

Although the importance of spiders in trophic chains of terrestrial ecosystems seems obvious, only a small number of research was performed under controlled laboratory conditions in which levels of selected biochemical parameters and intensity of stressing factors could be correlated and the main defense strategies of the investigated predators against different (in terms of quantity and quality) stressors could be studied. Experimental spider colonies are rather rarely maintained due to methodological issues, arising i.a. from the requirements of individuals at subsequent development stages. It is very difficult to provide the individuals, particularly young, with optimum conditions, including specific food and humidity requirements. Due to the above-described limitations, most data on the cytotoxic effects of anthropogenic and natural stressors were gathered in research of individuals collected directly from the field or only temporarily kept in the laboratory. Not many studies, particularly of long-term exposure to chemical substances, have been carried out on multi-generation spider colonies.

Living in the metal-polluted habitat leads to changes into metabolism caused by metals detoxification or/and direct toxicity with elevated levels of these xenobiotics. These changes can also affect the immune systems function, whose efficient functioning is one of conditions of organism survival and reproduction. Spiders, as macro-concentrators of heavy metals, are particularly vulnerable to the toxic effect of this type of pollution. However, there are few data in the literature concerning the condition of spiders immune system in terms of an effect of stressors, including heavy metals. The aim of this project is to verify whether and to what extent xenobiotic cadmium and biogenic copper administered to *Steatoda grossa* (Theridiidae) spiders in a simple model of the food chain: medium with metal → *Drosophila hydei* → spider, can alter the immunological potential of this species during short and long term intoxication in response to microorganisms invasion into the organism. An evaluation of the immune system will be carried out in the hemolymph of mature females, based on the analysis of selected parameters of cellular and humoral immunity, both in healthy individuals and those subjected to immunostimulation. Due to the fact the applied metals demonstrate a strong prooxidative activity, the study will also include an analysis of the level of selected enzymatic and non-enzymatic antioxidants, which will allow to recognize the relationship between the effectiveness of immune response, and the efficiency of antioxidant defense. It is also planned to conduct a molecular evaluation of spiders microbiome and verify its impact on the state of the immune system of this species individuals.

The results obtained from the planned analysis should not only help discover immunological responses in this group of predatory invertebrates, but also understand the ability of the spiders to compensate/adapt to conditions of exposure to the metal-contaminated food. Results obtained from this project will provide unique comparative data concerning the development of tolerance to metals present in food and they will facilitate the interpretation of results obtained from the field studies.