## DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Even nanotechnology is a relatively new field, nanoparticles are not. The first use of nanoparticles already dates back to 10 th century BC. Nanoparticles (NP) are of great scientific interest as they are the connecting link between bulk materials and atomic or molecular structures. From a scientific point of view the most attractive are nanoparticles of the graphene family. One of them is graphene oxide (GO) - an oxidized derivative of graphene, in recent years has been acclaimed a 'superstar' in the area of nanomaterials. It concentrate researchers' attention with a number of its unique physicochemical properties which determine its potentially widespread use in the industry, science and medicine. Yet despite the fact that the demand for graphene and its derivatives in commercial applications is still growing, many aspects of its toxicity and biocompatibility are still poorly recognized. Results of research conducted mainly on *in vitro* models and, much more seldom, *in vivo* models, show that exposure to graphene oxide may lead to many negative effect in living organism such as: damaging genetic material, disturbing the cell cycle, and unfavourable mutations The most important global problem, significant from the point of view of ecotoxicology, seems to be nanoparticles entering the ecosystem in form of industrial and household nanowaste and nanopollution as well as their accumulation in environment. Consequences of such a scenario, the scale of the final effect of industrial-scale introduction of GO, and groups of organisms which, in future, will bear the highest cost of such decisions of the mankind have not been assessed so far. History of inventing and using DDT (dichlorodiphenyltrichloroethane) to protect plants teaches how important it is to analyse a new substance in detail before introducing it into the environment. It is the reason why toxicity studies, especially toxicity studies in *in vivo* models, are so valuable and ought to have a priority.

**The main objective** of the project is to describe risk associated with chronic multigenerational exposure to low doses of GO in food, particularly many development and reproductive parameters of *Acheta domesticus*, which was chosen for the research as a useful model organism.

**To achieve the project aims and verify the hypotheses we will conduct a number of experiments:**

- ✓ assessment of *A. domesticus* development (changes in body weight, survival, duration of each larval stages)
- ✓ monitoring of number of laid eggs: per day and per individual (assessing successful hatch in consecutive generations)
- ✓ assessment of quality of eggs and condition of embryos (colour, weight and shape of eggs and structure of egg membrane)
- ✓ assessment of eggshell deformation and breaking strength and egg elasticity
- ✓ assesment of stress parameters (activity of catalase - CAT, the level of total antioxidative capacity - TAC, the level of heat shock proteins - HSP70 and DNA damage level)
- ✓ histological evaluation of the ultrastructure of the gut epithelium and testis