Università di Roma
Tor Vergata

Università degli Studi di Roma "Tor Vergata"

Dipartimento di Scienze e Tecnologie Chimiche
Via della Ricerca Scientifica, 1 - 00133 Roma (IT) - Tel +39 06 72594337 Fax +39 06 72594328

AVVISO DI SEMINARIO

Venerdì 9 Giugno alle ore 14.30
in Aula Magna Gismondi

Prof. Dror Seliktar

Faculty of Biomedical Engineering,
Technion – Israel Institute of Technology
Visiting professor presso il Dipartimento di Scienze e Tecnologie Chimiche

Terrà un seminario dal titolo:

Protein and Cell Therapeutics using Polymeric Hydrogel Carriers

Proponente: Prof. ssa Sonia Melino

Università di Roma
Tor Vergata

Università degli Studi di Roma "Tor Vergata"

Dipartimento di Scienze e Tecnologie Chimiche
Via della Ricerca Scientifica, 1 - 00133 Roma (IT) - Tel +39 06 72594337 Fax +39 06 72594328

Abstract:

In the near future, hydrogels are expected to play a much greater role in biomedicine, changing the way we approach issues in stem cell research, cancer biology, drug discovery, tissue engineering and biotechnology. The development of improved methods to synthesize cell-compatible biomedical hydrogels to accommodate this trend depends on a thorough understanding of the design possibilities and the limitations. While biological systems provide an exceptional source of design inspiration for creating cell-compatible hydrogels, man-made water-soluble polymers and polymer chemistry have contributed to the establishment of better control over the properties and reliability of the polymeric macromolecules, and subsequently, better control over the properties of the hydrogels they form. This presentation covers a few of the advanced design principles currently being applied to engineer cell-compatible biomedical hydrogels, with specific focus on how sophisticated new hydrogels may lead the way to new discoveries in basic science, clinical medicine and biotechnology.

Short Biography Prof. Dror Seliktar, PhD **Research Area** Dror Seliktar is professor at the Faculty of Biomedical Engineering at the Technion. He leads a large and multidisciplinary research group that explores applied and basic scientific aspects of tissue engineering and regenerative medicine, including: i) design and development of semi-synthetic hydrogels made from protein-polymer adducts; ii). regulation of cellular morphogenesis via physical matrix properties in 3D cultures; and iii) mechanical stimulation in tissue regeneration. One of the most important contributions of his early research was the development of a novel hydrogel biomaterial platform technology based on PEGylation of natural proteins, including fibrinogen. This family of semi-synthetic hydrogel biomaterials has laid the foundation for a successful exploration of stem cell morphogenesis in 3D cultures, as well as served as a test bed for developing new repair strategies for traumatic injuries or diseased tissues. The materials have undergone extensive validation and testing in pre-clinical and clinical settings, have received CE-mark approval in the EU and are currently awaiting final approval by the FDA for the treatment of focal cartilage injuries in the USA. In parallel, some of his more basic science projects focus on understanding the impact of matrix mechanical properties on the fate of stem cells in 3D culture. **Publications** Seliktar's discoveries on protein-polymer hydrogels, summarized and discussed in world-leading journals including *Science*, *PNAS*, *EMBO Molecular Medicine*, *ACS Nano*, *Biomaterials*, *Advanced Materials*, *Stem Cell*, , *Tissue Engineering*, *Angewandte Chemie*, *PLOS ONE*, and others, have left a significant imprint on the scientific community and the general public. This work has led to several patents, licencing agreements, and to a growing number of invited lectures, including keynote and plenary lectures on hydrogels for tissue engineering. **Commissions of Trust** Seliktar has contributed to his community in other ways as well, both abroad and locally, as indicated by his numerous commissions of trust. For example, at the Technion he served as the Director of the Norman Seiden International Multidisciplinary Graduate program in Nanoscience & Nanotechnology. In the Technion's Biomedical Engineering Department, he served as the Graduate Student Coordinator, and he was a member on a number of important committees, including the undergraduate studies and graduate studies committees. He has served or is currently serving as an associate editor or editorial board member of a number of leading Journals in his field, including: *Biomaterials, Acta Biomaterialia, ASME Journal of Biomechanical Engineering, Journal of Bionanoscience, Scientific Reports, Journal of Tissue Engineering and Regenerative Medicine, Frontiers in Tissue Engineering and Regenerative Medicine, ACS Biomaterials Science & Engineering, and Advanced Biomaterials and Devices in Medicine.* He has served on a number committees for various funding agencies,

including the European Research Council (ERC), the Israel Science Foundation (ISF), and the binational United States-Israel science foundation (BSF). He has also served on the organizing committees of several international scientific conferences in his field, including TERMIS, Society for Biomaterials, and Biomedical Engineering Conferences. He has served as an ad-hoc reviewer for prestigious journals such as *Nature Materials, Nature Biomedical Engineering, Nature Communications, PNAS, Science Translational Medicine, Advanced Materials*, and more. **Awards** Seliktar has received numerous awards for his teaching and research, including the Hershel Rich - Technion Innovation Award, the Dudi Ben-Aharon Award for Excellence in Research, the Salomon and Simon Mani Award for Excellence in Teaching, and the Georgia Tech Council of Outstanding Young Engineering Alumni award, to name a few. Seliktar was awarded a large-scale international cooperation grant from the Singapore government in the area of cardiac restoration therapies; he served as the founding director and lead PI of this multi-national collaborative endeavour. During this time, he was also honoured with a visiting associate professor appointment in the Department of Surgery, National University of Singapore. **Entrepreneurship** Seliktar's applied research in tissue regeneration has led to the discovery of a novel biomaterial, Gelrin™, which has been licensed to a company called Regentis Biomaterials Ltd., of which he is a founder. The technology transfer of the patented Gelrin™ biomaterial technology from the Technion into human clinical trials, which are currently underway in the USA, Europe and Israel, has been an integral part of his tenure in the department. The Gelrin™ Technology is poised to revolutionize the treatment of focal articular cartilage injuries. The company has raised more than $35 million in venture capital funding to bring Seliktar's technological discoveries to clinical application. The Technion Research and Development Foundation is among the shareholder and venture capital investors of the Company