

DNA-GOLD NANOPARTICLE BASED COLORIMETRIC COMPETITION ASSAY FOR THE DETECTION OF CYSTEINE

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NU-NSEC researchers developed a highly sensitive and selective colorimetric detection system for cysteine. The system is based on DNA functionalized gold nanoparticle probes with strategically placed thymidine-thymidine (T-T) mismatches complexed with Hg^{2+} . The assay relies on the distance-dependent optical properties of gold nanoparticles, the sharp melting transition of DNA-linked nanoparticle aggregates and the selective coordination of Hg^{2+} with cysteine. The concentration of cysteine can be determined by monitoring the temperature at which a purple-to-red color change takes place with either the naked eye or a UV-vis spectrometer. This assay does not utilize organic co-solvents, enzymatic reactions, light-sensitive dye molecules, lengthy protocols or sophisticated instrumentation. Cysteine is an important neurotoxin and disease-associated physiological regulator, and having ways to quickly identify it and measure its concentration in colorimetric fashion could lead to a variety of new medical applications.

