

Nanoparticles are inherent in the natural environment. They are created as a result of natural geophysical changes. In recent years, the number of ultrasmall nanoparticles that are a result of human activity has significantly increased, potentially threatening natural ecosystems as well as flora and fauna. Nanoparticles and materials enriched with nanoparticles are widely used in industry and waste that are created during production and use of such materials often find their way to the aquatic environment. Pollution of drinking water sources and ground water is a potential threat to human life and health. It is the aquatic organisms, however, (e.g. fish) that will be exposed to pollution first. The influence of nanoparticles can differ depending on the reproductive strategies of a given species of fish. The research proposed in the project will allow to determine the gravity of threat that nanoparticles pose for the reproductive system, sexual maturation and fertility of various species of fish.

The aim of this project is to show how silver nanoparticles can influence the fertility of oviparous and viviparous (ovoviviparous and matrotrophy species). It will also be established if silver nanoparticles can be transported from the mother's body into a developing embryo through the placenta. The effect of silver nanoparticles' toxicity will be examined in zebrafish (an oviparous species), guppy (an ovoviviparous species) and butterfly splitfin (this species have a trophotaenial placenta). Toxicological examinations will be carried out to determine the location of silver nanoparticles' location in the bodies of the fish, the changes of expression of genes associated with organism detoxification and the development of reproductive system as well as pathological changes in the livers, gills, spleen and gonads. The results acquired will help establish the influence of silver nanoparticles on human health. The proposed research will also allow to establish if viviparous species of fish with placenta can be an alternative research model for foetus physiology and placenta in mammals.