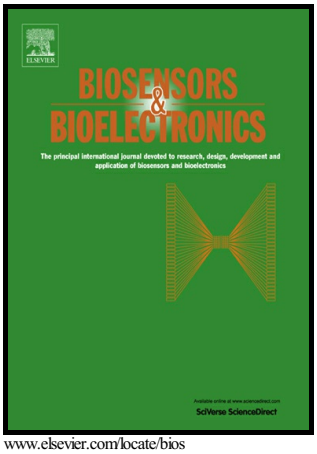

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Abstract

In the present manuscript, a closed bipolar electrode system integrated with electrochemiluminescence (ECL) detection has been introduced for sensitive diagnosis of human breast cancer cells (MCF-7). For sensitive and selective detection, the anodic pole of the bipolar electrode was modified with the AS1411 aptamer, a specific aptamer for the nucleolin, and treated by the secondary aptamer modified gold nanoparticles. The electrochemiluminescence of luminol was followed in the presence of hydrogen peroxide on the anode pole of bipolar electrode (BPE) as an analytical signal. Moreover, 3D printed microchannels were used for the fabrication of BPE systems to minimize the required amounts of sample. The present aptasensor offers low cost, sensitive and selective cancer cell detection with two acceptable linear ranges. The first linear section appears within 10-100 cells and the latter is found to be within 100-700 cells. The limit of detection was about 10 cells.