

## Multifunctional Magnetic Gold Nanocomposites: Cancer Detection via Magnetic Resonance Imaging and Localized Synchronous Therapy

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Novel multifunctional magnetic gold nanocomposites (MGNCs) were synthesized for synchronous cancer therapy and diagnosis via magnetic resonance imaging (MRI). The MGNCs consist of magnetic kernels (MKs: aggregates of ultra-sensitive MnFe<sub>2</sub>O<sub>4</sub> magnetic nanocrystals wrapped in polymer) as effective MR contrast agents and silica-gold nanocomposites as hyperthermal therapeutic agents. Erbitux (ERB)-conjugated MGNCs selectively recognized the target cancer cell lines. Fluorescence images and MRI analysis showed that the MGNCs were effectively taken up by the cells. ERB-conjugated MGNCs had an excellent synchronous therapeutic efficacy as a result of therapeutic antibody and NIR laser-induced SPR. Consequently, MGNCs clearly demonstrated selective imaging and treatment of breast cancer simultaneously.