Studying the enhancement of the in vitro anti-tumor effects of Epigallocatechin uploaded PLGA- copper hybrid nanoparticles on breast Ccancer

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Abstract:

Phytochemical compounds are generally antioxidant compounds, however, they could posses 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 effectivness 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 Epigallchatechine (EGC); a naturally occuring anti-oxidant to the target cancer tissue using copper carrying poly (d,l-lactide-co-glycolide) (PLGA) nano-particles (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 an 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 dısease. 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. Inhibition of Amyloid β Aggregation Using Optimized Nano-Encapsulated Formulations of Plant Extracts with High Metal Chelator Activities, PMID: 31820684
2. Apolipoprotein E4 mediated targeting of blood brain barrier using nano-micellar metal chelators for treatment of Alzheimer disease, Biol Syst Open Access 2015, 4:2

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