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Biodegradable Metallic Nanoparticles as OCT Contrast Agents

Background: The development of high contrast agents for use in Optical Coherence Tomography (OCT) is of great current interest in medical diagnostics for visualization of living tissues. However, there are currently no approved contrast agents for OCT or targeted thermal therapy. The development of such agents would allow for enhanced resolution OCT imaging of living tissue, and in vivo targeting and detection of molecular markers used in diagnostic procedures.

Several nanoparticle agents currently under investigation are made as solid particles with no clear route for degradation and/or eventual elimination from the body. The new nanoparticle agent, developed by researchers at The University of Arizona, Department of Biomedical Engineering combines the best aspects of: (i) a high contrast imaging agent for OCT; and (ii) a route for degradation and elimination of this contrast imaging agent from the body.

Applications:

- *Plasmon resonant structures or contrast agents for biomedical imaging such as Optical Coherence Tomography*
- *Therapeutic agent for treatment or nanosurgery*
- *Spatially and temporally controlled drug delivery*

Advantages:

- *Increased OCT image intensity, for greater sensitivity in medical diagnostics*
- *A biodegradable contrast agent which can be eliminated from the body after imaging living tissues*

The Technology: This technology creates a biodegradable, gold-coated, lipid sphere, i.e., nanoparticle, for use as an OCT high contrast agent. The shell of the nanoparticle is created using self-assembly techniques. Subsequently coating the shell with an array of gold nanoparticles creates nanoparticles of approximately 100nm diameter with the same optical characteristics of solid gold particles. However, when exposed to a surfactant or enzymes, the nanoparticles degrade into fragments which lose their optical properties and which are small enough to be eliminated from the body.

Lead Inventors: Prof. Marek Romanowski; Prof. Jennifer K. Barton; Timothy S. Troutman

Stage of Development: Test data have been collected with nanoparticles composed of gold-coated liposome-shells, and demonstrated to be both metastable and tunable in the near-infrared spectral range. Work is continuing. FDA approval will be required.

Status: Provisional patent application

Refer to Case # UA08-031
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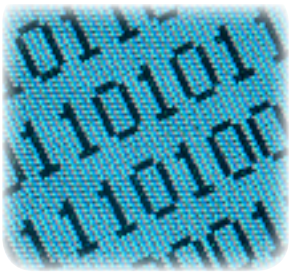

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