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DIPARTIMENTO DI CHIMICA

Scientific Seminar

Advanced Drug Delivery Platforms for Immuno-Chemotherapy in Brain Cancer and Beyond

Prof. Paolo Decuzzi

Laboratory of Nanotechnology for Precision Medicine @ Italian Institute of Technology, Genova (Italy)

Stanford University School of Medicine, Stanford (USA) (Visiting Professor)

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Aula 1 - PIANO RIALZATO - Dipartimento di Chimica

1 LUGLIO 2024 ore 11:00

Abstract

The 'rational design' of polymeric devices for the controlled delivery of therapeutic and imaging agents requires the integration of principles from various disciplines, including chemistry, engineering, pharmaceutical sciences, physics, biology, and medicine. This lecture demonstrates the fundamental importance of such a multidisciplinary approach by reviewing a few examples of nanomedicines and multiscale drug delivery systems developed in my laboratory over the past 10 years. Examples include: SPN, an archetypal configuration of spherical polymeric nanoconstructs for theranostic applications; microMESH, a regular network of microscopic polymeric filaments designed for treating glioblastoma and other tumors through complex immunochemotherapies; microPLates, shape-defined polymeric particles engineered for the pharmaco-mechanical and anti-inflammatory treatment of osteoarthritis; micro-Combinatorial hydroGel Particles, spongy discoidal carriers designed for the precise delivery of potent chemotherapeutic agents, targeting cancer metastasis within the pulmonary microvasculature. Through these examples, basic concepts in nanomedicine and drug delivery will be introduced and the potential of hierarchical-organized platforms, enabling the precise deployment of complex therapeutic regimens, will be demonstrated to address biophysical barriers and biological heterogeneity in cancer, chronic inflammatory diseases and other medical disorders.

Short BIO



Dr. Paolo Decuzzi is a Senior Scientist and Professor of Biomedical Engineering at the Italian Institute of Technology (Genoa, Italy), where he founded the Laboratory of Nanotechnology for Precision Medicine in 2015. He earned his M.Sc. in Mechanical Engineering from the Polytechnic University of Bari and his Ph.D. in Engineering from the University of Naples – Federico II in 2001.

Dr. Decuzzi has been a Visiting Scholar and Professor at several US institutions, including the University of Michigan, Princeton, Ohio State University, and Stanford University. He served as an Associate Professor of Health Informatics at the University of Texas Health Science Center Houston (2007–2010) and as Professor and Chair of Translational Imaging and Nanomedicine at Houston Methodist Hospital (2010–2015). He is currently a Visiting Professor in the

School of Medicine/Division of Oncology at Stanford University.

A Fellow of the Controlled Release Society, Dr. Decuzzi is also a board member of multiple scientific associations and EU review panels, and an advisor for biotech accelerators like SPARK Stanford and SPARK Europe. His lab focuses on developing drug delivery systems for disease treatment and imaging, combining engineering, pharmaceutical, and biomedical sciences. Dr. Decuzzi has authored over 200 papers, holds more than 10 patents, and has secured over \$15M in funding. Notably, 10 of his former trainees are now faculty members at institutions in Italy, South Korea, Japan, and the United States.

Tutti i docenti, dottorandi, borsisti e studenti sono invitati a partecipare
Chairperson: **Prof. Luisa Torsi**, Department of Chemistry, University of Bari