Nanoparticles are extremely small. They are 1000 times smaller than erythrocytes and other human body cells. The ratio of the sizes of nanoparticles and bacteria is similar. This means that if nanoparticles are much smaller then cells, they have perfectly enough room inside. This property of nanoparticles arouses great hopes in many branches of human life. In medicine and cosmetology they are used as carriers of pharmaceuticals which directly get into target cells, instead of wandering in the organism. Nanoparticles also whet appetite of food production branch, since the same feature may enable them creating functional food and food that may be stored for a loner time. Won't the smallest carriers of health and hygiene turn into the smallest Trojan horses when they get out from our control? This may happen when they start getting into natural environment in the form of wastes and pollutants. Then, the same properties of nanoparticles that are beneficial for humans, will start threatening other living organisms. In a way we do not control, in unknown concentration and unknown route of entering the body, nanoparticles may disturb homeostasis of not only individuals but also, as any other kind of pollutants, counterbalance of ecosystems. At the same time, because of, among other, their size, they are extremely difficult to be detected in the environment. This refers, especially, to graphene oxide, which is the object of this study. Its particles consist solely of carbon and oxygen, so they merge into any organic background. Tests led so far, still not very numerous, reveal some disturbances in life processes of animals, including invertebrates. The results of the experiments conducted by the scientists from University of Silesia reveal that crickets exposed to graphene oxide in food, demonstrate the symptoms of malnutrition and histological analyses showed changes in gut and reproductive glands. Moreover, in the cells of the exposed animals, oxidative stress reactions appeared which, if not balanced by repairing processes, is destructive for the cells. What is more, some changes were noticeable not earlier than in the third generation insects. This may seem surprising, but, according to the natural selection theory, this instability of genetic material enables the selection of individuals having the features which, in the following generations, will create a population that will be well adapted to this new stressing factor. The mechanism of these changes is still unknown. That is why the team of researchers from University of Silesia will take a try to explain some of them. They will check, measuring calorific value of the food, insect tissues and faeces, to what extent ineffective food assimilation may change energy budget of the crickets. Also, they will assess whether it may be connected with changes in the communities of symbiotic microorganisms, inhabiting their alimentary tract since microbiome assures proper digestion and absorption of the food. If, however, in food there are potentially toxic chemicals, here: graphene oxide nanoparticles, they may threaten also, or: above other, necessary microorganisms. Explanation of the changes observed in the subsequent generations of insects exposed to graphene oxide seems especially interesting. The executors of the project will assess the range of DNA damage as the effect of exposure to graphene oxide nanoparticles as well as the efficiency of repairing processes. This will enable them to estimate and predict the effects of chronic exposure of animals to nanoparticles in their habitats. Even if a perfect elimination of carbon nanoparticles from the environment does not seem possible, the expected results of this project will help us, on the one hand, assess the effects of their presence in the environment, and on the other hand – will provide us with arguments for special attention of producers and users of these structures to the environmental safety of their usage.