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In the last years, metal oxide nanoparticles (NPs) are receiving increasing attention due to their different applications. NPs have unique physicochemical properties that differ substantially from their respective bulk materials of the same composition. According to several studies, titanium dioxide (TiO₂) nanoparticles (NPs) have short-term risks on *Danio rerio* (zebrafish). In the present study, we focus on the potential toxic effects that can be caused by a long-term exposure to titanium dioxide (TiO₂) nanoparticles (NPs) on zebrafish. The zebrafish, has long been recognized as a useful model organism in ecotoxicology. Zebrafish Wild-type AB strains, were obtained from the Sicilian Center of Experimental Ichthyopathology (CISS), University of Messina, Italy, where they were kept in a "Fish facilities" (Stand Alone Unit, Tecniplast), a closed-loop system for the continuous monitoring of vital parameters. Adult specimens of zebrafish were exposed to different concentrations of TiO₂ NPs (0,5-1 mg/L) (Degussa P25, Sigma Aldrich), for 90 days. Histological, immunohistochemical and molecular analysis were performed on their gills, gut, skin, muscles and liver. All samples analyzed by immunohistochemical investigation, showed a very clear positive response to Metallothioneins (Abcam, 1:500). Moreover, the positivity was confirmed by Western blot analysis (WB). Histological examination showed intestinal alterations and in particular, partial thinning of the folds and occasional flaking of epithelium and morpho-functional alterations in the gill epithelium. Histological analysis on muscles, liver and skin showed no alterations. In conclusion, the current study confirmed only a slight cytotoxicity of TiO₂ NPs on zebrafish adults after a long-term exposure, however, further and wider studies are required to establish their effects on other organs and to evaluate the severity of their toxicity.

Theme Session: Physiology, Behaviour and Toxicology

Presentation type: Poster

The sterlet (*Acipenser ruthenus*) in the middle Danube: What are the causes of the average weight increase?

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The sterlet is the last regularly documented native sturgeon species in the Slovak-Hungarian stretch of the middle Danube. The current status of the species is generally unknown because there is lack of the data. There is no commercial fishing there and the only reliable data are the catches recorded by Slovak Anglers Club Union. We have used the data on the catches and the weights of all sampled sterlets between the years 2003 and 2014. Catches are continuously decreasing and the average height is increasing. Two hypotheses are available, the changes in angling practises to catch larger fishes or the increasing age of the population. The angling practises changed in last two decades with using larger hooks with favourite baits so there is higher probability to sample larger specimens. On the other hand, the number of sampled individuals are decreasing as well. Further research is needed to uncover the population characteristics of the sterlet in the middle Danube as well as to increase of the knowledge of spawning, feeding and wintering habitat.

Theme Session: Physiology, Behaviour and Toxicology

Presentation type: Poster

Effects of trichotecene mycotoxins on gene expression and activity of glutathione redox system in common carp (*Cyprinus carpio* L.)

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The purpose of present study was to evaluate the short- and long-term effects of T-2 toxin and deoxynivalenol (DON) in common carp. Short-term effect was evaluated using single oral doses of DON and T-2 toxin of 0.25, 0.50 or 3.00 mg/kg b.w.. Experimentally contaminated or control complete feed was given by gavage directly into the stomach. Liver samples were taken from 6 carps of each group at every 8th hour during a 24-hour long experimental period. The long-term effect was evaluated in 4 weeks in a feeding trial using 0.05 mg T-2 toxin/kg b.w. and 0.06 mg DON/kg b.w., where liver samples were taken from 6 carps of each group weekly. Reduced glutathione (GSH) concentration and activities of glutathione-peroxidase (GPx), glutathione reductase (GR) and glutathione-S-transferase (GST) were measured. In addition, expressions of phospholipid hydroperoxide glutathione peroxidase (GPx4) genes (*gpx4a* and *gpx4b*) were analyzed. Lipid peroxidation followed by the determination the amount of conjugated dienes (CDs) and -trienes (CTs) and malondialdehyde (MDA). Short-term exposure showed that both of the investigated mycotoxins caused rapid changes in the lipid peroxidation processes in the liver, but the emerging free radical burden quickly activated the glutathione redox system, so the end-product of the lipid peroxidation (MDA) did not elevate significantly in the 24-hour period. As effect of long-term exposure, the glutathione redox system showed decreased levels in T-2 toxin treated group, but the markers of lipid peroxidation processes did not elevate. Expression of the genes investigated showed minor changes during the experiments. The results revealed that glutathione redox system eliminate effectively the peroxidative effect of the investigated mycotoxins in the applied doses and periods. The research was supported by the National Scientific Research Fund (OTKA PD104823).

Theme Session: Physiology, Behaviour and Toxicology
Presentation type: Oral

New record of a fossil haplotilapiine cichlid from Central Kenya

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African freshwater cichlids (Cichlidae: Pseudocrenilabrinae) are well known for their exceptionally great diversity and their capability of rapid speciation as well as diverse adaptations. The extant Pseudocrenilabrinae can be grouped into 27 tribes, with more than 2000 species harbored in the Great Lakes and surrounding water bodies of the East African Rift System. However, this unique diversity is not reflected in the fossil record because fossil cichlids were predominantly reported based on isolated teeth and bones. Moreover, the few articulated specimens that are known have not been analyzed sufficiently with regard to their systematic position due to lack of comparative material. Here we present a new extraordinarily well-preserved cichlid fish fossil from the Middle Miocene (c. 13-14 Ma) Lagerstaette Kabchore, which was recovered during recent fieldwork in the Tugen Hills (Baringo County, Central Kenya Rift). Based on the evidence of tricuspid teeth, the Kabchore fossil can be assigned to the subclade of the Haplotilapiines within the Pseudocrenilabrinae. As the number of branchiostegal rays is seven in the fossil (recent cichlids have five or six), it represents an ancient representative of this group. Based on a multivariate analysis of a large meristic data set, derived from 1014 extant specimens (encompassing all main lineages of Haplotilapiines) and using available osteological data, this fossil is most likely related to one of the three haplotilapiine tribes Tilapiini, Haplochromini or Oreochromini. Moreover, the fossil specimen closely resembles the extinct cichlid *Oreochromis martyni* (Van Couvering, 1982), previously described as species of *Sarotherodon* from the Middle Miocene alkaline Kapkiamu Lake in the Tugen Hills. The analysis of the greatly preserved fossil fish specimen from Kabchore definitely supplements the fragmentary fossil record of Africa's Cichlidae and will afford new insights into its evolutionary history. We also expect that this fossil will be useful as calibration point for new divergence-time estimates.

Theme Session: Phylogeny, Systematics and Genetics
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