrinsic imaging and therapeutic properties once they burst, he says, in a blink-of-an-eye

process that takes only a minute or so after bubbles are infused into the bloodstream.

"So for clinicians, harnessing microbubble to nanoparticle conversion may be a powerful new tool that enhances drug delivery to tumours, prolongs [tumour](#) visualization and enables them to treat cancerous tumours with greater precision."

For the past decade, Dr. Zheng's research focus has been on finding novel ways to use heat, light and sound to advance multi-modality imaging and create unique, organic nanoparticle delivery platforms capable of transporting cancer therapeutics directly to tumours.

More information: In situ conversion of porphyrin microbubbles to nanoparticles for multimodality imaging, *Nature Nanotechnology*, [DOI: 10.1038/nano.2015.25](#)

Provided by University Health Network

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