Investigating Gold Nanoclusters as Multimodal MRI and CT Contrast Agents

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Diagnostic imaging relies heavily on contrast agents to enhance signal-to-noise ratios and image clarity. While gadolinium-based contrast agents (GBCAs) are the current clinical standard for Magnetic Resonance Imaging (MRI), evidence regarding their long-term accumulation in brain and bone tissues has raised significant safety concerns.[1] Despite extensive research to find commercial alternatives, a gap remains for agents that offer both high performance and enhanced safety. Furthermore, the development of multimodal agents capable of providing contrast for both MRI and Computed Tomography (CT) would optimize medical costs and clinical time by eliminating the need for multiple contrast administrations.
This study explores the potential of gold nanoclusters (AuNCs) as highly tunable, multimodal contrast agents. AuNCs are composed of several to tens of atoms and possess diameters of only a few nanometers, resulting in unique physicochemical properties, including strong photoluminescence and high biocompatibility. In particular, the biological inertness, renal clearance, combined with the ability to control their properties at the atomic level, make AuNC very promising candidate for biomedical applications.[2] A series of AuNCs doped with various transition metals were synthetized, characterized and systematically tested for their dual-mode performance. Our findings demonstrate that AuNCs are suitable agents for integrated MRI and CT imaging, offering a safe and practical option for clinical use **.**

Keywords:
Gold nanoclusters, metal doping, contrast agents, MRI, CT

References:

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