A1.19 PRIMARILY CULTURED GILL EPITHELIA AS PROTOTYPES FOR ASSESSING FISH RESPONSE TO HEAVY METAL EXPOSURE

TUESDAY 4 JULY, 2017 **POSTER SESSION**

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This study investigated the use of primarily cultured gill cells to assess changes in gill physiology in response to heavy metal exposure. Rainbow trout *(Oncorhynchus mykiss)* gill epithelia were cultured on permeable filter supports using a Double Seeded Insert (DSI) primary culture technique. The cells, which are tolerant to freshwater application on the apical surface, were exposed to a range of concentrations of zinc (Zn) [1-100 µM], lead (Pb) [0.5-50 µM] and cadmium (Cd) [0.01-1.0 µM] for 24 h. The expression of heavy metal responsive genes metallothionein A (mtA) and B (mtB) were quantified using Reverse Transcription quantitative Polymerase Chain Reaction (RT qPCR). Results showed that Zn significantly ($P < 0.05$) enhanced the expression of mtA and mtB in the cultured gill epithelia while Pb significantly ($P < 0.05$) inhibited the expression of mtA. These findings corroborate previous in vivo studies which showed that increased production of metallothionein in in fish is associated with an increase in internal concentrations of Cadmium, Mercury (Hg), Copper (Cu) and Zn only. The global call to reduce the number of fish used in toxicological evaluations has necessitated the need to develop *in vitro* systems as viable alternatives. This study demonstrated that primarily cultured gill epithelia is capable of detecting bioavailable metals in water and thus shows promise as a surrogate for fish toxicity tests.

A1.20 THE PHYSIOLOGICAL EFFECTS OF POLYETHYLENE MICROBEADS INGESTION IN JUVENILE ORANGE-SPOTTED GROUPER *(EPINEPHELUS COIOIDES)*

TUESDAY 4 JULY, 2017 **POSTER SESSION**

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Plastic particle in the ocean is an emerging pollution that affect aquatic habitats globally. Some of them are very small that can be eaten by a large range of animals, including fishes. However, the physiological influence on fish that ingested those microscopic particles is still unclear. This study aimed to investigate the physical impact of polyethylene (PE 0.2-125um) microbeads ingestion in juvenile orange-spotted grouper *(Epinephelus coioides)*. To this end, treatment fish were fed with the diet including 10^4 fluorescent microbeads per gram for two weeks. The remaining beads were searched and counted in the gastrointestinal tract and liver using fluorescent microscope. Furthermore, the possible stress and immune responses were estimated by the changing in transcripts of head kidney cyp11a1 (P450scc) and star (steroidogenic acute regulator), and hepatic *lept* (leptin) genes. As well as, the plasma ROS and cortisol levels will be determined for the possible immune responses.

A1.22 THE EFFECT OF THERMAL PREHISTORY AND EXPOSURE REGIME ON METAL TOXICITY TOLERANCE IN ZEBRAFISH (DANIO RERIO)

TUESDAY 4 JULY, 2017 **POSTER SESSION**

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Temperature is one of the most important environmental factors driving physiological and ecological dynamics. Although the effect of temperature on energy metabolism and other physiological processes has been subject of detailed study the effect of temperature on the sensitivity of environmental toxicants is poorly documented. Moreover, the effect of temperature is generally not considered in the setting of environmental quality standards. In this work we explore the effect of temperature acclimation and exposure on the uptake and toxicity of Cu and Cd and their mixtures in the zebrafish. To this end, we have defined 3 main scenarios including a short temperature treatment (1-4 days) in 17, 22, 25, 32 and 34°C and subsequent metal exposure for 10 days at the optimal temperature (Scenario 1), the same but with a 28 days temperature acclimation (Scenario 2) and a 28 days temperature acclimation followed by metal exposure at the temperature of acclimation (Scenario 3). The results showed that Cu was much more toxic than Cd. However, Cu and Cd together showed a strong synergistic effect. A short low temperature treatment (Scenario 1) appears to be protective while a short high temperature treatment increases sensitivity. In contrast, in Scenarios 2 and 3 higher temperatures increase the tolerance against metal toxicity. Although the temperature regime had a significant effect on metal accumulation there was no clear relationship between metal accumulation and toxicity. The results clearly show the importance of temperature in modulating the toxicological effects of metals and their mixtures in the zebrafish.