Breast cancer is most common type of malignant tumor among women. It is estimated that the risk of breast cancer incidence is 1 on 8 women and 1 on 36 women will die due to this type of cancer. Therefore breast cancer represents a serious clinical problem.

Current treatment of breast cancer is based mainly on standard chemotherapy. In recent years, for the therapy were introduced targeted drugs like Herceptin. Despite the great progress that has been made in the treatment of breast cancer, most of tumors become very often resistant to therapy. Therefore, it is very important to searching novel and efficient methods of breast cancer treatment.

Compounds of nature origin have regained recently attention of researchers that work on development of efficient anticancer drugs, however, due to their complex mechanism of action, their clinical application is difficult.

Based on the literature search and our own results we have chosen 2(5*H*)-furanone as the compound which will serve as the lead structure for the generation of substances with anti-cancer properties, especially in terms of breast cancer treatment. Many of the natural products with 2(5*H*)-furanone moiety in their structure poses anticancer properties. Nevertheless, their mechanism of action remains unknown. Therefore, the main objective of the planned research is the synthesis of 2(5*H*)-furanone derivatives with anti-cancer activity and determination of how these derivatives influence processes on the cellular level in breast cancer cell lines.