

Project Introduction

Written by John Mulcahy

Thursday, 08 April 2010 20:04 - Last Updated Sunday, 16 June 2013 22:57

Research area: NMP-2007-1.1-1 Nano-scale mechanisms of bio/non-bio interactions.

The BioElectricSurface project completed in September 2011.

The project had set out to develop methods to manipulate surface charge on biomaterials surfaces by electrical modification.

This surface charge is critical in mediating bio/non bio interactions in vivo and therefore very important in the area of medical devices.

The project developed novel nanoscale techniques to obtain a quantitative insight into biological interactions on the biomedical device surfaces.

The research provided valuable understanding of biological interactions at the nanometer scale and this understanding was applied to develop both plaque-resistant cardiovascular and urological stents; advancing new materials for rapid-healing orthopaedic implants; and producing MRSA-resistant self sterilising hospital gowns.

Project description

According to the World Health Organisation (WHO), cardiovascular diseases cause half the deaths in the EU. It is also the main cause of years of life lost (over 30 per cent) in early death thus causing huge pressure on the labour force and family earnings. The problem is becoming more acute in Central and Eastern European countries. Due to the ageing population in the EU, osteoporosis related bone fractures have almost doubled in the last decade. It is estimated that 40 percent of women over 50 years in age will suffer from fractures due to low density bone.

The European Commission considers the application of nanotechnology an important research strategy to address these problems. For this, design and control of biomaterial at the nanometre scale is set as a strategic research priority. Europe is, however, seriously under-represented in

Project Introduction

Written by John Mulcahy

Thursday, 08 April 2010 20:04 - Last Updated Sunday, 16 June 2013 22:57

the global market for nanotherapeutics, where the United States dominates with three-quarter of the market share. While the drive for nanoscale understanding of biological interaction can be high, the application of this knowledge in marketable devices should also be prioritised. Here, we propose electrical modification of biomaterials surface to manipulate surface charge that will mediate bio/non bio interactions in vivo.

We propose novel nanoscale techniques to probe this surface charge at the nanometre scale so that we have a quantitative insight to biological interaction at the biomedical device surfaces. Such an approach will help us to scale up electrical modification in cardiovascular stents, urological stents, orthopedic implants and photosterilisation devices. The research proposed here will not only provide nanoscale understanding of biological interactions on biomaterials surface but also result in novel applications and devices, which will penetrate into the market in short to medium term.

Project details**Project Acronym:** BIOELECTRICSURFACE

Project Reference: 212533

Start Date: 2008-10-01

Duration: 36 months

Project Cost: 5 million euro

Contract Type: Small or medium-scale focused research project

End Date: 2011-09-30

Project Status: Execution

Project Funding: 3.54 million euro

The project is now also listed on the [CORDIS website](#)