Scientific Foundation SPIROSKI, Skopje, Republic of North Macedonia
South East European Journal of Immunology. 2025 Mar 27; 8(CITIM):067
https://doi.org/10.3889/seejim.2025.6130
eISSN: 1857-9388
Category: *CITIM - Cancer Immunotherapy & Immunomonitoring (CITIM2025)*
Section: *Posters*

Enhancing tumor drug delivery: targeting nucleolin with liposomes for improved therapeutic efficacy

Delia Boteanu*, Maria Anghelache, Mihaela Turtoi, Manuela Călin

**Department of Medical and Pharmaceutical Bionanotechnology, Institute of Cellular Biology and Pathology "Nicolae Simionescu", Bucharest, Romania*

Citation: Boteanu D, Anghelache M, Turtoi M, Călin M. Enhancing tumor drug delivery: targeting nucleolin with liposomes for improved therapeutic efficacy. SEE J Immunol. 2025 Mar 27;8(CITIM):067. https://doi.org/10.3889/seejim.2025.6130.
Keywords: Nucleolin (NCL); Dexamethasone-loaded liposomes; Tumor-targeted drug delivery
***Correspondence:** *Department of Medical and Pharmaceutical Bionanotechnology, Institute of Cellular Biology and Pathology "Nicolae Simionescu", Bucharest, Romania.* E-mail: delia.boteanu@icbp.ro
Received: 11-March-2025
Accepted: 25-March-2025
Copyright: © 2025 Delia Boteanu, Maria Anghelache, Mihaela Turtoi, Manuela Călin. This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)
Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist

Abstract

Nucleolin (NCL) is a multifunctional protein that plays a significant role in cancer development and progression. Nucleolin's expression on both endothelial and cancer cells makes it a strategic target for cancer therapy and drug delivery applications. This study aims to develop dexamethasone-loaded liposomes (LP-Dexa) coated with an affinity peptide for NCL (F3/LP-Dexa) to target cancer and endothelial cells and reduce tumor-associated inflammation. LP-Dexa were prepared using lipid film hydration followed by the extrusion method and functionalized with F3 peptide via thiol-maleimide linkage. Internalization by bEnd.3 cells (endothelial cells isolated from brain tissue derived from a mouse with endothelioma) was assessed using immunofluorescence and flow cytometry at various intervals. NCL protein and gene expression were analyzed post-treatment using immunofluorescence, flow cytometry, and real-time PCR. The anti-inflammatory effect was evaluated by measuring monocyte chemoattractant protein-1 (MCP-1) expression via Western blot. NCL expression increased two-fold in TNF-α-activated bEnd.3 cells compared to controls. F3/LP-Dexa showed efficient internalization and significantly reduced NCL mRNA and MCP-1 protein levels without inducing cytotoxicity at lower dexamethasone concentrations. Targeting NCL with F3/LP-Dexa offers a novel strategy for intracellular drug delivery to both cancer cells and activated endothelial cells, potentially reducing tumor growth and vascular inflammation while advancing therapeutic options for cancer.