

Fluorescent Signal Amplification using 3-dimensional Nanomaterials for Sensitive Bioassay

안금영, 박동현, 이은아, Nguyen Huong Tra, 이지원*
고려대학교
(leejw@korea.ac.kr*)

Fluorescence-based detection is widely used in bioassays due to rapid and simple method. However, the low sensitivity owing to limited amplification of the fluorescence signal has remained as a major drawback. To improve the sensitivity, we synthesized 3-D nanomaterials with fluorescence amplification property. First, we used the ZnO nanorods with high protein adsorption capacity and amplified fluorescence emission as 3-dimensional platform for diagnostic assay of RA. As compare to polystyrene plate, the detection sensitivity of anti-CCP autoantibodies in patient sera was improved by using the ZnO nanorods. Second, We synthesized the DNA aptamer-conjugated FFNPs with enhanced stability and amplified fluorescence intensity as a signal amplified reporter probe in aptamer based assay of PDGF. The developed DNA aptamer-conjugated FFNPs showed significantly enhanced detection sensitivity compare to the same DNA aptamer conjugated Cy3 and eGFP. Consequently, the fluorescence base assay using 3D nanomaterials can be applied in general to sensitive detection of a wide variety of antibody or protein targets.