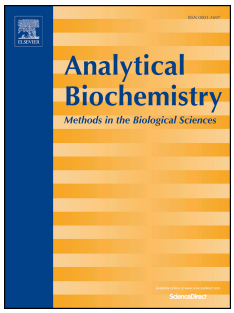
Accepted Manuscript



Selection of DNA aptamers to *Streptococcus pneumonia* and fabrication of graphene oxide based fluorescent assay

Abdullah Tahir Bayraç, Sultan Ilayda Donmez

PII: S0003-2697(18)30485-8

DOI: 10.1016/j.ab.2018.06.024

Reference: YABIO 13061

To appear in: *Analytical Biochemistry*

Received Date: 3 May 2018

Revised Date: 23 June 2018

Accepted Date: 25 June 2018

Please cite this article as: A.T. Bayraç, S.I. Donmez, Selection of DNA aptamers to *Streptococcus pneumonia* and fabrication of graphene oxide based fluorescent assay, *Analytical Biochemistry* (2018), doi: 10.1016/j.ab.2018.06.024.

Selection of DNA Aptamers to *Streptococcus pneumonia* and fabrication of graphene oxide based fluorescent assay

Abdullah Tahir BAYRAÇ[1], Sultan Ilayda DONMEZ[1]

[1]Department of Bioengineering, Karamanoglu Mehmetbey University, Yunus Emre Campus, 70100

Karaman, Turkey

bayrac@kmu.edu.tr

Abstract

Pneumococci are one of the leading causes of infections throughout the world causing problems mainly in children, elderly, and immune-deficient patients. In recent years antibiotic resistant *Streptococcus pneumoniae* strains become widespread. Therefore simple, rapid, and specific detection methods are needed for public health. In this study, DNA aptamer probes against *S. pneumoniae* were selected using bacterial Systematic Evolution of Ligands by Exponential Enrichment (SELEX) and these probes were integrated in to a graphene oxide (GO) based fluorescent assay. Among the tested aptamers three candidates Lyd-1, Lyd-2 and Lyd-3 showed K_d values of 844.7±123.6, 1984.8±347.5, and 661.8±111.3 nM, respectively. These candidates showed binding affinity to *S. pneumoniae* and no specific binding to the bacteria used in negative selection. The binding of aptamers were showed by fluorescence spectroscopy and flow cytometry. GO based label-free fluorescent assay developed using Lyd-3 aptamer had a unique detection limit of 15 cfu.mL^{-1}. Thus we believe that the selected aptamers and fabricated GO based assay has potential to be used in the detection of *S. pneumoniae*. Selected aptamers selectively bind to *S. pneumonia* with anti-pneumococcal potential and holds great potential to be used as molecular probes for identifying and targeting.

Key words: Aptamer; *pneumoniae*; SELEX; pathogen biosensor; biofilm