

Simultaneous Detection of Multiple Mutations in EGFR Using Fluorescence Quenching of Quantum Dots

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We have developed a simultaneous detection method for two common mutations in the epidermal growth factor receptor gene based on the fluorescence quenching phenomenon caused by aggregation of CdSe quantum dots. For detection of the in-frame deletion in exon 19 and the L858R point mutation in exon 21, water-soluble CdSe quantum dots with two sizes were functionalized using four different types of probe oligonucleotides. Addition of target oligonucleotides with two different mutational states into the suspensions of green and orange-emitting CdSe quantum dots caused selective aggregation of green and/or orange-emitting CdSe quantum dots, followed by the fluorescence quenching. This method allows a simultaneous detection of mutations in exon 19 and 21 of EGFR gene in a single experiment. PCR products of EGFR gene were also used to confirm that our method could be used to detect mutation in amplified DNA fragments.

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