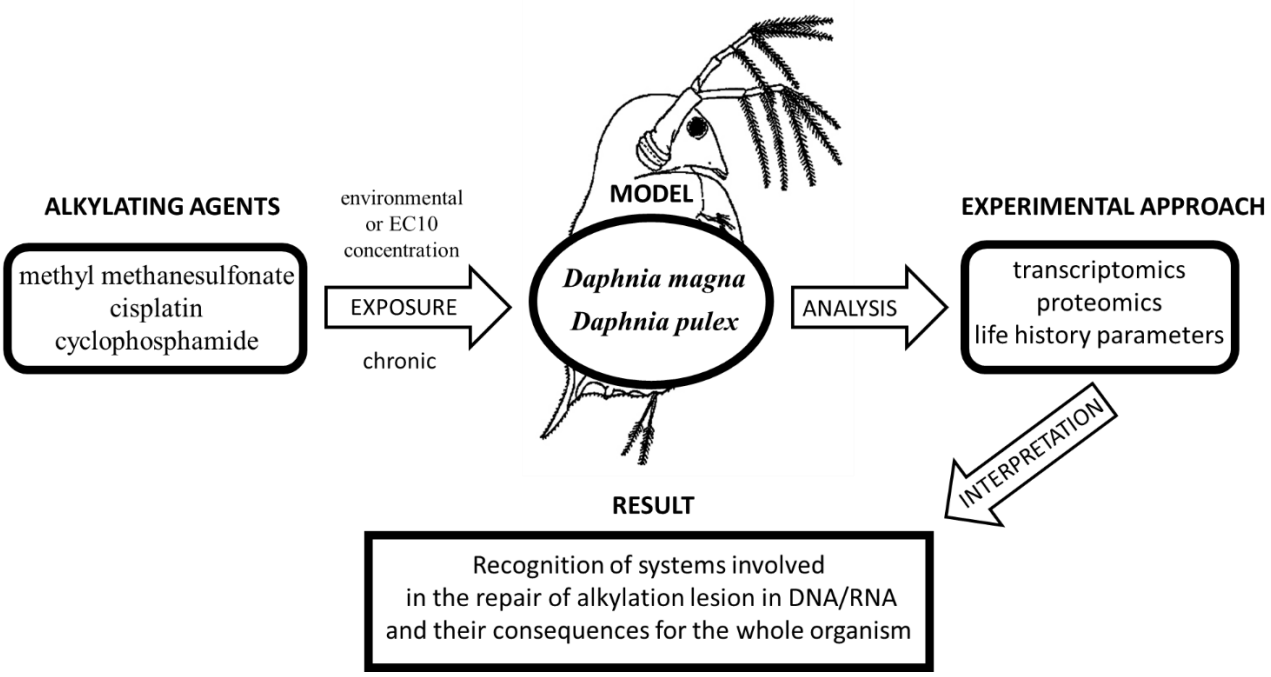
In recent years, the water pollution by pharmaceuticals remarkably increased due to enhanced medicine consumption. The reason for this phenomenon is complex. One of the explanations is that more people are treated for civilization diseases, such as obesity, type 2 diabetes, and cancer. Among the agents used in chemotherapy, significant role is played by alkylating agents. Their mode of action leads to the damage to the cellular DNA and RNA. One such compound is cisplatin used in the treatment of several types of malignant tumors and commonly detected in freshwater ecosystems.

The objective of the proposed research is to determine changes at the molecular and individual level in the presence of alkylating agents in *Daphnia* – a model organism and representative of filtering zooplankton. The concept of planned research is shown on the diagram below.




The use of low, observed in the environment concentrations of pharmaceuticals and extend exposure time is one of the innovative aspects of this project. High concentration of the chemical compound and short exposure time usually leads to the cytotoxic effect. We expect intravital changes on molecular and individual level, including increased expression of RNA and proteins involved in DNA repair systems and changes in life history parameters.

Changes in any of parameters related to fitness caused by the presence of pharmaceuticals can show dramatic effect on the planktonic crustaceans, thus, for the functioning of the aquatics food webs. *Daphnia* as filter feeders, play a major role in controlling algal biomass, so they may reduce the negative symptoms of eutrophication such as water blooms. On the other hand, cladocerans, and *Daphnia* among them, constitute the essential food for planktivorous fish. The structure and composition of zooplankton community translate directly to the characteristics of the ichthyofauna, and are essential for the fish production in lakes.

Thanks to the results obtained in the planned research, we will be able to verify *Daphnia* as an indicator of alkylating agents contaminations. On the other hand, knowledge of the systems involved in the response to this type of genotoxic stress, including DNA repair systems, coming mainly from studies on terrestrial organisms, will be extended to research on the water-living model crustacean.