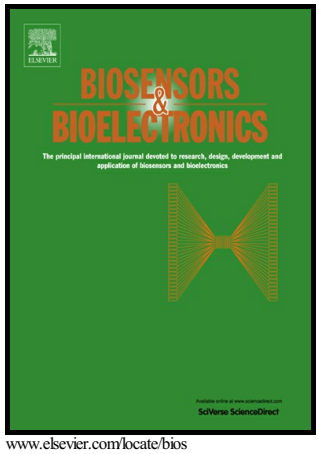

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Probing the Specific Binding of Folic Acid to Folate Receptor using Amino-functionalized Mesoporous Silica Nanoparticles for Differentiation of MCF 7 Tumoral Cells from MCF 10A

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Abstract

Folate receptor (FR) is overexpressed in various cancer cells while its expression in normal cells is restricted. The present study provides a new folic acid/folate (FA) functionalized nanomaterials to sense and the differentiation of the cancer cells from normal ones. The reported nanoprobe is based on the mesoporous materials that are functionalized with FA to specify the FR overexpressed cancerous cells. MCF 7 cell lines were used as a model to show the ability of the developed probe for cancer cell detection. The selective binding of FA to FR-positive cells causes the endocytosis of the mesoporous materials into the cells where it can be observed by fluorescence microscopy images. The specific nature of the binding of the FA functionalized mesoporous silica prevents the false detection of normal cells from cancerous cells even in the presence of each other. The cytotoxity of the n-Pr-NH_2-MCM 41-FA on the MCF 7 cells was investigated using MTT assay. The reported method can detect the MCF 7 cells from 100 to 1000 cells/mL. This method provides a selective and nontoxic approach towards detection of