



Studying the Enhancement of the in vitro Anti-Tumor Effects of Epigallocatechin Uploaded PLGA- Copper Hybrid Nanoparticles on Breast Cancer

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Abstract

Phytochemical compounds are generally antioxidant compounds, however, they could possess prooxidant effect (induction of oxidation) in the presence of free iron and copper, which is called Fenton reaction. Thus this enhancement in the oxidative stress level of the cell could be used in cancer treatment through DNA damage. Especially higher copper concentrations in cancer cells compared to that of the healthy cells provides enhanced effectiveness of natural pro-oxidants in these cells. Therefore, transportation of the phytochemical compounds to the target tissue together with copper using targeted nano drug delivery systems, may increase their and ensure evidencing their effect only on cancer tissue without damaging the healthy tissues.

The present study is aimed to transport the Epigallocatechin (EGC); a naturally occurring anti-oxidant to the target cancer tissue using copper carrying poly (d,l-lactide-co-glycolide) (PLGA) nanoparticles (final size 150 nm).

Copper was reduced using the green tea extract to form the copper nano-particles (NP) with the size of 40 nm. These NPs were then uploaded to the PLGA micelles along with EGC. While epigallocatechin was used as an antioxidant phytochemicals, it was hypothesized that it will act as a pro-oxidant in the presence of copper NPs. The enhancement of the cytotoxicity of particles were tested on the breast cancer cells (4T-1) and the genotoxic, apoptotic and cytotoxic effects were compared with free EGC. It has been shown that the presence of copper remarkably enhanced cytotoxicity of EGC compared to that of free EGC and EGC loaded PLGA NP.



Biography

Fatma Kazdal graduated from Biology- Karadeniz Technical University-Turkey. She obtained Master Degree in Biotechnology from Bezmialem Vakif University Health Sciences Institute, which the thesis subject was the targeting nano-formulation of active plant extracts to blood brain barrier with metal protein attenuating activity for treatment of Alzheimer's disease. She studies PhD at Medical Biochemistry, Bezmialem Vakif University Health Sciences Institute. Her area of interest is Molecular Biology and Nano Drug Delivery Systems.

Speaker Publications

1. Antigenotoxic and antioxidant potentials of newly derivatized compound naringenin-oxime relative to naringenin on human mononuclear cells; Drug and chemical toxicology 39 (1), 66-73.
2. Formulation, Characterization And Evaluation Of Curcumin-Loaded PLGA-TPGS Nanoparticles For Liver Cancer Treatment, Drug Des Devel Ther. 2019; 13: 3569-3578.

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