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Scaffolds stem cells, biophysical stimulations and nanotechnology in tissue engineering and regenerative medicine

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Recent advances in tissue engineering and regenerative medicine have shown that controlling cells micro-environment during growth is a key element to the development of successful therapeutic system. Various polymeric scaffolds have been used to support cellular growth and to a certain extent, favor cell organization and tissue structure. A large pool of stem cell lines such as multi-potent and pluri-potent is available for these types of studies. Furthermore, the exposure of stem cells to biophysical stimuli has been reported to favor early and rapid activation of the tissue repair process. But all of these approaches have appeared to be rather limited since they do not offer the fine control of the cell micro-environment in space and time. We will be presenting the biological effects exerted by electrospun nanocomposite materials on tuning the cell fate of human multi-potent and pluri-potent stem cells. Then, we will continue by presenting the effects related to the exposure of human multi-potent stem cells to Pulsed Electromagnetic Field (PEMF) or Low Level Laser Intensity (LLLI) on cell proliferation and differentiation towards osteoblasts. At the end, we will show the recent data obtained in the design of 3D scaffolds based on hydrogels as well as polymeric fibers to maintain the self- renewal of human pluripotent stem cells in feeder-free conditions.

Biography

L Visai received the PhD title in Biochemistry in 1989 and she is presently an Assistant Professor in Biochemistry at the Medicine Faculty of Pavia University. Her scientific experience were performed abroad initially at the Connective Tissue Laboratory, Alabama University in Birmingham (USA) and then to the Center for Infectious and Inflammatory Diseases (IBT), Houston University in Texas (USA). She has been recently a Visiting Professor at the Department of Nanomedicine and Nanotechnology of the Methodist Hospital in Houston, Texas, (USA). She is the Vice-Director of the Interdepartmental Center for Tissue Engineering in Pavia University and the Head of the Nanotechnology Laboratory at Salvatore Maugeri Foundation in Pavia. She has published more than 129 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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