

Simultaneous Detection of Cancer Specific Fusion Gene by Magnetic Separation Using the Quantum Dots

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The reported most common monitoring methods of clinical diagnosis and prognosis about fusion gene included fluorescence in situ hybridization (FISH), reverse transcription polymerase chain reaction (RT-PCR), But there were some limitations in these methods, such as time consuming, poor precision, and expensiveness. Thus it is very important to develop a new effective method to detect the fusion gene. To circumvent the problems of conventional detection methods, we have developed a detection method for fusion gene by magnetic separation using quantum dots and magnetic nanoparticles. To fabricate this sensor, CdSe/ZnSe/ZnS quantum dots and MNPs were functionalized with probe oligonucleotides were designed to be a perfect match to fusion genes. Addition of target fusion genes, QD-labeled probe DNAs and MNP-labeled probe DNAs hybridized with the target fusion gene. After magnetic separation, fluorescence of the QDs in different wavelengths was measured according to various types of fusion gene. This method could be successfully used to detect not only cDNA, but also genomic DNA. This system also provides a simple, fast, inexpensive, and highly sensitive way to detect fusion genes.