



TERMIS – EU SYMPOSIUM SUBMISSION FORM

Title:	NANOTECHNOLOGY AND REGENERATIVE MEDICINE	
	Name	Affiliation
Chair:	Prof Alexander M Seifalain	Centre for Nanotechnology & Regenerative Medicine, Division of Surgery & Intervetional Sciences, University College London, London, UK
Co-Chairs:	Dr Hossein Ghanbari	The same as above; and Nanotechnology Research Centre, Tehran University of Medical Sciences, Tehran, Iran
Keynote Speaker *:	Prof Alexander M Seifalain	The same as above
Organizers:	Dr Hossein Ghanbari Prof Alexander M Seifalain	The same as above
Synopsis: Please provide a brief synopsis of the proposed symposium (up to 600 words). Please use allocated space below.		
<p>Recent innovatory advances in nanotechnology have resulted in the emergence of novel techniques and advanced new nanomaterials with improved properties, capable of being used in several biomedical applications. Merging this advanced technology with other emerging innovatory fields such as stem cell technology and regenerative medicine can be a real breakthrough in current medical practice. Development of advanced diagnostic and therapeutic tools based on these novel technologies hold great promises in overcoming unsolved problems of traditional medicine. Application of nanoparticles or other nanostructures in nanomedicine including cell labelling, advanced imaging tools, and gene and drug delivery systems based on nano-carriers has opened new horizons to the field of regenerative medicine. Creating smart nanotopographic surfaces for tissue engineering by the use of nanotechnology is an interesting field which can be used to control and direct stem cell proliferation and differentiation. The advantage of smart scaffolds with specific nanotopography over other scaffold materials is that their structure is precisely controllable at microscopic and nanoscopic scale level in order to control cell behaviour, proliferation and differentiation. These scaffolds can be modified using different techniques to enhance their biocompatibility, to tune their biodegradation rate, and to improve their mechanical properties to sustain stresses at a specific site of application. Using nanotechnology, the physicochemical properties of the scaffold materials for various applications in tissue engineering field can be drastically improved. It is known that the nanotopography and other physical characteristics of the scaffolds such as porosity and pore structure, volume and size are responsible to regulate cell function. Highly porous scaffolds offer significant surface area for cell attachments. The key factor responsible for successful cell adhesion, proliferation and differentiation is pore interconnectivity. Good pore interconnectivity provides sustainable environment for a uniform cell distribution within the scaffold and plays an essential role in regulating the diffusion of cell nutrients and waste disposal. These features can be controlled and improved at nano-scale level by the use of advanced nanotechnological techniques. Recently, a novel family of nanocomposite polymers with improved biomechanical and surface properties has been developed for tissue engineering application. This includes a family of biocompatible nanocomposite polymers with tuneable biodegradation rate and porosity for several <i>in vitro</i> tissue engineering approaches, and a group of completely non-biodegradable scaffolds with smart surfaces for <i>in vivo</i> tissue engineering approaches. These nanocomposite polymers offer potential applications in the fields of tissue engineering liver, small intestine, cartilage, nerve conduits, and heart valve.</p> <p>This symposium aims to bring together all leading experts who are working to apply nanotechnology-offered materials and techniques in the field of tissue engineering and regenerative medicine. This can potentially expand our knowledge and ability to intervene at nano-scale level in order to control cell's behaviour, proliferation and differentiation for tissue engineering and stem cell therapy purposes.</p>		
Symposium Keywords:	Nanotechnology, Regeorative Medicine, Tissue engineering, nanomaterials	

***The Keynote Speaker needs to be confirmed at the time of the proposal**