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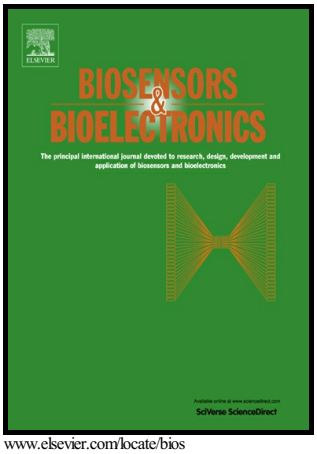

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Novel photoluminescence enzyme immunoassay based on supramolecular host-guest recognition using L-arginine/6-aza-2-thiothymine-stabilized gold nanocluster

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ABSTRACT

A new photoluminescence (PL) enzyme immunoassay was designed for sensitive detection of aflatoxin B_1 (AFB_1) *via* an innovative enzyme substrate, 6-aza-2-thiothymine-stabilized gold nanocluster (AAT-AuNC) with L-arginine. The enzyme substrate with strong PL intensity was formed through supramolecular host-guest assembly between guanidine group of L-arginine and AAT capped on the surface of AuNC. Upon arginase introduction, the captured L-arginine was hydrolyzed into ornithine and urea, thus resulting in the decreasing PL intensity. Based on this principle, a novel competitive-type immunoreaction was first carried out on AFB_1-bovine serum albumin (AFB_1-BSA) conjugate-coated microplate, using arginase-labeled anti-AFB_1 antibody as the competitor. Under the optimum conditions, the PL intensity increased with the increment of target AFB_1, and allowed the detection of the analyte at concentrations as low as 3.2 pg mL^{-1} (ppt). Moreover, L-arginine-AAT-AuNC-based PL enzyme immunoassay afforded good reproducibility and acceptable specificity. In addition, the accuracy of this methodology,