**Induction of programmed cell death with natural products: a promising method for breast cancer treatment**

Syed-Morteza Javadirad1

1 Assistant Professor, Department of Cell and Molecular Biology and Microbiology, Faculty of Biological Science and Technology, University of Isfahan, Isfahan, Iran. Orchid: 2293-2891-0002-0000.

Corresponding author Email: [javadirad@yahoo.com](mailto:javadirad@yahoo.com)

**‌ Statement of Problem:** Breast cancer (BC) is one of the malignant cancers associated with mortality in women worldwide and one of the main approaches to breast cancer treatment is chemotherapy. Breast tumors initially respond to drugs, but eventually develop resistance, and the tumor usually relapses after 5 years. Natural products have been widely used in breast cancer research and treatment in recent years due to the clear toxic effects of chemotherapy drugs.  
**Research Purpose:** This review categorizes and summarizes studies on the role of natural products in the apoptosis of breast cancer cells.

**Research Method:** A review of related articles was conducted using the keywords breast cancer treatment and natural products in NCBI and SCOPUS databases. Related studies were reviewed, categorized and summarized, and the final text was prepared.

**Results and Conclusion:** Programmed cell death or apoptosis is a natural cellular process that controls cell growth and death. Apoptosis induction is an important strategy to stop the excessive proliferation of breast cancer cells. Many evidences show that natural products can play a role in breast cancer treatment by suppressing cell apoptosis. Related mechanisms including the role of mitochondria, FasL/Fas proteins, PI3K/AKT, reactive oxygen species, and mitogen-activated protein kinase pathway have been introduced as cellular targets of natural products.

**Keywords:** breast cancer, apoptosis, natural products.