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# Cancer stem cells-emanated therapy resistance: Implications for liposomal drug delivery systems

Hassan Dianat-Moghadam[1, 2, 3, 4], Maryam Heydarifard[5], Rana Jahanban-Esfahlan[1], Yunes Panahi[4*] yunespanahi@yahoo.com, Hamed Hamishehkar[3], Farhad Pouremamali[1], Reza Rahbarghazi[2, 6**] Rezarahbardvm@gmail.com, Mohammad Nouri[2, 1***] Nourimd@yahoo.com

[1]*Department of Medical Biotechnology, Faculty of Advanced Medical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran*

[2]*Stem Cell Research Center, Tabriz University of Medical Sciences, Tabriz, Iran*

[3]*Drug Applied Research Center, Tabriz University of Medical Sciences, Tabriz, Iran*

[4]*Chemical Injuries Research Center, Faculty of Pharmacy, Baqiyatallah University of Medical Sciences, Tehran, Iran*

[5]*Department of Chemical Engineering, Islamic Azad University Tabriz Branch, Tabriz, Iran*

[6]*Department of Applied Cell Sciences, Faculty of Advanced Medical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran*

***Correspondence to:** Y. Panahi, Chemical Injuries Research Center, Faculty of Pharmacy, Baqiyatallah University of Medical Sciences, 1477893855, Tehran, Iran

****Correspondence to:** R. Rahbarghazi, 5166614756, Stem Cell Research Center, Tabriz University of Medical Sciences, Imam Reza St., Golgasht St., Tabriz, Iran.

*****Correspondence to:** M. Nouri, 5166614756; Address: Stem Cell Research Center, Tabriz University of Medical Sciences, Imam Reza St., Golgasht St., Tabriz, Iran).

**Abstract**

It is verified that failure in cancer therapy by conventional chemotherapeutic agents arise from cancer heterogeneity. That, a small subpopulation of cancer cells known as “cancer stem cells” (CSCs) are shown to be responsible for deriving clonal heterogeneity/diversity in tumors, which render them resistant to conventional treatment regimes. So far, efficient targeted cancer therapy by nanotechnology-based drug delivery approaches is well established. Among various introduced nanocarriers, the non-toxic nature and biocompatibility of liposome make it highly desirable for human studies. In addition, liposomal nanocarriers can be used to protect entrapped therapeutic agents against chemical and biological degradation, improve solubility of the encapsulated drugs, provide sustained drug release, extend *in vivo* half-life, reduce side effects, improve drug pharmacokinetic and pharmacodynamic profiles, reduce drug dosage and administration frequency. Further, multifunctional liposomes can be envisioned that are simultaneously loaded with different theranostics and chemically-modified with different tumor-specific surface ligands for targeted therapy. Such versatile nanocarrier can influence the physicochemical characteristics, immunological mechanisms, and uptake mechanisms following systemic delivery. Other