Insight Medical Publishing

Der Pharmacia Sinica

ISSN 0976-8688

2020

Vol.11 No.4

The application of polymeric composite nanoparticles for treating hepatic fibrosis via specific delivery of gallic acid to hepatic stellate cells

Walaa H. El-Maadawy
Theodor Bilharz Research Institute, Egypt

Abstract

Gallic acid (GA), a polyphenolic compound, is reported to possess potent antifibrotic effects in experimental animals, but exhibits low bioavailability due to its rapid clearance. Accordingly, we designed polymeric composite nanoparticles (NPs) as specific targeted delivery system for GA into hepatic stellate cells (HSCs); pivotal cells in orchestrating hepatic fibrogenesis. GA-loaded-NPs were prepared by solvent evaporation technique and characterized by different techniques. Cytotoxicity of GA-loaded-NPs was evaluated in rat HSCs cell line and primary hepatocytes using sulforhodamine B (SRB) assay. We also recorded the uptake of GA-loaded-NPs and their effects on cell migration in activated HSCs. The gene expressions of collagen I (col-1α), transforming growth factor (TGF)-β1 and α-smooth muscle actin (α-SMA) in HSCs were measured using qRT-PCR. Thereafter, bio-distribution of GA-loaded-NPs in rats was monitored via confocal laser scanning microscopy (CLSM). GA-loaded-NPs exhibited enhanced uptake in activated HSCs and inhibition of migration and fibrogenic genes expression of col-1α, TGF-β1and α-SMA in HSCs. Furthermore, CLSM illustrated higher accumulation of GA-loaded-NPs in liver than other organs. This is the first study that clearly shows the efficacy of GA-loaded NPs targeted delivery for HSC as a promising therapeutic approach for liver fibrosis.

Biography:

Walaa El-Maadawy "Researcher at the Pharmacology Department, Theodor Bilharz Research Institute (TBRI)" has completed her PhD in 2017 from Faculty of Pharmaceutical Sciences, Cairo University in the field of Pharmacology &Toxicology. She is also the Moderator of the Research Ethics Committee, TBRI. Her research work focuses on: pharmacokinetics, bioavailability and bioequivalence studies; investigation of therapeutic approaches for hepatic fibrosis and fatty liver diseases. She has published seven research articles in reputed journals and participated in four research projects sponsored by international and national agencies.

Speaker Publications:

1. "Impact of Reverse Micelle Loaded Lipid Nanocapsules on the Delivery of Gallic Acid into Activated Hepatic Stellate Cells: A Promising Therapeutic Approach for Hepatic Fibrosis"; Pharmaceutical Research; 2020, Vol 37 (9).
2. "Chemical Profiling of Polyphenolics in Eucalyptus globulus and Evaluation of Its Hepato–Renal Protective Potential Against Cyclophosphamide Induced Toxicity in Mice"; 2019; Antioxidants; Vol 8(9):415.
3. "Antifibrotic effects of gallic acid on hepatic stellate cells: In vitro and in vivo mechanistic study"; Journal of Traditional and Complementary Medicine, 2018: Vol 9 (1).
4. "Asian Pacific Journal of Tropical Medicine"; 2017; Vol 10(5)
5. "Anti-inflammatory/anti-fibrotic effects of the hepatoprotective silymarin and the schistosomicide praziquantel against Schistosoma mansoni-induced liver fibrosis"; Parasites & Vectors; 2012, Vol 5(9).

25th International Congress on Pharmaceutical Biotechnology; Webinar; June 24 -25, 2020.

Abstract Citation:

Walaa Hamido El-Sayed El-Maadawy, The application of polymeric composite nanoparticles for treating hepatic fibrosis via specific delivery of gallic acid to hepatic stellate cells, Euro Pharmaceutical Biotechnology 2020, 25th International Congress on Pharmaceutical Biotechnology; Webinar; June 24 - 25, 2020.

(https://biotechnology.pharmaceuticalconferences.com/abstract/2020/the-application-of-polymeric-composite-nanoparticles-for-treating-hepatic-fibrosis-via-specific-delivery-of-gallic-acid-to-hepatic-stellate-cells)