Commercialising gas bubbles for cancer drug delivery

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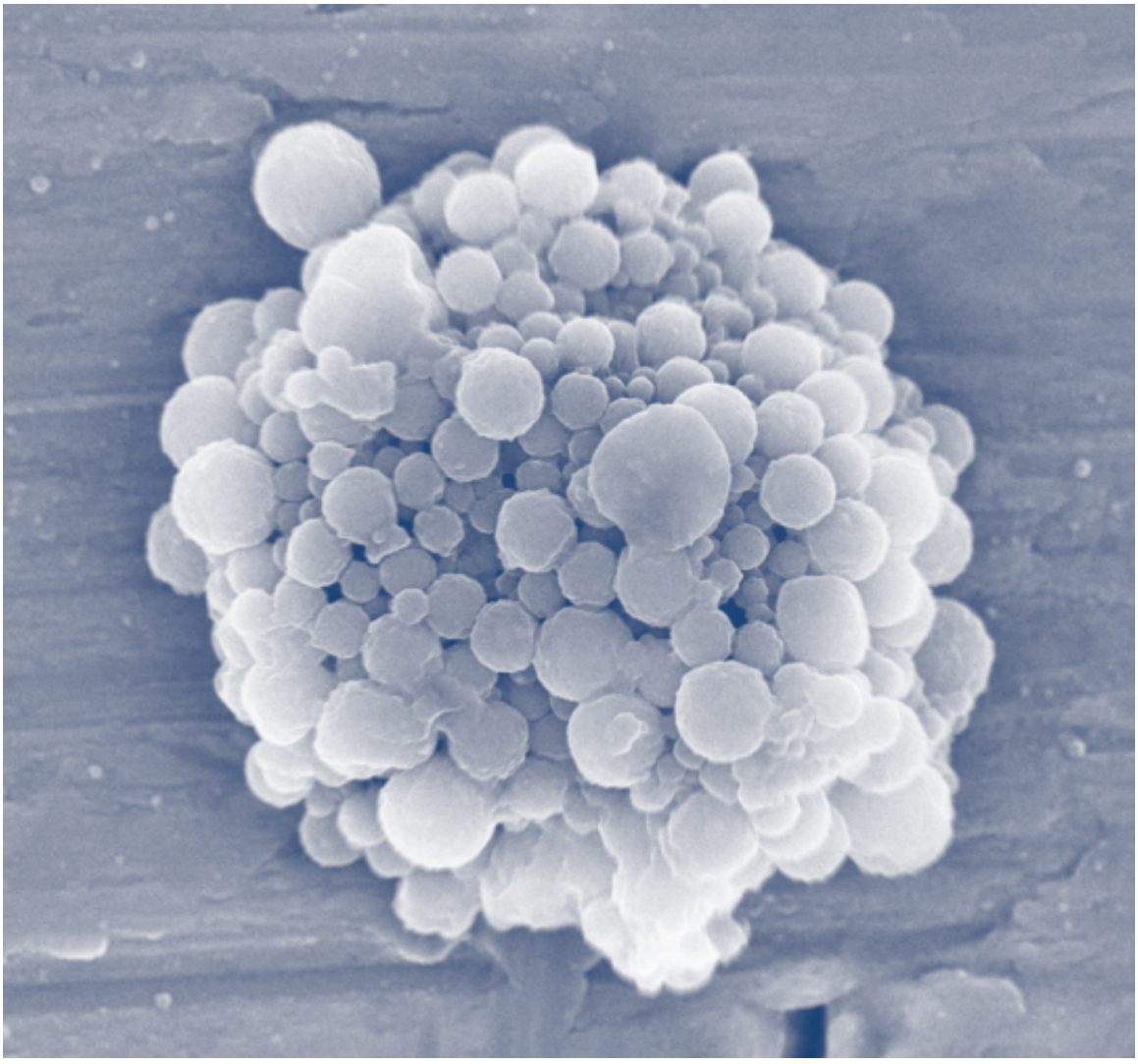

The new project will develop bubbles specially designed for ultrasound-based cancer treatments. Credit: SINTEF.

Researchers are now working to design stable micro-bubbles which, combined with ultrasound, can deliver cancer drugs straight to the target tumour.

The project recently started up in Trondheim is called 'BubbleCAN' and is based on SINTEF proprietary technology. Researchers are making stable micro-bubbles containing chemotherapeutic drugs.

The bubbles can be used in combination with ultrasound and are highly suitable for inoperable cancers and brain tumours that are difficult to treat using current methods.

Highly targeted therapy – fewer side-effects

Yrr Mørch at SINTEF tells Gemini that in traditional chemotherapy approaches, as little as between 0.001 and 0.01% of the drug injected into the body will reach the target tumour.

"The rest damages healthy cells and tissue, resulting in terrible side-effects", says Mørch. "But when we combine bubbles with ultrasound we can increase the amount of drug delivered directly to the cancer by creating small pores in the walls of the vessels supplying blood to the tumour.

Stable, customised micro-bubbles

The challenge facing researchers is that the bubbles are delicate and only have a restricted lifetime in the bloodstream. There is an urgent need to develop bubbles specially designed for ultrasound-based cancer treatments, but there are currently no such products on the market.

The aim of the BubbleCAN project is to optimise the micro-bubble

concept and develop a commercial product.

"The most important task in this project is to make the bubbles stable", says Mørch. "To do this we need nanoparticles that create a protective shell around the bubbles. The bubbles are injected into the blood and circulate to all parts of the body. When they reach the tumour, targeted ultrasound waves burst the bubbles, releasing the nanoparticles and simultaneously creating small pores in the blood vessel walls. This enables large amounts of nanoparticles to accumulate in the tumour, gradually dissolving and releasing the chemotherapeutic drugs", says Mørch.

Provided by SINTEF