Ud'A
Università degli Studi "G. d'Annunzio"

CRS
Italy Local Chapter

BRIDGING NANOMEDICINES, BIOMATERIALS AND THE IMMUNE SYSTEM

Aurum - largo Gardone Riviera - Pescara

October 29th to 31st, 2026

29th October: workshop premeeting starts at 11.00 am – Session I starts at 14.00 pm
31st October: workshop ends at 12.50 am

CRS ITALY WORKSHOP

Workshop theme

Nanomedicines and advanced biomaterials have significantly expanded drug delivery and controlled release strategies, enabling refined control over cargo protection, targeting, and spatiotemporal presentation. As these systems grow more complex and bioinspired, their interaction with the immune system becomes a critical factor influencing efficacy, safety, and translational success. This workshop aims to bridge nanomedicine and biomaterial design with mechanisms of immune recognition and response, addressing interactions with both innate and adaptive immunity. Rather than considering the immune system solely as a barrier, it will be examined as an active and dynamic partner capable of shaping biodistribution, persistence, and therapeutic outcomes. Contributions will focus on bioinspired and engineered nanocarriers, cell-derived and hybrid systems, and functional biomaterials designed to modulate immune interactions, whether to promote immune evasion, induce tolerance, or intentionally engage immune pathways. Emphasis will be placed on rational design, immune-relevant characterization, and mechanistic understanding of nano-bio-immune interfaces, fostering cross-disciplinary dialogue and accelerating the translation of next-generation delivery systems.

Scientific committee

Stefano Salmaso
Roberta Censi
Rossella Dorati
Calogero Fiorica
Rosa Maria Iacobazzi
Thomas Lee Moore
Silvia Pescina
Anna Maria Piras
Barbara Stella

Organizing committee

Antonio Di Stefano
Lisa Marinelli
Ivana Cacciatore
Marilisa Pia Dimmito
Maria Rosa Gigliobianco
Piera Di Martino
Silvia Franzè
Michele Schlich

Confirmed Speakers

Rosario Rizzuto
(Università di Padova)

Flávia Sousa
(University of Groningen)

Massimo Dominici
(University of Modena and Reggio Emilia)

Francesca Fallarino
(University of Perugia)

Cristina Fornaguera
(Institut Químic de Sarrià)

Paola Italiani
(CNR Napoli)

Ine Lentacker
(University of Ghent)

Paolo Macor
(University of Trieste)

Jai Prakash
(Radboud University)

Yang Shi
(RWTH Aachen University Clinic)

The Organizing and Scientific Committees look forward to welcoming you to Pescara for a highly stimulating and engaging workshop!

CRS Italy Local Chapter

Call for abstract

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

Abstract **must be submitted** on-line following the instructions at https://www.crsitalia.it/events/crs-italy-workshop-2026 **by July 8, 2026.**

Acceptance will be notified by July 26, 2026.
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.
Registration and payment will be activated on **August 26 through September 26, 2026.**
Organizing Secretariat: info.crs.it@gmail.com.

Registration fee only

- CRS Senior Member: € 82,00 (€ 80,00 registration fee + € 2,00 stamp duty)
- CRS Junior Member (student, PhD, post-doc): € 50,00
- Non-CRS Member Senior: € 132,00 (€ 130,00 registration fee + € 2,00 stamp duty)
- Non-CRS Member Junior (student, PhD, post-doc): € 65,00

Registration fee and social dinner

- CRS Senior Member: € 122,00 (€ 80,00 registration fee + € 40,00 Social Dinner + € 2,00 stamp duty)
- CRS Junior Member (student, PhD, post-doc): € 92,00 (€ 50,00 registration fee + € 40,00 Social Dinner + € 2,00 stamp duty)
- Non-CRS Member Senior: € 172,00 (€ 130,00 registration fee + € 40,00 Social Dinner + € 2,00 stamp duty)
- Non-CRS Member Junior (student, PhD, post-doc): € 107,00 (€ 65,00 registration fee + € 40,00 Social Dinner + € 2,00 stamp duty)

Location

Aurum - Largo Gardone Riviera, 65126, Pescara

Accomodation

A limited number of rooms are available at special rates from the hotels reported in the website https://www.crsitalia.it/events/crs-italy-workshop-2026

Programme

Workshop premeeting for PhD, post-doc, early career researcher
Thursday October 29, 2026

11.00 – 11.40
Francesca Fallarino
Immunity and tolerance: cellular and metabolic mechanisms of immune regulation

11.40 -12.20
Jai Prakash
The discovery of tumor microenvironment

Day one Thursday October 29, 2026 (half day)

13.00 - 14.00 Welcome and Registration

14.00 – 15.15 Session I (chair: TBA)

Rosario Rizzuto (35 min)
Gene therapy and therapeutic RNAs: a multidisciplinary route to precision medicine

Mauro Di Ianni (Pescara hospital) (20 min)
GMP-compliant manufacturing and functional characterization of extracellular vesicles for precision immunotherapies

Lisa Marinelli (UniCh) (20 min)
B7-H3 CAR-T cell-derived extracellular vesicles as a cell-free therapeutic strategy for pancreatic cancer

15.15 - 16.25 Coffee break and Poster Session I

16.25 - 18.00 Session II (chair: TBA)

Jai Prakash (35 min)
Nanomedicine-based targeting strategies to reprogram the tumor immune microenvironment

Technical presentation (20 min) - Corinna Galli (Thermo Fisher)
From days to hours: continuous spin-freeze-drying as an alternative to conventional lyophilization

Riccardo Rampado (UniPd) (20 min)
A modular polymer-lipid hybrid nanoparticle as vaccine against melanoma brain metastasis

Rossella Fasano (IRCCS) (20 min)
LNP-miR-21 inhibition enhances tumor immunogenicity and Anti-PD-1 therapy in 3D liver cancer

Day two Friday October 30, 2026 (full day)

09.00 – 10.35 Session III (chair: TBA)

Francesca Fallarino (35 min)
Disclosing communication pathways of natural extracellular vesicles with immune cells: paving the way for novel immunotherapies

Enrica Chiesa (UniPV) (20 min)
Modulating mechanotransduction via targeted nanocarriers to face heart fibrosis

Valeria Nele (UniNa) (20 min)
Self-assembling nanoparticles for miRNA delivery towards personalized medicine against melanoma

Technical presentation (20 min) - Fabio Perissinotto (Alfatest)
From formulation to analytics: advanced solutions for drug-delivery nanosystems

Programme

10.35 - 11.30 Coffee break

11.30 – 12.30 Session IV

Yang Shi (35 min)
Polymeric biomaterials for understanding and programming anti-cancer B cell immunity

Nicole Zoratto (Roma Tor Vergata) (20 min)
A biodegradable device for minimally invasive blood sampling

12.30 – 14.30 Lunch break (Discussion and Poster Session II)

14.30 – 16.00 Session V (chairs: TBA)

Flàvia Sousa (35 min)
Engineering RNA-based immunotherapies for brain cancer

Ine Lentacker (35 min)
Harnessing innate myeloid cells: transport mechanisms and therapeutic opportunities in chronically inflamed conditions

Technical presentation (20 min) - Chris Thomas (Lipoid)
Phospholipids in innovative pharmaceutical applications

16.00 – 17.00 Coffee break and Poster Session III

17.00 – 18.15 Session VI

Paolo Macor (35 min)
From targeting antibodies to opsonization: the opposite roles of soluble members of the immune system

Donato Cosco (UniCz) (20 min)
Pharmaceutical applications of zein-based formulations

Giulia Anderluzzi (UniMi) (20 min)
Scaffolds for endometrial repair: effect of preparation method and crosslinking on cell proliferation

20.00 Social dinner ***at «Il Granchio Royal», Piazza le Laudi, 2, 65129 Pescara***

Day Three Saturday October 31, 2026 (half-day)

09.00 – 10.30 Session VII (chairs: TBA)

Massimo Dominici (35 min)
Mesenchymal stromal cells delivery systems and CAR engineering to redefine therapy in solid tumors

Ine Lentacker (20 min)
ERC proposal challenges

Cristina Fornaguera (35 min)
Poly(ß-amino ester) polymers for controlled RNA delivery

10.30 - 11.05 Coffee break

11.05 – 12.50 Session VIII

Paola Italiani (35 min)
Interaction of nanomaterials with the immune system: role in nanosafety and nanomedicine

Programme

Rita Cortesi (UniFe) (20 min)
Design of nanosystems containing copper complexes for potential medical use

Angela Lopedota (UniBa) (20 min)
Dual-delivery microencapsulation of ß-galactosidase and lactobacillus acidophilus for lactose intolerance

Dritan Hasa (UniTS) (20 min)
Supramolecular chameleons: reversible transmutation of a cocrystal into a micelle delivery vehicle

12.40 - 12.50 Workshop closing remarks

Invited speakers

Rosario Rizzuto, Professor

Università di Padova (Italy)

Gene therapy and therapeutic RNAs: a multidisciplinary route to precision medicine

Abstract

Precision medicine, i.e. the possibility of developing targeted therapies of high efficiency, rests on two pillars. The first is the molecular understanding of the pathogenesis of diseases, and of the individual diversities, that is proceeding at an incredibly fast pace also thank to the improvement of biomedical technologies, and is revealing a large number of novel, often unexpected drug targets. The second pillar is the capacity to develop an accordingly large number of therapeutic molecules with high specificity for the target. It is clear that small-molecule chemistry cannot fully respond to this task, and a rapidly expanding role is taken by antibodies, and more recently nucleic acid-based therapeutic approaches (gene therapy and therapeutic RNAs). In this exciting new field, bypassing crucial bottlenecks (stability, toxicity, delivery, tissue specificity) requires the close collaboration of biomedical scientists and pharmaceutical chemists and technologists. In Italy, the National Center for Gene Therapy and RNA-based drugs is the joint enterprise in which collaborations and exchange of know-how has allowed an impressive scientific progress and consolidation of the country in the competitive challenge of developing these novel therapeutic approaches.

Short Biography

Rosario Rizzuto is Professor of General Pathology and Chair of the Department of Biomedical Sciences at the University of Padova. He served as Rector from 2015 to 2021 and is currently President of the National Center for Gene Therapy and RNA-based Drugs, which brings together 47 public and private research institutions, and Member of the General Council of the Cassa di Risparmio di Padova e Rovigo (CARIPARO). He previously held leadership roles at the University of Ferrara, including Dean of the School of Pharmacy, and coordinated the Emilia-Romagna network for Genomics and Biotechnology. His research has made seminal contributions to intracellular calcium signaling through organelle-targeted luminescent and fluorescent probes, the discovery of ER-mitochondria calcium microdomains, and the identification of the mitochondrial calcium uniporter and other ion channels. His distinctions include the Antonio Feltrinelli Award, the FEBS Theodore Bücher Medal, the Chiara D'Onofrio Prize, the Biotec Award and the title of Commander of the Order of Merit of the Italian Republic. He has authored more than 340 publications and is among the most highly cited researchers in his field.

Flàvia Sousa, PhD

University of Groningen (The Netherlands)

Engineering RNA-based immunotherapies for brain cancer

Abstract

Glioblastoma (GBM) stands out as the most prevalent and lethal primary brain tumor, primarily because of its aggressively invasive growth pattern, coupled with an immunosuppressive tumor microenvironment (TME). Nanovaccines are promising immunotherapy for GBM since they can efficiently convert the cold TME of GBM into a hot microenvironment. Poly(lactic-co-glycolic acid) nanoparticles (PLGA NPs) have been used to deliver therapeutics effectively to the brain in a controlled release manner, and therefore are a promising nanovaccine platform. However, optimization of their preparation methodology is needed to be applicable for gene delivery, specifically, the challengeable self-amplifying RNA (saRNA). This presentation will highlight our work on engineering nanoparticle-based RNA delivery systems for brain cancer immunotherapy, with a particular focus on self-amplifying RNA (saRNA) nanovaccines and non-viral gene delivery strategies. We will discuss how biomaterial design can enhance RNA stability, cellular targeting, and sustained transgene expression to promote immune reprogramming within the brain tumor microenvironment. In addition, the talk will address the development of advanced in vitro and in vivo models to evaluate delivery, immune activation, and translational potential. Together, these approaches aim to establish next-generation RNA immunotherapies capable of transforming "cold" brain tumors into therapeutically responsive lesions.

Short Biography

Dr. Sousa is an internationally Tenure-Track Assistant Professor at the University of Groningen in the Netherlands. She serves as Principal Investigator leading research in nanomedicine, precision immunotherapies, and the drug delivery of biotherapeutics, with a focus on engineering lipidic and polymeric nanoparticles to target brain cancer and cross the blood-brain barrier. She earned her Master's in Pharmaceutical Sciences from CESPU in 2013 and her Ph.D. in Biomedical Sciences from the University of Porto in 2019. Her research background spans appointments at top international institutions, including Imperial College London, the Istituto Italiano di Tecnologia, AGORA Cancer Research Center, and the Adolphe Merkle Institute, alongside visiting fellowships at Northeastern University as a Fulbright Fellow and Ghent University. Dr. Sousa has secured over one million euros in competitive research funding, supported by prestigious awards such as the Marie Skłodowska-Curie COFUND Postdoctoral Fellowship and the SNSF Women-in-Science Fellowship. Her key accolades include selection as one of MIT Technology Review's Innovators Under 35 Europe, a Falling Walls Female Science Talent, and the APS Emerging Scientist Award.

Massimo Dominici, Professor

University of Modena and Reggio Emilia (Italy)

Mesenchymal stromal cells delivery systems and CAR engineering to redefine therapy in solid tumors

Abstract

Frontier cancers, such as pancreatic, lung cancers and sarcomas, remain largely incurable due to complex tumor microenvironments and resistance to conventional therapies. Cell and gene therapies offer a paradigm shift by directly inducing tumor cell death while modulating immune responses. Pioneering work has highlighted mesenchymal stromal cells (MSCs) as programmable vehicles for targeted anticancer strategies. Engineered MSCs can deliver pro-apoptotic agents selectively within tumor niches, overcoming stromal barriers and enhancing cytotoxicity. In parallel, chimeric antigen receptor (CAR)-engineered immune cells enable highly specific recognition and killing of tumor cells. CAR-T and CAR-modified cellular platforms can be tailored to target antigens such as GD2, showing activity in solid tumors. These approaches enhance immune-mediated cytotoxicity while potentially reshaping the tumor microenvironment. The integration of MSC-based delivery systems with CAR-engineered effectors represents a synergistic strategy to induce tumor cell death. This framework opens new avenues for effective, targeted, and less toxic therapies in otherwise refractory malignancies.

Short Biography

Massimo is a hematologist/oncologist. Full Professor of Medical Oncology, Director of the Oncology Division and of the Residency School in Oncology at the University Hospital of Modena and Reggio Emilia (UNIMORE, Modena, Italy). Since November 2024 is the Director of Dpt. of Surgical and Medical Science @UNIMORE. Since 2005 he is also heading the Laboratory of Cellular Therapies with over 25 million € in research grants, about 330 papers, >59000 citations, H-index of 70 and 14 patents. More than 350 invited lectures. Founder of the University start-up Rigenerand srl, sold to Evotec Modena srl and founder of EIR Biotherapies a cell and gene therapy start-up. Advisor for several biotech/pharma companies. Co-founder of the Forum of Italian Researcher on MSC (FIRST). Former board member of JACIE, WBMT and scientific advisor for the Italian Minister of Health. Member of ESMO, AIOM, AACR, ASCO. He has been President of ISCT 2014-2016, Emeritus Member of ISCT. Since October 2019 expert advisory Panel member of the INN, acting in the cell and gene therapy group of the World Health Organization in Genève.

Francesca Fallarino, Professor

University of Perugia (Italy)

Disclosing communication pathways of natural extracellular vesicles with immune cells: paving the way for novel immunotherapies

Abstract

Biological extracellular vesicles (EVs), can modulate immune responses and enhance therapeutic outcomes. We demonstrate that EVs derived from human amniotic fluid stem cells reprogram inflammatory dendritic cells, crucial antigen presenting cells, into a tolerogenic state, reducing pro-inflammatory mediators and promoting regulatory T cell responses, with beneficial effects in autoimmune disease models, including multiple sclerosis. In parallel, we examine the anti-inflammatory potential of dietary carotenoids, showing that their efficacy is significantly enhanced through EV-based delivery systems. Together, these findings underscore the promise of integrating EVs and natural bioactive compounds as innovative approaches to treat inflammatory and autoimmune conditions.

Short Biography

Francesca Fallarino is a Full Professor at the University of Perugia, where she teaches Immunopharmacology with a focus on advanced therapies. She leads a multidisciplinary team of biotechnologists, immunologists, and pharmacologists working to develop innovative immunotherapy strategies. Her research explores how dendritic cells and macrophages can be trained to overcome tumor immune resistance or modulate autoimmune responses. Recently, her group discovered that natural extracellular vesicles and dietary components can influence dendritic cell function by activating specific metabolic sensors. Her work has advanced understanding of the link between metabolism and immune regulation in myeloid cells, paving the way for next-generation immunotherapies that bridge basic science and clinical application.

Invited speakers

Cristina Fornaguera, Professor

Institut Químic de Sarrià (Spain)

Poly(ß-amino ester) polymers for controlled RNA delivery

Abstract

Poly(ß-amino ester)s (pBAEs) have emerged as highly versatile biomaterials for the controlled delivery of genetic cargoes, owing to their synthetic modularity, biodegradability, tunable end-group chemistry, and intrinsic capacity to promote intracellular delivery. This lecture will provide an overview of the work in our NanoTher group developing pBAE-based systems for nucleic acid therapeutics, spanning nanoparticles for mRNA, siRNA and miRNA delivery, as well as biomaterial-assisted approaches for local and sustained administration. I will discuss how polymer structure and formulation design can be adapted to overcome specific biological barriers and to tune cell targeting, endosomal escape, and release kinetics. Particular attention will be given to two complementary translational formats explored in our lab (i.e. dissolvable microneedles and injectable hydrogels) as examples of how pBAEs can be integrated into advanced delivery platforms beyond conventional nanoparticles. I will finish the lecture by describing specific applications in the field of cancer immunotherapy.

Short Biography

Cristina Fornaguera, PhD, is Associate Professor at IQS-Universitat Ramon Llull (Barcelona) and Principal Investigator of the NanoTherapies Lab. Her research focuses on controlled delivery systems for nucleic acids, with particular emphasis on poly(ß-amino ester)s (pBAEs), hybrid nanomaterials, and biomaterial-assisted local delivery. She has developed pBAE-based platforms for the delivery of mRNA, siRNA, plasmid DNA and genome-modulating cargos across challenging biological barriers, combining polymer design with formulation engineering and translational pharmaceutics. Her group also explores localized and sustained delivery strategies, including injectable hydrogels and dissolvable microneedles, to improve spatiotemporal control, tissue targeting, and therapeutic efficacy. Cristina has authored more than 60 peer-reviewed publications, has secured funding as PI of more than 10 competitive projects and currently serves as President of the Spanish-Portuguese Local Chapter of the Controlled Release Society.

Paola Italiani, PhD

Consiglio Nazionale delle Ricerche (Italy)

Interaction of nanomaterials with the immune system: role in nanosafety and nanomedicine

Abstract

The immune system (IS) contributes to maintaining the body's functional integrity through recognizing and destroying both foreign external agents and senescent or damaged cells. Accordingly, the IS can detect pathogen/damage-associated molecular patterns with a spatial resolution of a few nm. Similarly, nanostructured materials (NMs) of comparable size with different molecular coatings can interact with the IS. NMs can be recognized or passed undetected by the IS. Once detected, they can be tolerated or induce defensive inflammatory responses. In nanomedicine, NMs-IS interaction is crucial: nanomedicines should evade immune recognition and clearance or can be designed to target the immune response against infections/diseases. This talk explores the significance and consequences of the interaction between NMs and the innate IS. Numerous challenges are still outstanding as a complete knowledge of such interaction in immunologically frail or compromised individuals. Nevertheless, recent advances indicate that the safe and effective use of NMs is feasible and necessary, supporting the development of selection criteria for nanosafety-by-design.

Short Biography

Paola Italiani works as an experimental immunologist at the National Research Council, where heads the Laboratory of Innate Immunity, Inflammation, and Nanosafety. She has always focussed her research interest on the mechanisms of the inflammatory response in physiological and pathological conditions. In this context, she has expertise in human monocyte and macrophage polarisation in response to different microenvironments and in their capacity to develop an immune memory. In human diseases, she is focusing on the cross-regulation of factors and receptors of the IL-1/IL-18 family in chronic inflammatory, autoimmune and degenerative pathologies.

She has always been involved in the study of modulation of macrophage functions for predictive assessment of the health hazard posed by engineered nanoparticles and nanomedicines. In this context, she was the first to demonstrate that nanoparticles can induce or modulate innate immune memory, an effect that should be considered in nanosafety assessment alongside well-known inflammatory responses. She is among the world's top 2% most influential scientists based on the Stanford University's ranking 2025.

Ine Lentacker, Professor

University of Ghent (Belgium)

Harnessing innate myeloid cells: transport mechanisms and therapeutic opportunities in chronically inflamed conditions

Abstract

Immune checkpoint inhibitors have improved cancer treatment, yet durable responses remain limited due to immunosuppression in the tumor microenvironment. Recent studies show that even non-tumor-targeted mRNA vaccines, such as SARS-CoV-2 vaccines, can enhance ICI efficacy by inducing type I interferon responses and activating innate and adaptive immunity. This highlights the need to understand how mRNA-lipid nanoparticles (mRNA-LNPs) interact with innate immune cells. Previously, we showed that circulating myeloid cells efficiently take up mRNA-LNPs and transport them to inflamed tissues. Extending this to tumors, we demonstrate that mRNA-LNPs rapidly reprogram myeloid populations in a myeloid-rich TME, potentially overcoming immunosuppression and improving ICI responses, particularly in "cold" tumors possibly driven by mRNA contaminants.

Short Biography

Ine Lentacker is currently a Full Professor at Ghent University and Principal Investigator of the 'Vaccine Delivery Group' within the Laboratory of General Biochemistry and Physical Pharmacy (www.drugdelivery.be). Her research focuses on the design, characterization, and clinical translation of innovative mRNA-based vaccines and immunotherapies. She serves as co-coordinator of the European Horizon 2020 project Baxerna2.0, which advances the development of bacterial mRNA vaccines. In parallel, she leads a CEPI-funded project aimed at elucidating the impact of freeze-drying on mRNA vaccine stability and performance using state-of-the-art analytical methodologies. Within the Nanomedicine Center, close collaboration with the GMP facility at UZ Gent is in place for the production of mRNA vaccines for phase I clinical studies, including the patented mRNA Galsome platform developed within her team. Recently, she was awarded an ERC Consolidator Grant (My-NANO) to investigate fundamental interactions between mRNA therapeutics and the innate immune system, with the goal of designing a new generation of immunotherapies for solid tumors.

Paolo Macor, Professor

University of Trieste (Italy)

From targeting antibodies to opsonization: the opposite roles of soluble members of the immune system

Abstract

Cancer nanomedicine has long relied on the EPR effect to achieve passive tumor accumulation, while antibody-functionalized nanoparticles have emerged as a promising active targeting strategy to improve selectivity and therapeutic efficacy. However, clinical translation remains limited also by rapid nanoparticle clearance through renal filtration and hepatic sequestration, which dramatically reduce circulating half-life and tumor bioavailability. A critical yet underappreciated determinant of nanoparticle fate is the complement system. Upon systemic administration, nanoparticles form protein corona, trigger complement activation and cause recognition by Kupffer cells and splenic macrophages. In vitro assays and animal models consistently demonstrate that physicochemical and antibody characteristics profoundly influence complement engagement. Strategic surface engineering, including polymer and protein incorporation, can mitigate these effects. Understanding the opposing roles of soluble immune mediators is essential to rationally design next-generation nanomedicines with improved pharmacokinetics and tumor targeting.

Short Biography

Paolo Macor is an Associate Professor in the Department of Life Sciences at the University of Trieste, Italy, where he teaches "Molecular Immunology and Immunotherapy" and "Molecular Pathology" in the Master's Program in Medical Biotechnology. He serves on the board of the PhD Program in Nanotechnology and is a member of the Italian and European Societies of Immunology, the Italian Society for Cancer Research, and the International and European Complement Societies. His research focuses on the development of therapeutic strategies for oncological and inflammatory diseases, with particular emphasis on targeted antibodies and polymeric nanoparticles in preclinical animal models. A central theme of his work is the role of the complement system, both as a mediator of inflammatory processes and as a potential therapeutic agent.

Invited speakers

Jai Prakash, Professor

Radboud University (The Netherlands)

Nanomedicine-based targeting strategies to reprogram the tumor immune microenviornment

Abstract

Most solid tumors and metastasis respond poorly to advanced cancer therapies, including immunotherapies. This limited response is largely due to a suppressed immune microenvironment, which hampers therapeutic efficacy. Nanomedicine-based approaches offer promising solutions by enabling the delivery of therapeutic agents that can re-activate the immune system to target and eliminate cancer cells. This talk will show novel nanomedicine-based targeting strategies to improve tumor immunity and thereby the therapeutic efficacy of immunotherapy in preclinical models.

Short Biography

Jai Prakash is Full Professor and Group Leader at Radboud University Medical Center, the Netherlands. Prior to that, he worked as a Professor at University of Twente for 13 years, and earlier worked at Karolinska Institutet and BiOrion Technologies. He obtained his PhD from University of Groningen in Cell-specific drug targeting in 2006. He is a founder and CSO of ScarTec Therapeutics, co-founder of NanoTME society and CRS BeNeLux chapter.

His group has been publishing in top-tier journals such as Nature Communications, Science Advances, Advanced Materials, Cancer Discovery. In 2024, he was awarded the prestigious ERC Advanced Grant from the European Commission. His research focuses on the development of targeted nanotherapeutics to reprogram stromal and immune cells within the tumor microenvironment (TME) to improve cancer treatment outcomes.

Yang Shi, Professor

RWTH Aachen University Clinic (Germany)

Polymeric biomaterials for understanding and programming anti-cancer B cell immunity

Abstract

B cell immunity is emerging as a major, yet still underexploited, frontier in cancer immunotherapy. Although most immunoengineering strategies focus on T cells, dendritic cells, or macrophages, growing evidence suggests that B cells represent a distinct and powerful axis of antitumor immunity. This talk presents a broader vision for how biomaterials can help redefine the role of B cells in cancer therapy, with particular emphasis on how B cells acquire, process, and present antigens to coordinate immune responses. By integrating clinical data analysis, biomaterials design, and immune mechanistic studies, our work highlights B cell antigen presentation as an underappreciated and potentially programmable function. More broadly, this points to an opportunity to move beyond viewing biomaterials simply as delivery vehicles and instead use them as tools to dissect and shape immune functions. Such an approach may open new ways to engage B cells, tertiary lymphoid structure (TLS)-associated immunity, and local T cell responses in tumors, thereby enabling a next generation of cancer immunotherapies.

Short Biography

Dr. Yang Shi is currently Full Professor, heading the Department of Polymer Therapeutics at the Faculty of Medicine, RWTH Aachen University, Germany. He serves as an Assocaite Editor for Journal of Controlled Release and Journal of Nanobiotechnology. He previously obtained a PhD degree from Utrecht University under the supervison of Prof. Wim E. Hennink on synthetic polymeric micelles for drug delivery. Currently, his group is focusing on engineering and understanding polymer-based therapeutic systems for drug delivery and immunoengineering. His research is funded by European Research Council (ERC StG and 2xPoC Grants), German Research Foundation (DFG) and German Federal Ministry of Education and Research (BMBF). He has received several academic awards, including the Theodore von Kármán Fellow, Science Award (International Pharma Sciences Foundation/Rottendorf Stiftung), Rising Star Awards from Journal of Nanobiotechnology (Springer Nature) and Biomacromolecules (American Chemical Society), and Merck Best On-Demand Talk Award (Controlled Release Society).

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