

Colorimetric detection of mutation in DNA sequences using selective aggregation of gold nanoparticles

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We have detected mutations in the epidermal growth factor receptor (EGFR) of non-small cell lung cancer patients using the selective aggregations of gold nanoparticles. Mutations in exon19 and exon21 of EGFR gene were detected in non-amplified genomic DNAs isolated from both the lung cancer cell lines and the cancer tissues of non-small cell lung cancer patients. At the optimal salt concentration, addition of the mutant DNA that was hybridized with the complementary probe into the suspension of unmodified gold nanoparticles caused the substantial aggregation the gold nanoparticles and the color change of solution. Gold nanoparticles, however, did not exhibit significant aggregation and the solution color remained unchanged with the addition of the wild type DNA hybridized with the probe. We could detect the deletion mutant form in exon19 and the point mutation in exon21 mutations by selective aggregation with gold nanoparticles. These results were also confirmed by the direct sequencing method.