

عنوان مقاله:

Colorimetric aptamer biosensor based on cationic polymer and gold nanoparticles for detection of kanamycin in human serum

محل انتشار:

اولین کنگره ملی نانو فناوری در علوم سلامت (سال: 1397)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

Background and Objective The purpose of this study was to quantitative detection of kanamycin employing unmodified gold nanoparticles, aptamer and a positively charged polymer poly diallyldimethylammonium chloride (PDDA). The proposed method is based on the aggregation of AuNPs using PDDA. Materials and MethodsThe PDDA when associated with the aptamer prevents the aggregation of the gold-nanoparticles while no such inhibition is observed when the kanamycin is added to the solution, thereby changing the AuNPs from red disperesed (λmax=520 nm) to blue aggregated state (λmax=630 nm) as an colorimetric analytics platform can be used to determination of kanamycin. In order to quantitative determination of kanamycin, ratio of the absorbance of aggregated peak to the characteristic AuNPs peak i.e. A630/A520 was plotted and a calibration curve was obtained that fitted best to the concentration of kanamycin. FindingsThis type of biosensor is quite simple and straightforward and can be completed in a few minutes without the need of any expensive equipment or trained personnel. The proposed method for detection of kanamycin was linear in the concentration range of 5-700 nM with 1.2 nM as the limit of detection. Also kanamycin can be observed by naked eyes when the concentration is above 200 nM. Due to the selectively recognized kanamycin in the presence of other interfering substances, this proposed assay applied to real samples for the rapid screening of kanamycin. ConclusionIn conclusion, we have successfully developed an aptamer biosensor with high sensitivity and specificity for kanamycin detection through colorimetric assay. The principle of such a biosensor is based on the aggregation of AuNPs that is controlled by the special interactions among the kanamycin-binding aptamer, cationic polymer PDDA and kanamycin. Moreover, due to the good sensitivity and recovery of this aptasensor, its application in biological fluids for kanamycin detection

کلمات کلیدی: Aptasensor; kanamycin; gold nanoparticles, colorimetry

لینک ثابت مقاله در پایگاه سیویلیکا:



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