From 2D fluidic array screening to 3D bacterial capturing structures in a point of care system for sepsis diagnosis

A combined 2D microfluidic-microarray high throughput approach is reported to identify universal bacterial capturing ligands that can be tethered on the surface of 3D sponges fabricated by different methods for concentrating of bacterial targets in diagnosis devices. The developed platform allows for the first time the simultaneous monitoring of various ligands’ affinities to different bacteria species in a dynamic condition in vitro. Moreover, it has been feasible to recognize the effect of steric hindrance on the function of capturing motifs through immobilizing spacer molecules with different lengths between the solid surface and ligands. 3D sponges and micropillars are modified with the most potent capturing molecule to assess their bacterial capturing in real blood samples. Next, the 3D structures are placed into a chip with an immense potential to recognize bacteria through imaging and fluorescence intensity concept.
Improved Targeting of Cancers with Nanotherapeutics

Targeted cancer nanotherapeutics offers numerous opportunities for the selective uptake of toxic chemotherapies within tumors and cancer cells. The unique properties of nanoparticles, such as their small size, large surface-to-volume ratios, and the ability to achieve multivalency of targeting ligands on their surface, provide superior advantages for nanoparticle-based drug delivery to a variety of cancers. This review highlights various key concepts in the design of targeted nanotherapeutics for cancer therapy, and discusses physicochemical parameters affecting nanoparticle targeting, along with recent developments for cancer-targeted nanomedicines.

General information
State: Published
Organisations: Department of Micro- and Nanotechnology, BioLabChip, Colloids and Biological Interfaces, Ligandal Inc.
Authors: Foster, C. (Ekstern), Watson, A. (Ekstern), Kaplinsky, J. J. (Intern), Kamaly, N. (Intern)
Pages: 13-37
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Methods in Molecular Biology
ISSN (Print): 1064-3745
Ratings:
BFI (2017): BFI-level 1
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 0.76 SJR 0.509 SNIP 0.242
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.548 SNIP 0.272 CiteScore 0.82
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.649 SNIP 0.319 CiteScore 1.02
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.686 SNIP 0.316 CiteScore 1.17
ISI indexed (2013): ISI indexed no
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.699 SNIP 0.369 CiteScore 1.26
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.699 SNIP 0.258 CiteScore 1.17
ISI indexed (2011): ISI indexed no
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.71 SNIP 0.254
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.603 SNIP 0.193
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.574 SNIP 0.257
Scopus rating (2007): SJR 0.633 SNIP 0.181
Scopus rating (2006): SJR 0.599
Scopus rating (2005): SJR 0.484
Scopus rating (2004): SJR 0.362
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.424
Scopus rating (2002): SJR 0.44
Scopus rating (2001): SJR 0.403
Scopus rating (2000): SJR 0.324
Scopus rating (1999): SJR 0.209
Original language: English
Targeting, Antibodies, Ligands, EPR, Cancer, Oncology, Nanoparticles, Nanotherapeutics, Nanomedicine, Multivalency, Drug delivery, Translation
DOIs:
Projects:

**Statistical Modelling of TCR Repertoires for Immunotherapy and Drug Delivery Systems**

Department of Micro- and Nanotechnology  
Period: 15/10/2017 → 14/10/2020  
Number of participants: 3  
Phd Student:  
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Supervisor:  
Kaplinsky, Joseph John (Intern)  
Main Supervisor:  
Andresen, Thomas Lars (Intern)

**Financing sources**  
Source: Internal funding (public)  
Name of research programme: Fonde  
Project: PhD

**Liposome based vaccines in cancer Immunotherapy**

Department of Micro- and Nanotechnology  
Period: 01/09/2016 → 31/08/2019  
Number of participants: 3  
Phd Student:  
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Main Supervisor:  
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**Financing sources**  
Source: Internal funding (public)  
Name of research programme: Grundforskningsfonden  
Project: PhD