

An increasing pollution of the environment and particularly contamination of water, by so called endocrine-disrupting compounds (EDCs) mimicking action of natural body hormones, draws attention of researchers world-wide. The most potent EDCs act like female sex hormones – estrogens (e.g. 17β -estradiol, E2); synthetic estrogens such as ethinylestradiol (EE2) which is widely used in contraceptive pills, and alkylphenols (e.g. 4-tert-Octylphenol, OP). Many of those compounds are formed e.g. during production of cosmetics, fertilizers or dyes. EDCs accumulated in water affect fish: decrease their growth and reproduction and cause male feminization. Consumption of aquatic animals by humans may cause high bioaccumulation of these compounds in their bodies.

To date, it has been largely overlooked that estrogens and EDCs can affect immune system, a key system for organism protection from pathogens and thus its survival. However, recent results indicate that such interactions take place in mammals, and that immune cells - leukocytes express receptors binding these compounds. It is also known that E2 and EDCs can act not only through these receptors but may also influence synthesis of natural endogenous hormones e.g. E2.

Therefore, **the aim of the current project is to study the effect of E2 and EDC on the bacteria-induced inflammatory reaction and activity of macrophages** – crucial leukocytes involved in infection recognition, bacteria elimination as well as involved in tissue repair/wound healing. This phenomenon will be studied in carp, the most popular fish species in Poland.

We will verify how E2 and EDCs affects ability of macrophages to produce factors responsible for the control of bacterial infection such as free radicals, and substances regulating the course of inflammation, ie. pro- and anti-inflammatory cytokines.

Explanation of the mechanisms related to the effects of estrogen and EDCs on the physiology and in particular on the immune system is now one of the major challenges in the area of immuno-neuroendocrinology and immuno-toxicology. We hope that our findings will help to develop new, more effective health control strategies, both for fish and mammals.