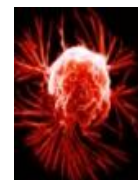


PEOPLE MARIE CURIE ACTIONS

**International Research Staff Exchange  
Scheme Call: FP7-PEOPLE-2012-  
IRSES**

**SMARTCANCERSENS**

**“better healthcare through  
smart analytical devices”**



Oncologists still rely heavily on biological characterisation of tumours and a limited number of biomarkers which have demonstrated clinical utility. Routine cancer diagnostic tools may not be always sensitive enough and may only detect proteins at levels corresponding to an advanced stage of the disease. Recently, new genomic and proteomic molecular tools (molecular signatures) are being employed which include genetic and epigenetic signatures, changes in gene expression, protein profiles and post-translational modification of proteins. Such advanced diagnostic tools are not always readily adapted to clinical cancer screening due to their complexity, costs and the requirement for highly-qualified operators. Novel bioanalytical methodologies for detection of specific biomarkers/ biomolecules, based on nanostructured electronic sensors (rapid, sensitive devices capable of miniaturisation and deployment on site or in small clinics), fulfill the necessary requirements and have the potential to compliment time- and labour consuming clinical analysers used in medical laboratories currently. The primary objective of this proposal, therefore, is to gather together an international and interdisciplinary consortium of ten research teams from EU Member States, Third (including ENP) countries with EU agreements on S&T, in order to share and jointly exploit knowledge and expertise in the development of micro/nanosensors as tools in early cancer diagnosis. A key scientific target is the realisation of intelligent electronic devices which respond to biomolecules such as formaldehyde, amines, metal ions, saccharides, activities of amine oxidases, arginase and glutathione-S-transferase. This will entail design, development and characterisation of nanoscale transducers suitable for testing in clinical samples.

The primary objective of this proposal is to establish a multi-annual joint research which exploits an international and interdisciplinary consortium of leading research teams from EU Member States and Third countries. This synergistic network of excellence is essential for delivery of multidisciplinary research, innovation and technology transfer in the areas of micro/nano sensors R&D for early cancer warning systems. This will be based on mutually beneficial research strategies and will contribute significantly to integration of related research activity from a wide geographic area - Ireland, Romania, Spain, Portugal, Sweden, France, Ukraine, South Africa, Egypt, and Tunisia.

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<http://www.univ-lyon1.fr/discover-lyon-1/>

## Workpackages

Major Research Activities	Description
<b>SYNTHESIS</b> (WP leader - Egypt)	Synthesis of ionophores, Thiolated metallophthalocyanines, Poly-Lysine, Poly-Glutathione molecules.
<b>PREPARATION</b> (WP leader – South Africa)	Preparation of monoclonal antibodies and aptamers, and a range of nano-materials including those with redox driven reactivity.
<b>MICRO/NANO TRANSDUCERS FABRICATION</b> (WP leader - France)	Design, development, fabrication, packaging and characterization of the metallic micro/nano-electrodes based on polymeric and silicon substrates as well as development of software for data analysis and acquisition.
<b>SURFACE FUNCTIONALIZATION</b> (WP leader - Romania)	Modification of electrode surfaces using nano-materials and chemical/ biological components.
<b>SURFACE CHARACTERIZATION</b> (WP leader - Portugal)	Characterization of the structure, electrical and sensing properties of recognition membranes at nano-scale with scanning probe microscopies including chemical probe microscopy.
<b>NANOMAT</b> (WP leader - Tunisia)	Development of the software for numerical optimization and prediction of the nano-structured electrodes sensing characteristics
<b>SMARTCANCERSENSOR</b> (WP leader - Ireland)	Assembly and integration of a/the smart nano-electrochemical device/s capable of detecting the desired cancer targets.
<b>VALIDATION</b> (WP leader - Ukraine)	Validation of the developed device/s analytical characteristics in real samples (serum, urine, blood etc.) and their comparison with those obtained by traditional (if any) approaches
<b>METTECH</b> (WP leader - Sweden)	Marketing investigation of World cancer sensors needs and requirements as well as Exploitation and Transfer Technologies