

HOSTING GROUPS FOR INTERNATIONAL MOBILITY

Lab of Biocompatible Polymers – Nanomedicine Section

Expertise on advanced procedures for the functionalization, the physical-chemical and biological characterization of biocompatible polymers (eg polysaccharides, polyaminoacids, polyesters), employed in the field of modified/controlled release of biologically active substances (drugs, genes, proteins); design and manufacture of biopolymers for the complexation and delivery of DNA/RNA.

Consolidated expertise on the technological processes enabling their transformation into intelligent nano- and micro-structured pharmaceutical systems, and on their characterization for application in diagnostics/theranostics, gene therapy, to treat pulmonary, hepatic and neurodegenerative diseases and cancer.

The overarching goals of her research are driven by several needs: enhancing the performance of drugs with proven safety and efficacy, allowing the administration of drugs with a short half-life, achieving organ-targeted release to minimize administered doses and side effects and reducing the chemical/enzymatic degradation.

Methods: chemical/structural modifications of polymeric materials by the use of low environmental impact methods (microwaves, photo-irradiators); physicochemical characterization techniques such as ¹HNMR, FT-IR, UV spectroscopy, rheological measurements, particle size determination, optical microscopy and image analysis; Size Exclusion Chromatography and Light Scattering; evaluation of bio-adhesive properties of materials; short and long-term stability tests; resolution of issues related to the instability of pharmaceutical forms; drug release profile evaluation; in vitro assays on cell compatibility and transfection.

Team members:

Cavallaro Gennara

Craparo Emanuela Fabiola

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Drago Salvatore Emanuele



Selected publications: (con DOI, Max 5)

- *Diving into RNAi Therapy: An Inhalable Formulation Based on Lipid-Polymer Hybrid Systems for Pulmonary Delivery of siRNA* **Biomac.**, 26 (1), (2025). <https://doi.org/10.1021/acs.biomac.4c00387>
- *Exploiting inhalable microparticles incorporating hybrid polymer-lipid nanoparticles loaded with Iloprost manages lung hyper-inflammation.* **Int. J. Pharm.**, 666, (2024). <https://doi.org/10.1016/j.ijpharm.2024.124813>
- *Lung Disease Management by Iloprost-Loaded Nanoparticles to Address Hyperinflammation Associated with Cystic Fibrosis* **ACS Applied Nano Mat.**, 7 (12), (2024). <https://doi.org/10.1021/acsanm.4c01379>

- *Rapamycin-based inhaled therapy for potential treatment of COPD-related inflammation: production and characterization of aerosolizable nano into micro (NiM) particles.* **Biomat. Sci.**, 12 (2), (2024). DOI: 10.1039/d3bm01210g
- *Development of polymer-based nanoparticles for zileuton delivery to the lung: PMeOx and PMeOzi surface chemistry reduces interactions with mucins.* **Nanomedicine: Nanotechnology, Biology, and Medicine**, 37, (2021). <https://doi.org/10.1016/j.nano.2021.102451>