عنوان مقاله:

A PEI-Alg Polyelectrolyte Micelle Containing Melittinto Break Down Multidrug Resis tance in Breas t CancerCell Line

محل انتشار:

بیست و سومین کنگره بین المللی هیبریدی پزشکی تولید مثل و هجدهمین کنگره هیبریدی فناوری سلولهای بنیادی رویان (سال: 1401)

تعداد صفحات اصل مقاله: 1

نویسندگان:

Z Tavakolnejad - *Department of Biology, Faculty of Science and Technology, ACECR,Ins titute of Higher Education, Isfahan, Iran . Department of Animal Biotechnology, Cell Science ResearchCenter, Royan Ins titute for Biotechnology, ACECR, Isfahan, Iran*

SZ Mirahmadi-Zare - *Department of Animal Biotechnology, Cell Science ResearchCenter, Royan Ins titute for Biotechnology, ACECR, Isfahan, Iran*

K Dormiani - *Department of Animal Biotechnology, Cell Science ResearchCenter, Royan Ins titute for Biotechnology, ACECR, Isfahan, Iran*

خلاصه مقاله:

Objective: Melittin peptide (MLT), the main cons tituent ofbee venom, has a great ability to diges t the extracellular matrix(ECM) and s timulate the cells of the immune sys tem. Therefore,if it can be successfully loaded into smart nanoparticlesthat preserve it before delivery to cancer cells, it is expectedto be able to overcome multidrug resis tance (MDR) by diges tingECM proteins and then inducing cell death. In particular,various mechanisms for MLT cytotoxicity have been reportedin different types of cancer cells, including cell cycle changes,effects on proliferation and/or growth inhibition, and inductionof apoptosis and necrosis by activation of caspases and ECMmetalloproteinases. In addition, the co-delivery of melittin withodder chemotherapeutic drugs can synergis tically increase theirefficiency in the treatment of the cancer cell line. Therefore, apolyelectrolyte core-shell micelle based on polyethylene iminealginate(PEI-Alg) was designed with the ability to load melittinalong with a secondary cargo (GFP vector as a reporter anddrug model). Results confirmed the micelle s tability for safetransport of MLT and its smart delivery onto the multidrug resistance breas t cancer cell line (MDA-MB-۲۳۱). In addition,ECM protein expression was significantly different in the treatedgroup compared to the control.Materials and Methods: In this s tudy, a shell-core polyelectrolyticnanosys tem was designed by the microemulsion method.Polyethyleneimine and GFP vector were used as nuclei and alginatewas used as a shell to carry the peptide. Nanosys tems wereinves tigated for size, load, s tability, loading efficiency, and drugrelease. The efficacy of melittin-containing nanosys tems in theexpression of ECM factors and induction of cell death on theMDA-MB-۲۳۱ cancer cell line is then evaluated.Results: The findings showed that encapsulating the drug in themicellar nanocarrier, increased the s tability of the nanosys temin the circulatory sys tem and decreased its release before reachingthe surface of the cancer cell with an acidic environment.In addition, due to the ability of melittin to diges t ECM andincrease the permeability of the tumor and its placement in thenanosys tem shell, it increased the drug delivery to cancer cellsand increased drug efficiency.Conclusion: Our s tudy successfully declares that melittinloadedin polyelectrolyte nanocarrier with micelle coating hadmore anti-cancer effects than free melittin. The present s tudiesshowed that polyelectrolytic nanosys tems are suitable carriersfor melittin, .compare to the free form

کلمات کلیدی:
Co-Delivery Drug to Cancer, Extracellular Matrix,Micelles, Melittin, Polyelectrolyte Nanocarrier