UNIVERSITÀ DEGLI STUDI DI BRESCIA

DIPARTIMENTO DI SPECIALITÀ MEDICO-CHIRURGICHE, SCIENZE RADIOLOGICHE E SANITÀ PUBBLICA

Research Seminar

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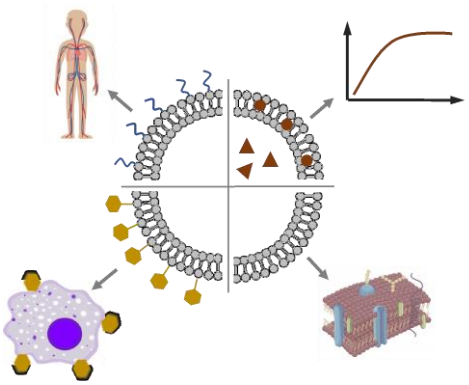
Exploring bioinspired and bioderived drug delivery strategies for the evolving therapeutic landscape

The evolving therapeutic landscape, ranging from small molecule drugs to bio- and cell therapeutics, calls for modular and biocompatible formulation strategies to improve medical adherence and broaden the delivery options for next-generation therapeutics. Bioderived and bioinspired drug delivery systems can deliver a plethora of active pharmaceutical ingredients at a tunable, predetermined rate within the therapeutic range for a specified period and could be further combined with polymeric materials using advanced production technology, such as additive manufacturing, for patient-centric drug products.



Our research group generated long-acting drug delivery systems for parenteral administration modulating the surface properties of liposomes. Via *in vitro* and *in vivo* studies, we showed that calcium-driven aggregation of liposomes prior to subcutaneous injection is essential to extend the drug release profile. Exploring the favorable lubrication properties of liposomal depots, we further optimized this system for the local treatment of osteoarthritis, a debilitating chronic joint disease characterized by the degradation of articular cartilage, synovial fibrosis, and low-grade inflammation. To treat peritoneal pathologies locally, we loaded liposomes with gefitinib, a tyrosine kinase inhibitor, and incorporated the lipid carriers in 3D-printed microbeads. This multicomposite system, designed for intraperitoneal administration, could reduce the clearance of drugs administered in the peritoneal cavity to treat post-surgical adhesions, peritoneal carcinomatosis, or peritoneal fibrosis.

Phospholipids may also exert a direct bioactive action, and we explored this property to generate new therapeutics for the treatment of liver fibrosis. If left untreated, this pathological condition may ultimately lead to organ dysfunction, cirrhosis and hepatocarcinoma. In the last years, we investigated the potential of essential phospholipids and polyenephosphatidylcholines as basis of antifibrotic dosage forms and we evaluated their action, also in combination with investigational drugs, on hepatic stellate cells (HSCs), key players in fibrogenesis, on extracellular vesicles derived from HSCs, and, more recently, on biomimetic vesicles produced from HSCs.

Mercoledì 13 Novembre 2024, Ore 13:00, Aula A1 Ed. Polifunzionale.

Ospite: Dr. Lucia Paolini

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