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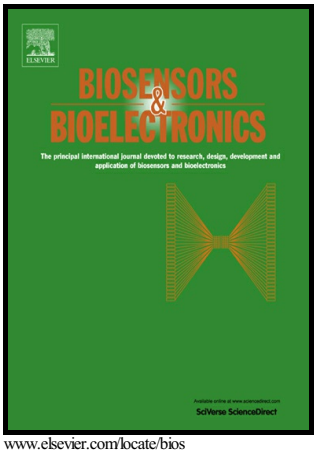

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PII: S0956-5663(16)30224-X
DOI: http://dx.doi.org/10.1016/j.bios.2016.03.033
Reference: BIOS8544

To appear in: *Biosensors and Bioelectronic*

Received date: 30 December 2015
Revised date: 11 March 2016
Accepted date: 14 March 2016

Cite this article as: Yu Tao and Debra T. Auguste, Array-based identification of triple-negative breast cancer cells using fluorescent nanodot-graphene oxid c o m p l e x e s , *Biosensors and Bioelectronic* http://dx.doi.org/10.1016/j.bios.2016.03.033

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Array-based identification of triple-negative breast cancer cells using fluorescent nanodot-graphene oxide complexes

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Accepted manuscript

Abstract

Early and accurate diagnosis of breast cancer holds great promise to improve treatability and curability. Here, we report the usage of six luminescent nanodot-graphene oxide complexes as novel fluorescent nanoprobes in a sensing array capable of effectively identifying healthy, cancerous, and metastatic human breast cells. The sensory system is based on the utilization of nanoprobe-graphene oxide sensor elements that can be disrupted in the presence of breast cells to give fluorescent readouts. Using this multichannel sensor, we have successfully identified breast cancer cells and distinguished between estrogen receptor positive, human epidermal growth factor receptor-2 positive, and triple negative phenotypes. This approach also allows cell identification at high sensitivity (200 cells) with high reproducibility. The unknown cell sample analysis indicates that the sensor is able to identify 49 out of 50 breast cell samples correctly, with a detection accuracy of 98%. Taken together, this array-based luminescent nanoprobe-graphene oxide sensing

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