

A Nobel Detection Method of Specific Antigen Based on Nanomaterial Combined with Viral Nanoparticles

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The biosensor systems that are subjected to detecting protein analytes requires immobilization of probe antibodies on the surface of nanomaterial, which is a key step determining sensitivity. In this study, we used the HBV capsid-derived and biotinylated nanoparticles that are subjected to attaching to avidin molecules on the surface of nanostructured quartz. Owing to the surface-displayed tandem repeat of B domain of Staphylococcal protein A of the viral particles, the nanostructured quartz surface is densely covered by probe antibodies with controlled orientation, leading to the preparation of 3-dimensional assay system. We developed a highly sensitive biosensor to detect the E. coli enterotoxin marker. By combining the engineered viral particles derived from HBV capsid with the nanostructured quartz, we constructed a novel 3-dimensional assay system and successfully detected the target enterotoxin marker even at attomolar concentrations, suggesting that sensitive diagnosis may be possible at very early stage of ETEC infection.