



Research project description

Advanced Apparatus for Pathogen Detection (AAPD)

Project Directors:

SURNAME/First name/Title	Job Title, Institute and Address	Country
Abdelghani Adnane/Pr	Full Professor, INSAT	Tunisia
BALDRICH/Eva/Dr.	CNM-CSIC. Campus UAB, Barcelona.	SPAIN
DELCAMPO/Javier/Dr	CNM-CSIC. Campus UAB, Barcelona	Spain
SIMONIAN/Aleksandr/Prof.	Sam Ginn College of Engineering, Auburn, Alabama AL	USA
Biophage Pharma (End User)	Royalmount, Montreal, QC H4P 2R2, Canada	Canada

Objectives: The goal of the present project is to develop a strategy and a system for the rapid detection of selected bacterial pathogens. The system will make use of two complementary measurement techniques such as Surface Plasmon Resonance, SPR, and Electrochemical Impedance Spectroscopy, EIS. The sensing areas will be functionalised using phages, which are highly specific bacterial viruses. The system will make use of microfluidics to enhance mass transport rates and minimise the required volume of reagents and sample. Also, the system will have the option to use phage-functionalised magnetic beads to pre-concentrate the samples and amplify the detection signal. The timely detection of bacterial pathogens is of vital importance in biological warfare scenarios

In addition to this, rapid pathogen detection methods are also of great interest in the food industry as well as in environmental control. The result of the project will be a prototype that BioPhage Pharma will test in pre-commercial state.

Ph.D student and Post-doc:

- Saloua Helali, , Researcher, Physist, Tunisia
- Moataz Billah Mejri, Ph.D student, biologist, Tunisia
- Hamdi Baccar, Ph.D student, Physist, Tunisia

Results:

- 1/H.baccar, M.B.Mejri, T.Ktari, A.Abdelghani, Surface Plasmon Resonance Immunosensors for Bacteria detection, Talanta, 82,(2010) 810-814
- 2/M.B Mejri, H Baccar, E. Baldrich, F. J. Del Campo, S. Helali, T. Ktari, A. Simonian, A. Abdelghani, "Impedance biosensing using phages for bacteria detection: Generation of dual signals as the clue for in-chip assay confirmation", Biosensors and Bioelectronics, (2010), Volume 26, issue 4, pp 1261-1267.
- 3/M. B.Mejri, A. Tlili, and A. Abdelghani, Magnetic Nanoparticles Immobilization and Functionalization for Biosensor Applications, International Journal of Electrochemistry, Volume (2011), Article ID 421387,
- 4/ M. B. Mejri, H. Baccar, T. Ktari, A. Abdelghani, Detection of E. Coli Bacteria using Impedance Spectroscopy and Surface Plasmon Resonance Imaging based Biosensor, Sensors letters, vol.9, (2011), 2130-2132
- 5/Hamdi Baccar M.B.Mejri, A. Abdelghani, Functionalized Gold Nanoparticles for Biosensors Application, Sensors letters, vol.9, (2011), 2336-2338.
- 6/ Baccar. H, Mejri.MB, Prehn R, del Campo FJ, Baldrich .E, Rosemonde. M and Abdelghani. A, Interdigitated Microelectrode Arrays Integrated in Microfluidic Cell for Biosensor Applications, Nanomedicine & Nanotechnology, (2014), Volume 5, issue 6, 1000243, <http://dx.doi.org/10.4172/2157-7439.1000243>

Budget

	(1)	(2)	(3)	(4)
<i>Country:</i>	Tunisia	Spain	USA	Canada
<i>Institute:</i>	INSAT	CNM	AU	Biophage Pahrma Inc.