Overview of genomic, proteomic, signal and metabolic data suggests that most diseases are more complex than originally thought, and many of the genes associated with disorders of homeostasis differ in the way of expression. Progress in this area has created the foundation for innovative concepts discovery of new drugs: network pharmacology. Now, move away from strategy according to which in the treatment of one disease uses a one drug acting on one of the molecular targets. An innovative method is applying multi-functional drugs or multitarget drugs, containing the active substance acting on more than one molecular target, usually with different points of the grip and by different mechanisms. These drugs are precisely aimed at several proteins, so that is possible to simultaneously influence for a few of important mechanisms comprising the disease. The benefits associated with such drugs should their activity complete, less risk of interaction between the different administered drugs, than during the combination therapy and also fewer side effects.

Despite getting a better diagnosis, access to research and the progress that has been made in cancer therapy, the number of new cases is not decreasing. Scientific researchers confirm that approximately 25% of all neoplastic lesions caused by chronic inflammation. To increase the chances of survival of the patients with cancer significantly affected by effective prevention, detection of the disease in an early stage of development, and the use of the most effective methods of the treatment. To increase the chances of survival of the patients with cancer significantly affected by effective prevention, detection of the disease in an early stage of development, and the use of the most effective methods of the treatment. An alternative to the ineffective therapy of cancer is chemoprevention, i.e. the use of pharmacological agents or natural factors which stop or delay the process of changes. In recent years a growing interest shows substances of plant raw materials that simultaneously exhibit antitumor activity and low level of toxicity.

Most of the previously characterized compounds of the chemoprevention are plant extracts, which can block the initiation stage of carcinogens or inhibit the proliferation of malignant cells in subsequent stages of promotion and progression. Thanks to the wide spectrum of biological properties, curcumin is compound classified to both classes. Several literature data indicate that both in vitro and in vivo, the compound inhibits the process of tumorigenesis at all of these stages and also exerts the cytotoxic effect, i.e. induces different types of tumor cell death or inhibits the proliferation of (the effect of cytostatic) does not initiate unwanted side effects. Also known are hybrid connections of curcumin inter alia with thalidomide, which exhibit strong cytotoxic activity, causing the destruction of multiple myeloma cells and with the Taxol, a drug used to treat breast cancer, where it supports the effect of curcumin increases the effectiveness of therapy and reduces the toxic effects on the body. In both cases, the action of the connection of curcumin and the drug is more effective than any component alone. This suggests that the hybrid strategy for drug development, will conduct to obtain the new chemical structures with the interesting biological activities.

The aim of the project entitled **„Modulation of the structure and properties of curcumin using triterpene oleanolic modifiers”** is to obtain new connections hybrid composed of curcumin and its analogues and triterpene units skeleton of oleanane.

The chemical structure units connections were divided into three models of modulation:

- direct model, using the mutual reactivity of the functional groups of both constituents,
- intermediate model, using bifunctional intermolecular spacers (linker),
- merged model, leading to reduce the molecular weight of the derivative obtained as a consequence of the overlapping of selected structural elements.

The resulting new hybrid connections will be characterized by physico-chemical and spectral methods, will be assessed their solubility and durability. New compounds will be subjected also to the cytotoxic and antiproliferative activities against selected cell lines. Biological studies should answer for the question, if new connections will potentially effective drugs in the chemoprevention of cancer diseases.