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Target-activatable gold nanoparticle-based aptasensing for protein biomarkers using stimuli-responsive aggregation

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Abstract

An ultrasensitive and selective light-scattering (LS) aptasensor for prostate specific antigen (PSA) was developed based on bifunctional DNA decorated gold nanoparticles (Au NPs) by use of target stimuli-responsive assembly. Both binding sequence poly adenine (poly(dA), Domain I) and the recognition sequence aptamer (Domain II) of bifunctional ssDNA were in favor of the sensitivity for the fabricated light-scattering aptasensor due to modulated the lateral spacing of DNA on Au NPs surface and possessed strong antigen binding affinity, respectively. And they efficiently promoted the Au NPs aggregation and activated the signal of light-scattering of aptasensor. The formation of aptamer-PSA complex induced conformational transformation of the aptamer on the surface of the Au NPs-based aptasensor and then tuned the interparticle distance of gold nanoparticle assemblies. The larger scattering particles, the higher light-scattering intensity. Target stimuli-responsive aggregation behavior of Au NPs lit up the light-scattering signal of

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