Gregor Johann Mendel
1822 - 1884

CEITEC
Central European Institute of Technology
BRNO | CZECH REPUBLIC

Laboratoř Metalomiky a Nanotechnologií
Laboratory of Metallomics and Nanotechnologies

SEM/2001

Středoevropský technologický institut, výzkumná skupina Chytré nanostroje
Laboratoř metalomiky a nanotechnologií, Mendelova univerzita v Brně

Seminář/Seminar 05/2015

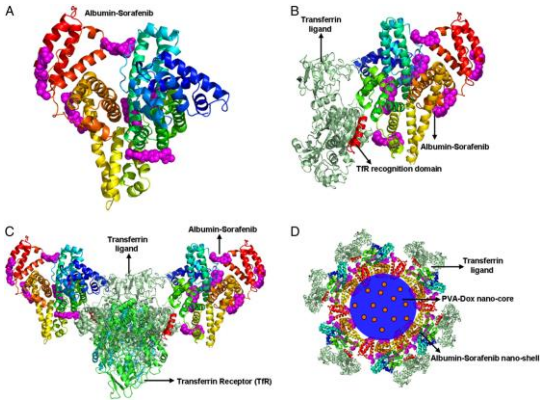
Vás zve na seminář:

Transferrin targeted core-shell nanomedicine for combinatorial delivery of doxorubicin and sorafenib against hepatocellular carcinoma

Amitava Moulick, MSc., Ph.D.

Abstract

Combinatorial drug delivery is an attractive, but challenging requirement of next generation cancer nanomedicines. Here, we report a transferrin-targeted core-shell nanomedicine formed by encapsulating two clinically used single-agent drugs, doxorubicin and sorafenib against liver cancer. Doxorubicin was loaded in poly(vinyl alcohol) nano-core and sorafenib in albumin nano-shell, both formed by a sequential freeze-thaw/coacervation method. While sorafenib from the nano-shell inhibited aberrant oncogenic signaling involved in cell proliferation, doxorubicin from the nano-core evoked DNA intercalation thereby killing N75% of cancer cells. Upon targeting using transferrin ligands, the nanoparticles showed enhanced cellular uptake and synergistic cytotoxicity in ~92% of cells, particularly in irondeficient microenvironment. Studies using 3D spheroids of liver tumor indicated efficient penetration of targeted core-shell nanoparticles throughout the tissue causing uniform cell killing. Thus, we show that rationally designed core-shell nanoparticles can effectively combine clinically relevant single-agent drugs for exerting synergistic activity against liver cancer..



Nanomedicine: Nanotechnology, Biology, and Medicine
10 (2014) 1649–1659

27. 03. 2015, 14:00 h

Department of Chemistry and Biochemistry and Central European Institut of Technology in Brno, room D06, contact: kizek@sci.muni.cz

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND
INVESTING IN YOUR FUTURE

2007–13
OP Research and Development for Innovation