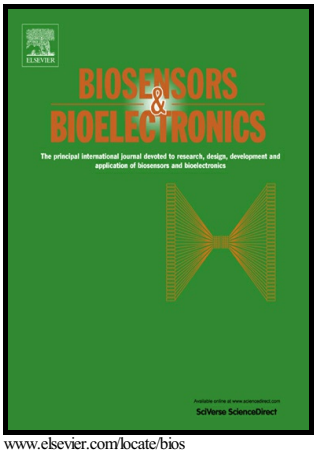
Amplified fluorescent sensing of DNA using luminescent carbon dots and AuNPs/GO as a sensing Platform: A novel coupling of FRET and DNA hybridization for homogeneous HIV-1 gene detection at femtomolar level

Somaye Hamd Qaddare, Abdollah Salimi



www.elsevier.com/locate/bios

PII: S0956-5663(16)31051-X
DOI: http://dx.doi.org/10.1016/j.bios.2016.10.033
Reference: BIOS9255

To appear in: *Biosensors and Bioelectronic*

Received date: 27 August 2016
Revised date: 7 October 2016
Accepted date: 18 October 2016

Cite this article as: Somaye Hamd Qaddare and Abdollah Salimi, Amplifie fluorescent sensing of DNA using luminescent carbon dots and AuNPs/GO as a sensing Platform: A novel coupling of FRET and DNA hybridization fo homogeneous HIV-1 gene detection at femtomolar level, *Biosensors an Bioelectronic,* http://dx.doi.org/10.1016/j.bios.2016.10.033

Amplified fluorescent sensing of DNA using luminescent carbon dots and AuNPs/GO as a sensing Platform: A novel coupling of FRET and DNA hybridization for homogeneous HIV-1 gene detection at femtomolar level

Somaye Hamd Qaddare[a], Abdollah Salimi[a,b*]

[a]Department of Chemistry, University of Kurdistan, 66177-15175, Sanandaj, Iran

[b]Research Center for Nanotechnology, University of Kurdistan, 66177-15175, Sanandaj, Iran

absalimi@uok.ac.ir

absalimi@yahoo.com

Corresponding author. Tel.: +98 8733624001; fax: +98 8733624008.

Abstract

The demand for simple, sensitive, affordable, and selective DNA biosensors is willing, due to the important role of DNA detection in the areas of disease diagnostics, environment monitoring and food safety. The presented work is devoted to the fabrication of an ultrasensitive homogeneous biosensor for the detection of DNA sequences related to HIV based on fluorescence resonance energy transfer(FRET) between carbon dots(CDs) and AuNPs as nanoquenchers. CDs as fluorophore with average size 3-4 nm were prepared by hydrothermal treatment of histidine. In this respect, the hybridization was occurring between the assemblies of fluorescence CDs functionalized 5-amino-labeled oligonucleotides as capture probe and label free oligonucleotides as detection probe. Due to strong fluorescence and good biocompatibility of CDs, the capture probe was covalently conjugated to CDs. In the presence of the target probe, the association