

## Lab-on-a-disc agglutination assay for protein detection by optomagnetic readout and optical imaging using nano- and micro-sized magnetic beads - DTU Orbit (09/11/2017)

### Lab-on-a-disc agglutination assay for protein detection by optomagnetic readout and optical imaging using nano- and micro-sized magnetic beads

We present a biosensing platform for the detection of proteins based on agglutination of aptamer coated magnetic nano- or microbeads. The assay, from sample to answer, is integrated on an automated, low-cost microfluidic disc platform. This ensures fast and reliable results due to a minimum of manual steps involved. The detection of the target protein was achieved in two ways: (1) optomagnetic readout using magnetic nanobeads (MNBs); (2) optical imaging using magnetic microbeads (MMBs). The optomagnetic readout of agglutination is based on optical measurement of the dynamics of MNB aggregates whereas the imaging method is based on direct visualization and quantification of the average size of MMB aggregates. By enhancing magnetic particle agglutination via application of strong magnetic field pulses, we obtained identical limits of detection of 25 pM with the same sample-to-answer time (15 min 30 s) using the two differently sized beads for the two detection methods. In both cases a sample volume of only 10  $\mu$ l is required. The demonstrated automation, low sample-to-answer time and portability of both detection instruments as well as integration of the assay on a low-cost disc are important steps for the implementation of these as portable tools in an out-of-lab setting.

#### General information

State: Published

Organisations: Department of Micro- and Nanotechnology, Nanoprobes, Magnetic Systems, Center for Intelligent Drug Delivery and Sensing Using Microcontainers and Nanomechanics, BluSense Diagnostics

Authors: Uddin, R. (Intern), Burger, R. (Ekstern), Donolato, M. (Ekstern), Fock, J. (Intern), Creagh, M. (Ekstern), Hansen, M. F. (Intern), Boisen, A. (Intern)

Number of pages: 7

Pages: 351-357

Publication date: 2016

Main Research Area: Technical/natural sciences

#### Publication information

Journal: Biosensors and Bioelectronics

Volume: 85

ISSN (Print): 0956-5663

Ratings:

BFI (2017): BFI-level 1

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 1

Scopus rating (2016): CiteScore 7.22 SJR 2.092 SNIP 1.633

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1

Scopus rating (2015): SJR 2.077 SNIP 1.694 CiteScore 7.07

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 1

Scopus rating (2014): SJR 2.059 SNIP 1.74 CiteScore 6.57

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 1

Scopus rating (2013): SJR 2.033 SNIP 1.744 CiteScore 6.34

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 1

Scopus rating (2012): SJR 2.4 SNIP 1.605 CiteScore 5.7

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 1

Scopus rating (2011): SJR 2.121 SNIP 1.717 CiteScore 5.85

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 2

Scopus rating (2010): SJR 2.129 SNIP 1.62

Web of Science (2010): Indexed yes

BFI (2009): BFI-level 1

Scopus rating (2009): SJR 1.981 SNIP 1.79

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 1

Scopus rating (2008): SJR 2.498 SNIP 1.806

Web of Science (2008): Indexed yes

Scopus rating (2007): SJR 2.097 SNIP 1.994

Web of Science (2007): Indexed yes

Scopus rating (2006): SJR 1.881 SNIP 1.674

Web of Science (2006): Indexed yes

Scopus rating (2005): SJR 1.427 SNIP 1.617

Scopus rating (2004): SJR 1.44 SNIP 1.607

Scopus rating (2003): SJR 1.232 SNIP 1.571

Scopus rating (2002): SJR 1.101 SNIP 1.238

Scopus rating (2001): SJR 1.2 SNIP 1.586

Scopus rating (2000): SJR 1.587 SNIP 1.295

Scopus rating (1999): SJR 1.03 SNIP 0.925

Original language: English

Magnetic bead, Agglutination assay, Thrombin, Microfluidic disc, Optomagnetic readout method, Optical imaging method  
DOIs:

10.1016/j.bios.2016.05.023

Source: FindIt

Source-ID: 2304290193

Publication: Research - peer-review › Journal article – Annual report year: 2016