

Title:

Evaluation the molecular mechanism of Gallic acid effect on MCF-7 breast cancer cell line.

Abstract

Cancer is a disease that results in the uncontrolled growth of certain cells with the ability to invade or spread to other parts of the body. Cancer is often used to refer to malignant tumors, and the hallmark is a distinctive feature that in cancer the balance between cell proliferation and cell death that normally maintains homeostasis of healthy tissue is disrupted. Breast cancer is the most common cause of cancer-related death in women worldwide. Many of the known risk factors are related to estrogen. The risk is increased with early menarche, late menopause, and obesity in postmenopausal women, and prospective studies have shown that high endogenous estradiol concentrations are associated with increased risk. The Hippo signaling pathway is an important pathway whose function is essential for maintaining the normal size of tissues and organs. Dysfunction of this molecular pathway has been observed in many types of cancer, where it plays an important role in modulating cell proliferation. The Hippo signaling pathway is mainly composed of mammalian Ste20-like (MST1/2) and large tumor suppressor (LATS1/2) and (YAP) kinases. Nowadays, new therapeutic strategies, including combination therapy with natural products, are emerging to overcome drug resistance in the way Stegallic acid is a trihydroxybenzoic acid in which the hydroxy groups are located at positions 3, 4, and 5. It is a colorless or slightly yellow crystalline compound that has wide applications in the food and pharmaceutical industries. In this study, we aimed to investigate the effects of gallic acid, a plant polyphenol compound with antioxidant capacity and anticancer activity, on the sensitization of MCF-7 cell line. Based on the results of the study, gallic acid effectively inhibited cell survival in a concentration-dependent manner, and the IC₅₀ was achieved at a concentration of 75 μ M gallic acid. Based on the results of the study, gallic acid effectively inhibited cell survival in a concentration-dependent manner, and the IC₅₀ was achieved at a concentration of 75 μ M gallic acid. Gallic acid effectively inhibited cell survival in a concentration-dependent manner, and the rate of cell apoptosis in a concentration-dependent manner showed an increasing trend in the drug. Gallic acid also reduced the intracellular glutathione (GSH) level, leading to a decrease in the content of

reactive oxygen species (ROS) in a concentration-dependent manner. Treatment of cells with gallic acid led to an increase in the expression of Bax, Bcl-2 and a decrease in the expression of Yap, as well as a decrease in the Bax/Bcl-2 ratio. Therefore, the use of gallic acid can be effective in sensitizing MCF-7 cells to gallic acid and in gallic acid-induced resistance.

Keywords:

Leukemia, Apoptosis, Hippo signaling pathway, Yap signaling pathway, Gallic acid