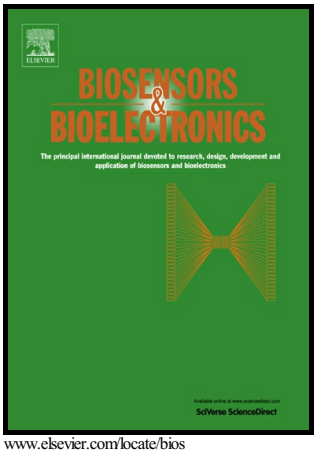
Author's Accepted Manuscript

Cyanine5-doped silica nanoparticles as ultra-bright immunospecific labels for model circulating tumour cells in flow cytometry and microscopy

Claire L. O'Connell, Robert Nooney, Colette McDonagh



www.elsevier.com/locate/bios

PII: S0956-5663(16)31251-9
DOI: http://dx.doi.org/10.1016/j.bios.2016.12.023
Reference: BIOS9416

To appear in: *Biosensors and Bioelectronic*

Received date: 22 August 2016
Revised date: 5 December 2016
Accepted date: 9 December 2016

Cite this article as: Claire L. O'Connell, Robert Nooney and Colette McDonagh Cyanine5-doped silica nanoparticles as ultra-bright immunospecific labels fo model circulating tumour cells in flow cytometry and microscopy, *Biosensor and Bioelectronic,* http://dx.doi.org/10.1016/j.bios.2016.12.023

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, an review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered whic could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

Cyanine5-doped silica nanoparticles as ultra-bright immunospecific labels for model circulating tumour cells in flow cytometry and microscopy

Claire L. O'Connell[1*], Robert Nooney[2], Colette McDonagh[1].

[1] School of Physical Sciences, Dublin City University, Ireland

[2] Biomedical Diagnostics Institute, Dublin City University, Ireland

[*]Correspondence to: claire.oconnell57@mail.dcu.ie

Accepted manuscript

Abstract:

In this work, ultra-bright fluorescent silica nanoparticles (NPs) labels have been shown to selectively bind to a model circulating tumour cell (CTC) line, MCF-7, a metastatic breast cancer by targeting epithelial cellular adhesion molecule (EpCAM) present on the MCF-7 cell membrane. Silica NPs approximately 40 nm in diameter were doped with different concentrations of Cyanine5 dye molecules, using the reverse microemulsion method. The NPs were two orders of magnitude brighter than Cyanine5 free dye and the measured fluorescence intensity matched a homo-Förster Resonance Energy Transfer model. NPs were conjugated with anti-EpCAM antibody to the NP surface for immunospecific targeting. In flow cytometry experiments the NPs were twice as bright as two commercial anti-EpCAM red fluorophore conjugates, APC and AlexaFluor®647. This increase is achieved while keeping non-specific binding low as established in control tests with a non-metastatic cancer cell line (HeLa). The NPs were also immunospecific in fluorescence microscopy experiments performed at room temperature on non-fixed cells. Confocal

Download English Version:

https://daneshyari.com/en/article/5031149

Download Persian Version:

https://daneshyari.com/article/5031149

Daneshyari.com