

Colorimetric Detection of Target Nucleic Acids Based on DNAzyme-Modified Nanoparticles

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A novel colorimetric bio-barcode assay has been developed based on DNAzyme-functionalized nanoparticles. In this study, probe DNA-modified magnetic nanoparticles were used for rapid separation of target nucleic acids, while gold nanoparticles modified with DNAzymes and probe DNA were simultaneously added for the generation of colorimetric readout signals. The DNAzyme on gold nanoparticles consists of guanine-rich DNA aptamer and hemin. The aptamer binds hemin in a supramolecular G-quadruplex configuration that acts as a biocatalyst for the generation of a blue-green product ABTS⁺ from colorless substrate ABTS in the presence of H₂O₂. The color change could be detected visually and measured by UV-Vis spectrophotometer. The DNAzyme-functionalized nanoparticles allow for rapid, simple and sensitive detection of the target nucleic acids. The detection limit of this assay was 1×10⁻¹⁰ M.

References:

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