

The aim of this project is to investigate in vitro that electroporation (EP) supports the transport of drugs and to check the influence this method on the expression and location of multidrug resistance proteins in mega colonies mammary tumor cells.

Resistance to chemotherapy of breast cancer and treatment of cytostatics is a major problem in clinical oncology. There is a lot of work to enhance the effectiveness of chemotherapy in breast cancer by improving the pharmacokinetic and pharmacodynamic parameters of drugs. Other methods, such as a hormone or radiotherapy do not bring the expected results and are characterized by low selectivity in action on cancer cells. Numerous side effects of chemotherapeutic drugs and congenital or acquired resistance of tumor cells to drug administration are serious constraints chemotherapy. Consequently, it is necessary to design and develop new strategies for the treatment of tumors. The works of many research centers rely primarily on the search for more effective, less toxic drugs and their delivery method. One method of improving the efficiency of delivery of compounds into cells is electroporation. It is a method for the induction of continuity of the cell membrane by subjecting it to an external electric field.

Electrochemotherapy (ECT) is a method of dynamically drop-down and attracts the attention of many interdisciplinary research teams because of the potential for numerous medical applications, biological and biotechnological products. However, as other methods used in the treatment of neoplastic diseases, it requires exploration of the mechanisms underlying its selective effect on cancer cells. Using an alternative method which is electroporation opens up new possibilities in the field of cancer therapy, especially for malignant tumors and drug-resistant. The use of targeted therapy may be more effective than traditional chemotherapy and less radical than surgery. Combating cancer cells is based primarily on overcoming their mechanisms of resistive and those that inhibit their elimination by apoptosis. Electrochemotherapy is a promising strategy for cancer therapy, which works in skin cancer.

The influence of the electric field and concentration of the drugs on the intracellular processes will be assessed. A comparative description will be tested in the mechanisms of multidrug resistance related to the use of inhibitors (Elacridar and fulvestrant). Flow cytometry will be evaluated protein expression of P-gp and BCRP. Will examine the changes in the concentration of a marker of lipid peroxidation and protein damage. The fluorescent properties of doxorubicin allow for assessment of co-localization and possibly removing it out of the cell after electrochemotherapy. Assessment of the well as the type of cell death and cellular responses induced electroporation of the test compounds.

The project will assess the impact of a combination of standard chemotherapy, and electroporation in adenocarcinoma breast cells, it will also contribute to a better understanding of cellular processes. The results obtained will form the basis for further research on the development of more effective cancer treatments, to solve problems expected in the future, as well as further preclinical studies. The result of the project will be publishing papers in highly rated scientific journals with international scope with a conference presentations. This type of studies allow the emergence of alternative and non-standard treatments, as well as extending the existing knowledge base, which will be able to provide a basis for solving problems in the future. Received in the way of the planned project results will be used to further in vivo tests.