University of Nottingham hosts partner meeting of the European project IMMODGEL

Local immunomodulation around implants by innovative hydrogel-based systems

On the 17th and 18th of November 2014, Prof. Amir Ghaemmaghami's Cellular Immunology and Tissue Modelling research group at the University of Nottingham hosted the third partner meeting for the EU FP7 project IMMODGEL. IMMODGEL is a 4-year project funded by the European Union Seventh Framework Programme for research, technological development and demonstration. It runs from October 2013 to September 2017 and, in addition to the University of Nottingham (UNOT), involves academic and industry partners from across Europe and the USA. Partners who travelled to Nottingham for the meeting included Steinbeis-Europa-Zentrum (SEZ, Germany), University of Heidelberg (UHEI, Germany), University of Strasbourg (UDS, France), Brigham and Women´s Hospital at Harvard Medical School (BWH, USA), Contipro (CTP, Czech Republic), and Protobios LLC (PTB, Estonia) to discuss the progress made in the first year of the project and to agree upon the plan of action for the next 6 months. Richard Kowalski from DePuy Synthes was also present in his capacity as an industry advisor on the project.

The main objective of IMMODGEL is to avoid the frequent adverse immune reactions following implant surgery. Such immune reactions will be reduced by means of an innovative system composed of chemical (hydrogel) and biological (immune system cells) elements. The design will be adjustable for any implant, medical device or transplant.

Furthermore, a diagnostic test will be developed to predict the patients' specific immune responses to implant materials. The system's chemical and physical properties will be modified accordingly to avoid implant rejection. IMMODGEL will for the first time allow implants to be personalised and to minimise adverse immune reactions.

The key innovation will be the development of IMMODGEL as a system that will significantly decrease the level and duration of implant induced inflammation besides optimising the healing phase upon implantation. Thus, it will reduce the negative outcomes of implant surgery, relieve pain and reduce related medical costs in Europe.

In the early stages of the IMMODGEL project, the University of Nottingham is leading efforts in identifying optimal surface features for modulating 'immune cell-surface' interactions with the ultimate aim of identifying patterns with distinct immunomodulatory properties. The University of Nottingham is also supporting the phenotypical and functional characterisation of macrophages in 2D and within 3D constructs. This involves the use of different analytical tools including high throughput microscopy. Another major contribution the University of Nottingham will be providing is expertise and know-how in the development and characterisation of immunocompetent tissue models to the scientific partners of the project. In this context they will primarily use a 3D model of human lung epithelium to validate macrophage phenotype and function under in vivo-like conditions.

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L to R: Mercedes Dragovits (SEZ), Mehmet Dokmeci (BWH), Alexandru Gudima (UHEI), Sabine Müller (SEZ), Amir Ghaemmaghami (UNOT), Helena Knopf-Marques (UDS), Lucie Wolfová (CTP), Philippe Lavalle (UDS), Richard Kowalski (DePuy Synthes), Jan Klemes (CTP), Toomas Neuman (PTB), Sonali Singh (UNOT), Pengxiang Chang (UNOT).

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