Towards better point of care devices: Conducting polymers as smart surfaces in biosensors

Fact Sheet

Project Information

CP-SMARTSURFACES

Grant agreement ID: 224880

Project closed

Start date
1 May 2008

End date
6 July 2015

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 100 000,00

EU contribution
€ 100 000,00

Coordinated by
UNIVERSITY OF SURREY
United Kingdom

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Objective

Discovered just over 20 years ago, conducting polymers (CPs) have gained considerable attention because of their unique chemical and electronic conducting properties. As a result they have various (bio)analytical and technological applications. CPs are easily synthesised, both chemically and electrochemically under mild conditions, opening up vast possibilities for the immobilisation of biomolecules. Immobilisation of antibodies by entrapment within films or by covalent binding on these films permits the straightforward fabrication of biosensors. In electrochemical biosensors, non-specific binding (NSB) of molecules, e.g. proteins in serum, can occur, lowering overall device performance. In the past, surface chemistry has been employed to prohibit NSB on electrodes with sites that do not have antibodies attached. This surface chemistry however, impairs device performance. CPs have inherent dynamic surface properties that can be easily switched upon the application of an appropriate electrical potential. Their ability to be switched between different oxidation states and the associated switch in properties such as doping level, resistance and surface wettability can be controlled by changing the electrical potential resulting in reversible switching. Routes to nano-dimensional CPs, exhibiting markedly improved properties from those of the bulk materials, have been recently developed. We therefore propose to exploit the dynamic chemical nature of CPs to inhibit NSB in electrochemical bio-assays and demonstrate the efficacy of this approach using a simple nanostructured electrochemical prostate cancer diagnostic platform made from conducting polymers. One can imagine the significance of a biosensor that provides increases in performance and shorter detection times, since the immobilising platform, transducer and dynamic surface control are implemented within a single material.

Fields of science (EuroSciVoc)

medical and health sciences > clinical medicine > oncology > **prostate cancer**

engineering and technology > electrical engineering, electronic engineering, information engineering > electronic engineering > sensors > **biosensors**

natural sciences > chemical sciences > electrochemistry > **electrolysis**

natural sciences > biological sciences > biochemistry > biomolecules > **proteins**

natural sciences > chemical sciences > **polymer sciences**

Keywords

antibodies | biosensors | conducting polymers | electrochemistry | medical diagnostics | nanotechnology | point of care devices | prostate cancer | smart surfaces

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

PEOPLE-2007-4-3.IRG - Marie Curie Action: "International Reintegration Grants"

Call for proposal

FP7-PEOPLE-2007-4-3-IRG
See other projects for this call

Funding Scheme

MC-IRG - International Re-integration Grants (IRG)

Coordinator

UNIVERSITY OF SURREY

EU contribution

€ 100 000,00

Total cost

No data

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South East (England) > Surrey, East and West Sussex > West Surrey

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Participants (1)

DUBLIN CITY UNIVERSITY

Ireland

EU contribution

€ 100 000,00

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Ireland > Eastern and Midland > Dublin

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Total cost

No data

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