conferenceseries.com

J Biosens Bioelectron 2018, Volume 9
DOI: 10.4172/2155-6210-C1-037

Effect of the size of gold nanoparticles on the sensitivity and rapidity of immunobiosensing

Youngsang You[1], Sundaram Gunasekaran[1] and Seokwon Lim[2]
[1]University of Wisconsin-Madison, USA
[2]Hoseo University, South Korea

The use of nanomaterials, especially gold nanoparticles (AuNPs), has facilitated the development of biosensors that can potentially be used on-site. We have developed a highly sensitive, rapid and visible detection method based on aggregation of AuNPs that does not require any readout device. The biosensor consists of streptavidin-functionalized gold nanoparticles (st-AuNPs), which can produce a visually recognizable color change and biontinylated anti-bacteria antibody as Bifunctional Linker (BL). While BL can function both as a cross linker to bind to the target and to aggregate st-AuNPs, its aggregation function is largely limited when it binds with the target. This mechanism facilitates generating a visible colorimetric signal based on the quantitative relationship between the amount of BL used and the number of st-AuNPs in the system. We used this biosensing system to detect streptavidin and *Escherichia coli*. The effect of the size of AuNPs on the detection sensitivity of our immunoassay was determined by synthesizing AuNPs 5, 13, 25, 35, 50 nm in diameter. Series of tests employing BL and large st-AuNPs (35~50 nm) produced visible color change in response to the presence of streptavidin and *E. coli* as low as 20 pm and 10 CFU/mL, respectively and the total time for testing is about one hour. The results show that sensitivity and rapidity of detection are affected by the size of AuNPs used and hence the biosensing system should be chosen to optimize limit of detection and rapidity.

youngsang1015@gmail.com

Notes: