Università degli Studi di Palermo

DIPARTIMENTO DI SCIENZE E TECNOLOGIE BIOLOGICHE CHIMICHE E FARMACEUTICHE (STEBICEF)

CRS Italy Local Chapter

October
5 to 7, 2023

Palermo
ITALY

NEXT GENERATION BIOMATERIALS AND CARRIERS: NEW TOOLS FOR DRUG DELIVERY AND THERAPY

CRS ITALY WORKSHOP

Workshop theme

The theme of the 2023 CRS Italy Workshop is about the design and the clinical application of the "Next generation biomaterials and carriers". Clinical and pharmaceutical scientists, biomedical engineers, material scientists, biophysicists will discuss novel therapies, use of new materials and delivery systems for difficult-to-treat diseases (cancer, inflammation, neurodegeneration, tissue fibrosis). The workshop will be articulated over 5 sessions, with 11 invited talks and several selected speakers among the CRS Italy community, poster sessions, and one full Saturday morning Young CRS Italy Scientist session. Multiple break sessions will facilitate interactions, face-to-face discussions, and help launching new interdisciplinary collaborations. The Organizing and Scientific committees look forward to welcome you all in Palermo for a vibrant meeting with a strong audience participation.

Scientific committee

Stefano Salmaso
Pasquale del Gaudio
Fabio Salvatore Palumbo
Rossella Dorati
Silvia Franzè
Silvia Pescina
Francesco Puoci
Michele Schlich
Barbara Stella

Local Organizing Committe

Fabio Salvatore Palumbo
Gennara Cavallaro
Giovanna Pitarresi
Mariano Licciardi
Emanuela Fabiola Craparo
Calogero Fiorica
Nicolò Mauro
Cinzia Scialabba

Plenary Speakers:

Virginia Arechavala Gomeza
Biocruces Bizkaia Health Research Institute (Spain)
Kevin Braeckmans
Ghent University (Belgium)
Massimo Conese
University of Foggia (Italy)
Elena Del Favero
University of Milan (Italy)
Giovanna Lollo
University Claude Bernard Lyon 1 (France)
Michael Malkoch
KTH Royal Institute of Technology of Stochkolm (Sweden)
Ben Maoz
Tel Aviv University (Israel)
Paolo Netti
IIT Naples (Italy)
Julien Nicolas
University Paris-Saclay, Orsay (France)
Maurizio Pesce
IRCCS Centro Cardiologico Monzino, Milan (Italy)
Nicola Tirelli
IIT Genoa (Italy)

Call for abstracts

The CRS Italy Local Chapter is soliciting abstracts in the broad fields of drug delivery, nanomedicine, and pharmaceutical technologies.

Abstracts **must be submitted** on-line following the instructions at https://www.crsitalia.it/events/workshops/crs-italy-workshop-2023 **by June 15, 2023.**

Acceptance will be notified by July 20, 2023.
Selected abstracts will be offered a podium presentation during the regular sessions of the workshop.
All the abstracts will be presented during the Poster Sessions.

On-line registration at www.crsitalia.it **Fees due by August 18, 2023**.

Venue
Orto Botanico, Via Lincoln, 2, 90133 Palermo PA

Registration fees
CRS Senior € 70
CRS Junior € 40
NON-CRS Senior € 95
NON-CRS Junior € 55
Social Dinner – Oct. 6: € 30*

Organizing Secretariat
MCR Conference
info.crs.it@gmail.com

*payment for social dinner, which is not included in the registration, must be added to the registration fee in the same bank transfer. Include in the reason for the bank transfer "+DINNER" if you are paying for it

Accomodation
A limited number of rooms are available at special rates from the following hotels:
Hotel NH Palermo (until August 21, 2023), https://www.nh-hotels.it/event/universita-di-palermo-crs-italy-chapter
Hotel Villa Archirafi, http://villaarchirafi.com/.

Programme

Day one Thursday October 5, 2023 (Half Day)

11.00 – 14.00 Welcome and Registration

12.00 – 13.00 Presession
"Challenges in the preparation of grant proposals: from original ideas to self-assessment"
(dedicated to young scientists < 35 y.o.):
Prof. Gianfranco Pasut - University of Padua,

14.00 – 15.10 Session I
Prof. Julien Nicolas, Universitè Paris-Saclay (France) (35 min)
Prof. Nicola Tirelli, IIT Genova (Italy) (35 min)

15.10 – 15.40 Coffe Break

15.40 – 17.00 Session II
Technical presentation (20 min)
Selected Speaker (20 min)
Selected Speaker (20 min)
Selected Speaker (20 min)

17.00 – 18.00 Poster Session I

Day two Friday October 6, 2023 (Full Day)

08.30 – 10.20 Session III
Prof. Giovanna Lollo University Lyon 1 (France) (35 min)
Prof. Massimo Conese, University of Foggia (35 min)
Selected Speaker (20 min)
Selected Speaker (20 min)

10.20 – 10.50 Coffee Break

10.50 – 12.40 Session IV
Prof. Kevin Braeckmans,
Ghent University (Belgium) (35 min)
Prof. Virginia Arechevala-Gomeza, Biocruces Bizkaia Health Research Institute (Spain) (35 min)
Selected Speaker (20 min)
Selected Speaker (20 min)

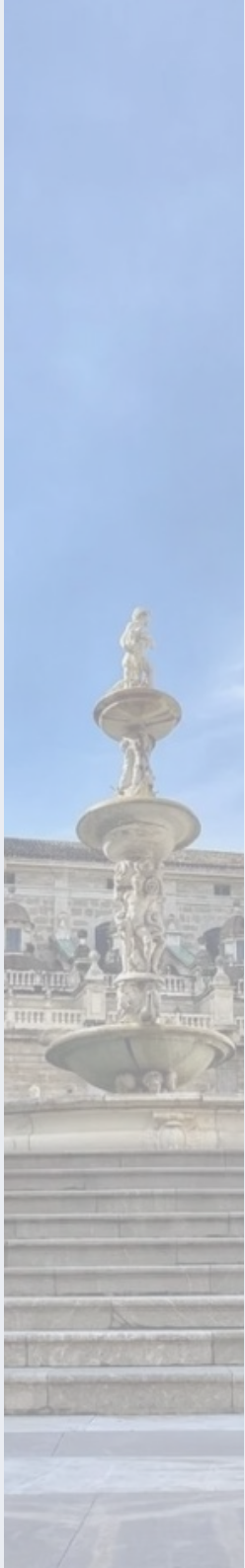
12.40 – 14.20 Lunch Break
(Discussion and **Poster Session II**)

14.20 – 15.50 Session V
Prof. Michael Malkoch, KTH Royal Institute of Technology, Stockholm (Sweden) (35 min)
Prof. Maurizio Pesce, Centro Cardiologico Monzino (IRCCS), Milan (Italy) (35 min)
Selected Speaker (20 min)

15.50 – 16.40 Poster Session III

16.40 – 18.15 Session VI
Prof. Elena Del Favero, University of Milan (Italy) (35 min)
Technical presentation (20 min)
Selected Speaker (20 min)
Selected Speaker (20 min)

20.00 Social Dinner
Istituto professionale Pietro
Piazza - Corso dei Mille 181



Programme

Day Three **Saturday October 7, 2023** (Half-Day)

09.00 – 10.30 Session VI: Spin-off ideas:from academic research to the technology transfer (Special Session organized by the CRS Italia Young Scientists)

Prof. Julien Nicolas, Universitè Paris-Saclay (France)
Imescia: Unlocking the full potential of highly potent anticancer drugs (30 min)

Prof. Kevin Braeckmans Ghent University (Belgium)
From research to spin-off: a troublesome road or an exciting adventure? (30 min)

Round table

10.30 – 11.00 Coffee Break

11.00 – 12.50 Session VII
Prof. Ben M. Maoz, Tel Aviv University (Israel) (35 min)
Prof. Paolo A. Netti, IIT Naples (Italy) (35 min)
Selected Speaker (20 min)
Selected Speaker (20 min)

12.50 Closing Remarks

Invited speakers

Virginia Arechevala-Gomeza, Professor

Neuromuscular Disorders Group,
Biocruces Bizkaia Health Research Institute (Spain)

Nucleic acid therapeutics may change the way we treat disease, but not until we solve the delivery problem

Abstract

New drugs, based on nucleic acids have the potential of becoming a new paradigm in pharmacology: they should be much easier to "design", as they could target very specifically to their targets. However, there are many hurdles that need to be considered before those drugs become mainstream and the main one is their deficient delivery to target tissues. Prof. Arechavala-Gomeza has participated in the development of some of these drugs and will provide the audience with a summary of how they work and what is still needed to make them a viable therapeutic alternative.

Short Biography

Virginia Arechavala-Gomeza is an Ikerbasque Research Professor, head of the Nucleic Acids Therapeutics in Rare Disorders group at Biobizkaia HRI, Spain and Chair of COST Action "Delivery of Antisense RNA ThERapeutics (DARTER). She is a pharmacist, (University of the Basque Country, Spain) and PhD in neurology (King's College London). As a postdoctoral researcher (Imperial College London and University College London), she participated in the first two clinical trials for eteplirsen, and in the development of this and other therapies approved for the treatment of Duchenne muscular dystrophy. In 2013 she joined Biobizkaia HRI to lead the Neuromuscular Disorders group. She was appointed as an Ikerbasque Research Professor in 2019 and her main interest is the development of better methods to evaluate treatments for neuromuscular disorders. Through the international network DARTER, (www.antisensera.eu), she aims to improve the delivery of oligonucleotide drugs to target tissues.

Kevin Braeckmans, Professor

Biophotonics Research Group Lab, General Biochemistry and Physical Pharmacy, Ghent University (Belgium)

Delivering effector molecules in cells in vitro and ex vivo by photoporation

Abstract

Delivery of bioactive compounds, such as proteins and nucleic acids, into cells in vitro or ex vivo is a generic requirement for many applications in the life sciences, such as for the engineering of therapeutic cells. Physical delivery methods are attractive in this context as they are well-controlled, and can accommodate a broad variety of effector molecules and cell types. Photoporation is such a recently developed physical delivery technology which combines laser stimulation with photothermal nanoparticles. Localized thermal effects upon laser irradiation can create pores in the cell membrane, allowing the influx of external molecules in cells. Importantly, photoporation is very gentle to cells, resulting in excellent cell viability and preservation of a cell's phenotype and functionality. In this presentation I will give an overview of the most notable work that we performed on photoporation as a next-generation transfection technology in the past decade.

Short Biography

Kevin Braeckmans first studied physics before doing his doctoral studies in pharmaceutical sciences at Ghent University in Belgium. From early on he was passionate about developing biophotonics technologies for drug delivery and diagnostics. In 2008 he was appointed professor at Ghent University as the group leader of the Bio-Photonics Research Group. In 2015 he received a prestigious ERC Consolidator Grant and became full professor in 2018. His research presently focuses on studying biological barriers to nanomedicines by advanced microscopy techniques, and combining light with nanoparticles to enable light-triggered drug delivery and related therapeutic applications. He is also a co-founder and CSO of the spin-off company Trince.

Massimo Conese M.D., Ph.D, Professor

Department of Clinical and Experimental Medicine,
University of Foggia Italy

Nanoparticle-based drug delivery systems for dampening inflammation/oxidative stress and enhancing mucopenetration in chronic respiratory diseases

Abstract

Chronic respiratory diseases, i.e. cystic fibrosis (CF) and chronic obstructive pulmonary disease (COPD), whose pathological hallmarks are oxidative stress, persistent inflammation and tenacious viscous mucus, need novel therapeutic tools. In the effort to avoid both the adhesion trapping and the steric inhibition by the mucin network, we have developed surface PEGylated Small Unilamellar Vesicles (SUVs), able to overcome the sputum obtained from COPD outpatients. We have previously demonstrated the ability of red grape seed extract (GSE) loaded into biocompatible solid lipid nanoparticles (SLNs) in reducing oxidative stress and inflammation on airway epithelial cells in vitro. We tested magneto-sensitive iron oxide-loaded SLNs (mSLNs) based on Gelucire® 50/13 on different mucus sources. In the presence of a magnetic field, mSLNs were more permeable in porcine gastric mucus and less in COPD outpatient sputum, while high and low secretions of COPD patients are still difficult to overcome. These results highlight different strategies to overcome the mucus barrier in the respiratory tract in pathological conditions, allowing to target safely epithelial cells with the aim to deliver therapeutic molecules.

Short Biography

Massimo Conese, M.D., Ph.D, is full professor in General Pathology at the University of Foggia (Italy). His general interests are in the pathophysiology of cystic fibrosis as well as in gene-, drug- and stem cell-based treatments. He is presently working on nanoparticle-mediated drug delivery and plant-derived extracellular vesicles aimed at treating chronic airway inflammatory diseases, Parkinson's disease, and inflammatory bowel disease. He is also studying the role of human adipose-derived stem cells in the treatment of intractable wounds. He was appointed Coordinator in the European Community (EC) project (FP5) "Development and application of chromosome-based gene transfer vectors for cell therapy" (2003-2006) and was Partner in two EC projects (FP6) "Improved precision of nucleic acid based therapy of cystic fibrosis" (2005-2008) and "European Coordination Action for Research in Cystic Fibrosis" (2005-2009). As per Scopus, Dr. Conese has published 169 peer-reviewed scientific articles, with a h-index of 39. Dr. Conese is Editorial Board Member of: Open Medicine, Current Stem Cell Research & Therapy, Case Reports in Medicine, International Journal of Molecular Sciences, Cells, Journal of Respiration, Pathophysiology, Stem Cell Investigation.

Elena Del Favero, PhD, Professor

Dept. of Medical Biotechnologies and Translational Medicine (BIOMETRA) University of Milan (Italy)

Structural characterization of biomaterials and carriers at the nanoscale

Abstract

Scattering techniques are well suited for studying the physicochemical properties of biomaterials, nanoparticles, and aggregates in solution, meanwhile being largely non-invasive. Different probing radiations allow to access different structural and dynamical parameters on different lengthscales, spanning from the size of particles (10 -1000 nm) to the very local internal structure (0.1-1 nm). Moreover, experiments can be designed to enhance the visibility of selected regions of the aggregates without significant chemical drawbacks. The combined use of laser light, X-ray, and neutrons techniques will be presented as a powerful tool to probe the structural properties of different systems, polymeric nanofibrous or porous scaffolds, nanoparticles, nanoemulsions, also in interaction with mucus models. The correlation between structural and biopharmaceutical properties appears to be a pivotal point for the development of novel platforms suitable for biomedical application and for the delivery of pharmaceutical compounds also via different administration routes, ocular, intranasal, and inhalation.

Short Biography

Elena Del Favero is a soft matter physicist, with a PhD in Biochemistry. At present, she is Professor of Medical and Applied Physics at the University of Milan. Her research focuses on bio-soft matter and nanomaterials. She applies physical techniques: laser light scattering (visible, UV), calorimetry, Neutron, and X-ray techniques to study the structural organization and dynamics of biomimetic colloids on different length-scales, from the mesoscale (hundreds of nm) to the very local scale (tenths of nm). The main research topics of her group are the structural and thermotropic properties of lipid membranes, the structure of stimuli-responsive nanoparticles for drug delivery and controlled release, the properties of biopolymer-based scaffolds, and the self-aggregation and membrane interaction of peptides and proteins. She published more than 100 papers in peer-reviewed scientific international journals.

Giovanna Lollo, PhD, Professor

Faculty of Pharmacy-ISPB at the University of Claude Bernard Lyon 1 (France)

Oral nanocomposites for precision medicine

Abstract

Oral delivery is considered the preferred route of administration for localized or systemic delivery at gastrointestinal (GI) level. However, the therapeutic efficacy of several drugs and biologics is hampered by their solubility in GI fluids and/or permeability, and chemical/enzymatic stability. Nanosystems (NPs) have been designed to overcome these drawbacks, but they undergo destabilization caused by gastric acid, bile salts, and lipases and suffer from rapid clearance and very poor fate predictability once ingested. The creation of hybrid systems improved NPs stability and permeability in the GI tract. Hybrid systems can be defined as nanocomposites when they possess at least one nano-scaled phase, dispersed in a matrix. The rational design of nanocomposites made of lipid nanosystems embedded into a polymeric matrix is presented. These systems are aimed to target inflammatory bowel diseases (IBD) upon oral administration. The research here presented at the interface of pharmaceutical technology and biology shows how nanotechnologies may improve the treatments of IBD and can be used for oral delivery of biologics.

Short Biography

Dr. Giovanna Lollo is Associate Professor at the Faculty of Pharmacy-ISPB at University of Claude Bernard Lyon 1. She carries out research activity at the frontiers of pharmaceutical technology, physical chemistry, material science and biology at the LAGEPP UMR CNRS 5007. She graduated as Pharmacist in 2007 from the University of Naples Federico II (Italy), obtained the diploma of Hospital Pharmacist from the same University and in 2012, under the supervision of Prof. M.J. Alonso (University of Santiago de Compostela-Spain), she was awarded Ph.D. in Pharmaceutical Technology. She joined the MINT laboratory led by J.P Benoit at University of Angers (France) as postdoctoral scientist developing novel immuno-chemotherapeutic approaches to defeat cancer. Dr. Lollo's activity embraces a multidisciplinary approach for the development and physico-chemical characterization of nanosystems loaded with small drugs or nucleic acids to overcome biological barriers and to reach the target while minimizing side effects. The efficacy of this strategy has been demonstrated in different therapeutic areas: auto-immune diseases, oncology and muscular diseases

Michael Malkoch, Professor

KTH Royal Institute of Technology, Stockholm (Sweden)

Dendritic hydrogels as regenerative and antibacterial materials

Abstract

Dendritic polymers are highly branched macromolecules with large representation of functional groups displayed at surface. Within this family of polymers, flawless dendrimers and polydisperse hyperbranched as well as linear-dendritic block copolymers are well studied as nanocarriers for therapeutic applications. However, the high functional group density of dendritc polymers makes them ideal multifunctional building blocks to generate advanced dendritic networks with biological function. In here, the synthesis and biological evaluation of hydrolytically degradable dendritic hydrogels based on 2,2-bismethylol propionic acid (bis-MPA) will be highlighted. This include antibacterial cationically charged hydrogels that are spontaneously crosslinked through ionic interactions or NHS/amine chemistry as well as neutral hydrogels via on-demand UV-initiated thiol-ene click reactions. Hybridization with cellulose nanofibrils or placenta powder as well as the unique biological features of these hydrogels will also be detailed.

Short Biography

Dr. Malkoch is a Professor in Functional Organic Nanomaterials at KTH Royal Institute of Technology. He holds several distinguished awards from Swedish Research Council (VR) and Knut and Alice Wallenberg Foundation. The Malkoch group focuses on developing novel approaches that allows the construction of complex macromolecules that can be introduced in cutting edge fields of materials and biomedical sciences. Five main areas are of interest: 1) identifying new and sustainable chemistries to generate highly complex and functional macromolecules, 2) construction of advanced nanoscopic delivery sy,stemswith emphasis on therapeutic applications 3) fabrication of antibiotic-free antibacterial hydrogels to address current challenges with multidrug resistant bacteria strains, 4) development of next generation materials and treatment methods for fixation and regeneration of damages soft and hard tissue and 5) polymer-based manipulations of generic surfaces towards sensitive biosensor applications. Malkoch has over 20 patents and 137 published papers with 7195 citations and H-index 41 in Google Scholar.

Ben M. Maoz, Professor

Sagol School of Neuroscience and the Department of Biomedical Engineering, Tel Aviv University (Israel)

Organs-on-a-Chip: A new told for studying human physiology

Abstract

Between 60 to 90% of the drugs that successfully pass animal trials fail in human clinical trials. This poor statistic demonstrates the urgent need for a human-relevant model. Micro-engineered cell culture models, termed Organs-on-Chips, have emerged as a new tool to recapitulate human physiology and drug responses. Multiple studies and research programs have shown that Organs-on-Chips can capture the multicellular architectures, vascular-parenchymal tissue interfaces, chemical gradients, mechanical cues, and vascular perfusion of the body. In this talk, we will present two approaches of using this technology. The first, will demonstrate how drug can be tested by linking of 8 human-Organ-on-a-Chip and showing results that are comparable to clinical data. Furthermore, we demonstrate how to exploit the micro-engineering technology in a novel system-level approach to decompose the integrated functions of the neurovascular unit into individual cellular compartments.

Short Biography

Dr. Maoz is a faculty member at the Sagol School of Neuroscience and the Department of Biomedical Engineering at Tel Aviv University. Dr. Maoz did his Ph.D on nano-optics in the School of Chemistry at Tel Aviv. During his post-doctoral studies, at Harvard University, in Prof. Don Ingber and Kit Parker, he developed Organ-on-a-Chip platforms for studying human relevant physiology. Dr. Maoz received number of prestigious fellowships, awards and honors, such as the Harvard-Wyss Technology Fellowship, Azrieli Fellowship for Academic Excellence and Leadership, ERC grant, recently he was chosen by "The Marker" as the most promising 40 under 40 and he gave a talk in the first metaverse TedX

Paolo A. Netti, Professor

Center for Advanced Biomaterials for Health Care, Italian Institute of Technology, Naples (Italy)

On-chip simulation of the efficacy and safety of novel drug delivery approaches: achievements and challenges

Abstract

Organ-on-chip (OoC) technology aims at developing and validating animal-free methods that are relevant to human health for testing therapies and studying diseases. OoC devices are widely used in laboratory research for assessing efficacy and toxicity of novel therapeutic approaches including advanced delivery strategies. OoC can be used to recapitulate the dynamic identity of tumor microenvironment (TME) which is a key factor in cancer phases and therapeutic response. Our group has introduced a novel bioengineered inspired strategy to produce viable 3D human tissue-equivalent in which cells dwell and operate within their own native extracellular matrix (ECM). Following this approach, we reconstructed histological competent portions of human tumor that recapitulate the same cell-ECM dynamic reciprocity of their native counterpart. Spatial and temporal tumor heterogeneity arise spontaneously as a consequence of the recapitulation of the native TME allowing to depict important features of tumor progression and invasion. In this lecture, the competence of these models to recapitulate intra- and extra-tumor heterogeneity and to depict the complexity of TME in vitro will be presented and discussed along the possibility of their use to optimize and design personalized therapeutic approaches.

Short Biography

Paolo A. Netti is a chemical engineer who specialized in molecular transport in solid tumors during his postdoctoral studies at the Harvard University. In Rakesh K. Jain's laboratory, he investigated macro and microscopic fluid transport in solid tumors with particular emphasis on the role of extracellular matrix assembly in interstitial transport. His results have contributed to dissect the pathophysiology of the vascular and extra-vascular components of tumors and to improve cancer detection, prevention, and treatment in humans. At the University of Naples "Federico II", where he is today a full professor of bioengineering, he implemented the knowledge on the role of extracellular matrix in controlling the local cellular microenvironment to design novel cell instructive materials. Moreover, he established a novel and proprietary tissue engineering technology to build up homotypic and heterotypic physio-pathological 3D human tissues in vitro exhibiting functional, structural and histological features closely resembling their native counterparts. He has been co-founder and director of the Interdepartmental Center for Research on Biomaterials (CRIB) of Federico II University; Chair of the Master's Degree in Materials Engineering; Founder and chair the Master's Degree in Industrial Bioengineering since 2015; Founder and director of the Center for Advanced Biomaterials for Health Care (IIT @ CRIB) of the Italian Institute of Technology since 2009.

Julien Nicolas, PhD

Université Paris-Saclay, CNRS, InstitutGalien, 91400 Orsay (France)

Drug-Initiated Synthesis of Polymer Prodrugs for Anticancer Therapy

Abstract

We report on the design of a new class of polymer prodrug nanocarriers by using the "drug-initiated" method, which consists in the controlled growth of vinyl polymers from anticancer drug-bearing initiators to prepare well-defined and high drug content polymer prodrug nanoparticles with in vitro and in vivo anticancer activity. This method is robust and versatile as it was applied to different anticancer drugs, polymers and drug/polymer linkers to adjust the drug release kinetics and thus the cytotoxicity. This approach was further developed to yield heterotelechelic polymer prodrugs for imaging and combination therapy. We also designed well-defined hydrophilic polymer prodrugs suitable for the subcutaneous administration of vesicant/irritant anticancer drugs in order to circumvent the limitations and drawbacks associated to IV chemotherapy. We also developed efficient synthetic pathways to confer degradability to these polymer prodrugs by means of radical ring-opening polymerization.

Short Biography

Dr. Nicolas received his PhD degree in 2005 from the University P. and M. Curie (France). After a postdoctoral position at the University of Warwick (UK), he obtained in 2007 a permanent CNRS researcher position at InstitutGalien Paris-Saclay (France) and got promoted Director of Research at CNRS (2016) and group leader (2019). His research activities lie in advanced macromolecular synthesis and in design of innovative polymer-based nanomedicines for anticancer therapy. He is (co)author of more than 120 articles, 7 patents and 13 book chapters. He is the co-founder of the startup company Imescia which develops hydrophilic polymer prodrugs for the administration of anticancer drugs. He is Associate Editor for Chemistry of Materials and is part of the Editorial Advisory Board of ACS Macro Letters, Macromolecules and Polymer Chemistry. He received the 2016 SCF/GFP award, the 2017 Polymer Chemistry Lectureship award, the 2017 Novacap Prize of the Academy of Science and the 2018 Biomacromolecules/ Macromolecules Young Investigator Award.

Nicola Tirelli, PhD

Italian Institute of Technology, Genova (Italy)

Hyaluronic acid - a critical review of its interactions with cell surface receptors, and the implications on targeted drug delivery

Abstract

Hyaluronic acid (HA) is a naturally occurring biomolecule, which has found widespread clinical use as a biomaterial. It is also an attractive component of (nano)systems designed to deliver drugs in a targeted fashion: HA has virtually no toxicity, is degradable, is easily chemically functionalized, and, most importantly, can allow a systemically circulating structure A) to accumulate in solid tumours and B) to be internalized in a receptor-mediated fashion. Facing all these positive features, relatively little is known at a detailed, mechanistic level. This talk will focus on point B, specifically discussing the molecular controlling factors of the interactions between HA and its most widespread receptor, CD44.

Short Biography

Nicola was born in Rome. He spent his childhood in the quiet town of Pisa, and his teenager and University years in its even quieter outskirts.

While reading Chemistry, he became interested in polymers and started a PhD in the field of electro-optical applications of macromolecular materials, during which he moved to the ETH Zurich, group of Macromolecular Chemistry. He stayed as a postdoc, then moving to the group Biomaterials and Tissue Engineering as an Oberassistent. In 2003 he moved to the School of Pharmacy of the University of Manchester first as a Senior Lecturer and since 2005 as a Professor. Since 2017 his group moved to the Italian Institute of Technology (IIT) in Genova, where he is also Associate Director for Education since 2020.

Maurizio Pesce, PhD

Centro Cardiologico Monzino (IRCCS), Milan (Italy)

Tailored targeting of mechano-sensitive in human cardiac fibroblasts for reduction of fibrosis and heart failure

Abstract

We recently unraveled the role of mechanically activated YAP/TAZ complex in cardiac fibrosis and maladaptive remodeling of the myocardium. Given the pleiotropic functions of YAP/TAZ in cardiac biology, targeting in the myocardium requires carriers with competence to deliver inhibitors of the transcriptional complex selectively in cardiac fibroblasts and inflammatory cells (where it has a pro-fibrotic/pro-inflammatory role) but not in cardiomyocytes (where it has a pro-survival function). To this aim we elaborated a strategy to engineer nan-theranostic particles able to deliver cargos based on coating with a moiety specific for cellular receptors expressed in the pathologic cells. In the course of the talk, I will expose the basic principles of mechano-therapeutic approaches for cardiovascular pathologies and will present the first experimental proofs-of-concepts.

Short Biography

Dr. Maurizio Pesce is a Senior Biologist at Center Cardiologico Monzino (IRCCS) with a PhD in embryology, stem cells, and a more than 20-year course specialization in cardiovascular diseases, regenerative medicine, and tissue engineering. He leads the research unit on cardiovascular tissue engineering in his home Institution, where he pursues specific studies on cell mechanosensation and fibrotic diseases of the cardiovascular systems. He is trainee in the PhD program in Bioengineering at the School of Engineering in Turin (IT), he speaks four languages (Italian, English, French and German) and he is a passionate cycler. Author of over 150 peer-reviewed publications (h index 34), and of a patent granted. He is elected chair of the Working Group of the European Society of Cardiology for the Cellular Biology of the Heart. He received the National Scientific Qualification as Associate Professor for sectors 05/H2 (histology) and 05/B2 (Comparative Anatomy and Cytology), it is valid until 2033.

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