عنوان مقاله:

Gold nanoprobe based method for sensing Activated Leukocyte Cell Adhesion Molecule (ALCAM) gene expression, as a breast cancer biomarker

محل انتشار:

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خلاصه مقاله:

Aim: The aim of this study was sensing Activated Leukocyte Cell Adhesion Molecule (ALCAM) gene expression, as a breast cancer biomarker, with gold nanoprobes.Method: Gold nanoparticles were synthesized based on Turkevich method. The morphology and size of the synthesized gold nanoparticles were evaluated by transmission electron microscopy (TEM). The probe and target sequences were designed based on the consensus region of 4 different splice variants. Then gold nanoparticles were functionalized with the designed probes. Finally, for sensing the target, nanoprobes were mixed with different concentrations of target, negative control and dispersionsolution. The absorption was noted by the NanoDrop-ND1000 spectrophotometer in the spectral range of 250 nm to 750 nm. Results: The mean size of the synthesized gold nanoparticles was 12-14 nm. At high MgCL2 concentrations, nanoprobes aggregated in the absence of the complementary DNA sequence and alteration in the solution color was detectable by evaluating the localized surface Plasmon resonance (LSPR). But in the presence of complementary DNA, nanoprobes hybridized to the complementary sequence, therefor no aggregation took place, and no color change was observed. Conclusion: We designed a gold nanoprobe-based method that promptly detects theALCAM gene expression in a low reaction volume with high sensitivity and specificity. This method is simple, fast, selective and quantitative and can be done with small concentrations of the target (fmol/µl). Limit of detection of the method corresponded to 300 fmol/µl of synthetic ALCAM target.

کلمات کلیدی:

ALCAM, breast cancer, gold nanoparticles, nanoprobe, LSPR