Enhanced Nanoparticles for Bio-compatible Diagnostic and Therapeutics (#7518)

*Biocompatible copper sulfide nanoparticles with perfluorocarbon nanodroplets to increase ultrasound and photoacoustic contrast*

Georgia Tech inventors have developed CuS NPs containing laser-activated perfluorocarbon nanodroplets for enhanced ultrasound and photoacoustic contrast. This allows improved diagnostics while retaining the favorable clinical characteristics of CuS NPs, and is done by controlling droplet vaporization for increased penetration. The imaging characteristics of synthesized CuS-PFCnD constructs were first tested in tissue mimicking phantoms, and later in an in vivo model. In vivo results indicated that the particles were stable upon intravenous injection, and provide sufficient US/PA contrast in a diseased lymph node model.

**Benefits/Advantages**

- Biocompatible
- Imaging at clinically relevant depths
- Provide enhanced ultrasound and photoacoustic contrast
- Capable of delivering therapeutics

**Potential Commercial Applications**

- Ultrasound and Photoacoustic diagnostics
- Therapeutics

**Background/Context for This Invention**

Nanoparticles have been researched intensely, particularly for diagnostic purposes, but are currently unable to provide contrast on their own or are biologically unsafe for diagnostic imaging. Combined nanoparticles bring the strengths and weaknesses of each type (organic and inorganic) but are still not ideal for imaging use. CuS NPs (copper sulfide nanoparticles) have favorable clinical properties including biocompatibility, biodegradability, and the ability to provide contrast, but are limited as imaging agents as they only offer photoacoustic contrast and often require high concentrations to provide sufficient signal to noise.

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For more information about this technology, please visit:
https://industry.gatech.edu/technology/enhanced-nanoparticles-bio-compatible-diagnostic-and-therapeutics