

## Fluorescence Resonance Energy Transfer Based Detection of Mutation in Exon 19 and 21 Using CdSe Quantum Dots and Sphere/Hollow Au Nanoparticles

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We have detected mutations in the epidermal growth factor receptor (EGFR) of non-small cell lung cancer patients using CdSe QDs and Sphere/Hollow Au 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. We designed the sensing system for mutation in the Exon 19 and 21 of EGFR using water-soluble CdSe QDs and nanoparticles. To fabricate this sensor, we synthesized DNA-functionalized CdSe QDs using ligand exchange and EDC conjugation process and Au nanoparticles. We tuned the absorption wavelength of hollow Au nanoparticles by the controlling of the amount of HAuCl<sub>4</sub> added. For simultaneous detection of mutation in Exon 19 and 21, we functionalized CdSe QDs using two different types of probe DNA. In case of perfectly matched dsDNA pairs, fluorescence quenching and color change was observed and these phenomena are from the FRET between CdSe QDs and Au nanoparticles.