

Effects of Long-Term Exposure of Cadmium to the Ovary of *Lithobius forficatus* (Myriapoda, Chilopoda)

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Abstract : Heavy metals polluting the environment, especially soil, have a harmful effect on organisms, because they can damage the organ structure, disturb their function and cause developmental disorders. They can affect not only the somatic tissues but also the germinal tissues. In the natural environment, plants and animals are exposed to short- and long-term exposure to these stressors, which have a major influence on the functioning of these organisms. Numerous animals have been treated as the bioindicators of the environment. Therefore, studies on any alterations caused by, e.g., heavy metals are in the center of interests of not only environmental but also medical and biological science. Myriapods are invertebrates which are bioindicators of the environment. One of the species which lives in the upper layers of soil, particularly under stones and rocks is *Lithobius forficatus* (Chilopoda), commonly known as the brown centipede or stone centipede. It is a European species of the family Lithobiidae. This centipede living in the soil is exposed to, e.g., heavy metals such as cadmium, lead, arsenic. The main goal of our project was to analyze the impact of long-term exposure to cadmium on the structure of ovary with the emphasis on the course of oogenesis. As the material for analysis of cadmium exposure to ovaries, we chose the centipede species, *L. forficatus*. Animals were divided into two experimental groups: C - the control group, the animals cultured in laboratory conditions in a horticultural soil; Cd2 - the animals cultured in a horticultural soil supplemented with 80 mg/kg (dry weight) of CdCl₂ for 45 days - long-term exposure. Animals were fed with *Acheta* and *Chironomus* larvae maintained in tap water. The analyzes were carried out using transmission electron microscopy (TEM), flow cytometry and laser scanning (confocal) microscopy. Here we present the results of long-term exposure to cadmium concentration in soil on the organ responsible for female germ cell formation. Analysis with the use of the transmission electron microscope showed changes in the ultrastructure of both somatic and germ cells in the ovary. Moreover, quantitative analysis revealed the decrease in the percentage of cells viability, the increase in the percentage of cells with depolarized mitochondria and increasing the number of early apoptotic cells. All these changes were statistically significant compared to the control. Additionally, an increase in the ADP/ATP index was recorded. However, changes were not statistically significant to the control. Acknowledgment: The study has been financed by the National Science Centre, Poland, grant no 2017/25/B/NZ4/00420.

Keywords : cadmium, centipede, ovary, ultrastructure

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