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MEDICAL AND PHARMACEUTICAL BIONANOTECHNOLOGIES LABORATORY

Major position/appointments

- Principal Investigator, Scientific Researcher grade I
- Member of the Scientific Councilof ICBP "N. Simionescu"
- Expert evaluator of the national grants
- Supervision of Graduate Students and Postdoctoral Fellows
- Invited Peer Reviewer for International Scientific Journals

STAFF

Daniela Rebleanu, *PhD /* ***Mihaela G. Cărnuță,*** *PhD /*
Florentina M. Safciuc, *PhD /* ***Cristina A. Constantinescu,*** *PhD student/*
Elena V. Fuior, *PhD student /* ***Geanina Voicu,*** *PhD student /*
Maria Anghelache, *Master student /* ***Marilena Misici,*** *Technical assistant*

SELECTED NEW FINDINGS OF THE LABORATORY

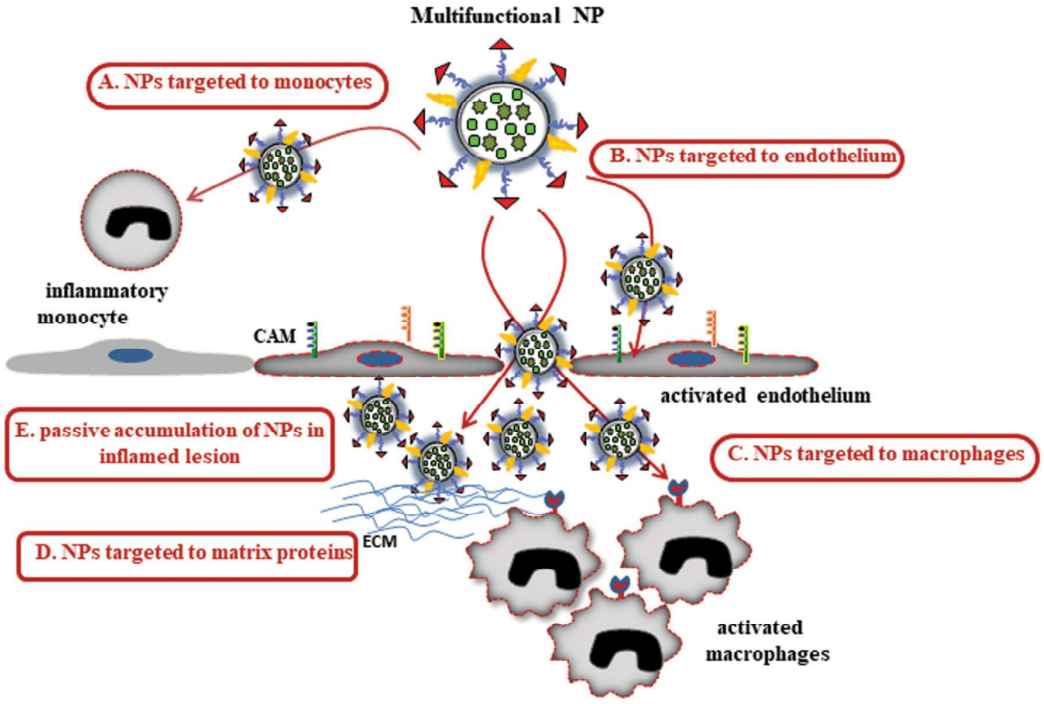
NANOTHERAPY

- VCAM-1 is an appropriate target for specific delivery of drugs to activated endothelial cells employing immunoliposomes
- Superoxide dismutase entrapped-liposomes restore the impaired endothelium-dependent relaxation of resistance arteries in experimental diabetes
- Endothelial VCAM-1 directed target-sensitive liposomes carrying CCR2 antagonists bind to activated endothelium, diminish adhesion and transmigration of monocytes, reduce the atherosclerotic lesions in ApoE-deficient mice and prevent the generation of pulmonary metastases in a murine and a human xenograft (patient-derived cells) model.
- Curcumin encapsulated in polymeric nanoparticles displays anti-inflammatory activity on TNF-α–activated endothelial cells by suppressing the phosphorylation of p38MAPK.
- Cell-penetrating peptides-functionalized curcumin-loaded lipid nanoemulsions are efficiently internalized by the endothelial cells, producing anti-inflammatory effects; when administrated intravenously in mice exhibit increased accumulation in the liver and the lungs.
- P-Selectin targeted dexamethasone-loaded lipid nanoemulsions reduce selectively the endothelium activation and the consequent monocyte infiltration and diminish significantly the lungs' inflammation, in a mouse model of acute inflammation.
- Lipopolysaccharide-induced inflammation in monocytes/macrophages is blocked by the liposomal delivery of Gi-protein inhibitor.
- P-selectin targeted PEGylated cationic liposomes bind specifically to activated endothelial cells and deliver with high-efficiency siRNA into the cells, that subsequently knock-down the mRNA expression of the target gene.
- VCAM-1 targeted lipid nanoemulsions deliver polyphenols to activated EC and have the functional capacity to lower monocyte infiltration by a mechanism involving the inhibition of NF-kB nuclear translocation and a reduced level of MCP-1 chemokine.

CURRENT PROJECTS

NANOTECHNOLOGY-BASED THERAPIES: A NEW PROSPECT FOR TREATMENT OF VASCULAR INFLAMMATION IN ATHEROSCLEROSIS

Recently, the emergence of nano-technology uses in medicine (i.e., nanomedicine) has opened a new prospect for the development of targeted therapies for atherosclerosis based on drug nanocarriers.Nanoparticles employed for biomedical applications typically have sizes below 100 nm and can be manufactured from a variety of organic materials (carbon, lipids, polymers), metallic or inorganic materials (gold, silver, or metal oxides), or hybrids of these materials. The development of different nanocarriers with tunable composition, architecture, and functionalities designed to improve diagnosis and clinical intervention in atherosclerosis has been boosted in the last few years.



Nanotechnology-based approaches envisaged to exploit the increased permeability at sites with vascular inflammation and the passive accumulation of nanoparticles in atheromatous lesions and also, the use of specific molecular targets exposed on surfaces of activated endothelium or monocytes/macrophages in vascular locations with plaques to diagnose and/or threat inflammatory atherosclerosis (Calin M, Manduteanu I, Curr Med Chem. 2017;24(6):550-567).