Interdisciplinary Infectious Disease Cluster (IIDC)

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Team Members

• Faculty
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• Others
Interdisciplinary Infectious Disease Cluster (IIDC)

• Infectious disease, a big public health concern
  • Such as the recent coronavirus pandemic (SARS-CoV-2)
  • 42 M COVID-19 cases (USA 8.5 M), 10/22/2020
  • 1.2 M Deaths (225 K), 10/25/2020
  • …

• IIDC Goal: Assembly of a distinguished interdisciplinary team to work collaboratively to address major problems in infectious disease to improve public health
  • Antimicrobial resistance (AMR)
  • COVID-19, and so on
Proposal

• Problem & Significance
  • Antimicrobial resistance (AMR) is an increasingly serious threat to global public health
  • Methicillin-resistant *Staphylococcus aureus* (MRSA)
    • Life threatening
    • The number one cause of hospital-associated infections with a high percentage of these caused by MRSA.
    • 72,444 MRSA infections and 9,194 related deaths each year in the U.S. only
  • Multidrug-Resistant TB (2018)
    • 450,000 MDR-TB
    • 170,000 deaths
Multidrug Resistance (MDR) Bacteria efflux multiple drugs similar to MDR cancer cells

• MDR in cancer therapy, a major obstacle

Same-Single-Cell Analysis for the Study of Drug Efflux Modulation of Multidrug Resistant Cells Using a Microfluidic Chip

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Cite this: Lab Chip, 2011, 11, 1378

www.rsc.org/loc

TECHNICAL NOTE

A simple and fast microfluidic approach of same-single-cell analysis (SASCA) for the study of multidrug resistance modulation in cancer cells†

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Received 24th November 2010, Accepted 10th January 2011
DOI: 10.1039/c0lc00626b
Objective:

• To develop a POC microfluidic device for the rapid detection of MRSA, through specific recognition by integrated aptasensors on the chip using
  • a low-cost common thermometer
  • Smartphone –based technique

Plan: Proposal

• R01

• RFA-AI-20-001: Combating Antibiotic-Resistant Bacteria (CARB) Interdisciplinary Research Units (U19)

• TB resistance: R21 or R01
Thank you!

• Thanks for the IDR support!