BILOBA

Bloch electromagnetic surface wave bio-sensors for early cancer diagnosis

Project reference: 318035
Instrument: CP / STREP

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Web site

http://www.biloba-project.eu/

Timeline

Start Date: 01/10/2012
End Date: 30/09/2015

Budget

Overall Cost: 4,731,524 €
Funding: 3,600,000 €

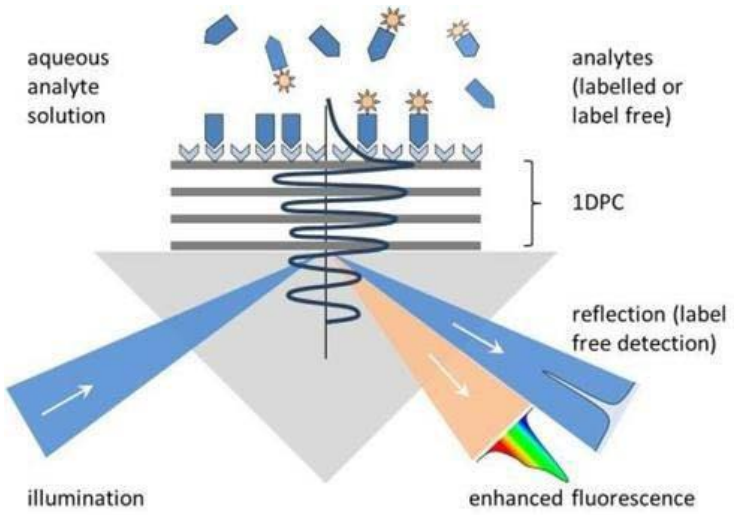
Project Partners

- Università di Roma "La Sapienza", I
- Politecnico di Torino, I
- Fraunhofer Institute, D
- Imperial College of London, UK
- Università di Torino, I
- LABOR Srl, I
- Biotray SAS, F
- HORIBA Jobin Yvon SAS, F
- KDS Radeberg GmbH, D

Vision & Aim

BILOBA aims to develop and pre-clinically validate a multi-functional point-of-care platform capable of performing real-time cancer biomarker detection in a tandem configuration. The configuration exploits a label-free detection based on the resonance shifts, and the spectral analysis of enhanced fluorescence emitted by biomolecules immobilized on the surface. Utilizing both labeled and label-free analysis on one sensor increases the sensitivity and the reliability of optically readout surface bound assays.

The standard optical label-free detection is the surface plasmon resonance (SPR) method. Its sensitivity suffers from the strong absorption of waves bound to the metal surface. Here, a similar concept, already at the proof of principle stage, will be advantageously implemented by applying the unique properties of Bloch Surface Waves (BSW) sustained on 1D Photonic Crystals (1DPC). Therein, a surface wave without absorption is excited, giving rise to an enormous narrowing of resonances and an associated increase in sensitivity. Furthermore, fluorescence enhancement due to near field effects will be exploited. By engineering the BSW dispersion both detection schemes will be combined.



The goal of the project is to explore, design, and set-up BSW systems optimized for analytical sensing, and develop a corresponding analytical instrument. Immobilization protocols and biochemical assays have to be established for optimizing the binding site surface density and for detecting the target biomarkers. The development of a sophisticated, robust fluidic system to ensure a high signal-to noise ratio even in the case of lowest analyte concentrations accompanies this work.

The results will be applied to early cancer biomarker analysis by validating the project's results in pre-clinical tests. The target application is the detection of Angiopoetin-1, Angiopoietin-2 and Vascular Endothelial Growth Factor (VEGF-A) with these proteins being indicative of angiogenesis associated to human cancer progression.