

metallothionein-like proteins played an important role in metal detoxification (e.g., for Cd, Ag), preventing the binding of nonessential metals at physiologically important sites. Incorporation of metals such as Ni, Pb and Tl into mineral inclusions was another important and complementary metal-detoxification strategy. However, these strategies were not completely successful since significant accumulations in metal-sensitive fractions were observed for all the metals studied, even for animals exposed at the lower end of the metal contamination gradient. These inappropriate bindings of nonessential metals could induce deleterious effects. Among the metal-sensitive fractions, mitochondrial appear to be a major binding compartment (for As, Cd, Pb and Tl). The percentage of accumulated trace metals stored in detoxified form varied greatly among metals and animals. Such information should help the development of improved models for predicting metal toxicity, based on the biologically active pools that contribute to toxic responses and not on the total accumulated metal concentrations.

#### 17 Local morphometry and biogeochemistry affects methylmercury bioaccumulation and biological responses in fish from an Amazon floodplain lake

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Mercury in the Amazon River system is derived from a variable mixture of natural and anthropogenic sources. Anoxic environments in floodplain lakes have been identified as the main sites of mercury methylation, a critical step in the bioaccumulation of mercury in the aquatic biota of this system. Lago Janatucá is located along the southern floodplain of Solimões River, 40 km upstream from Manaus. The northern part of this lake is shallower than the southern region, which results in different patterns of thermal and oxygen stratification. We hypothesized that this would result in different patterns of mercury dynamics and ecotoxicological responses in these regions. To test this hypothesis we collected *Hoplias malabaricus*, a sedentary predatory fish, in the northern and southern regions of the lake during the dry season of 2015. Samples of water and sediments and in-situ measurements of relevant physicochemical parameters were also collected at both sites. Mercury analyses were performed following EPA 1630 and Pichet et al (1999). Metallothionein and histopathological lesions in fish were determined according to Viarengo et al (1997) and Bernet et al (1999). MeHg concentrations in water were significantly higher in the southern region (t-test,  $p = 0.0114$ ) due to greater stratification of temperature and oxygen which favored mercury methylation. Fish from the southern region presented significantly higher MeHg bioaccumulation (t-test,  $p=0.017$ ), higher metallothionein content (t-test,  $p=0.036$ ) and higher occurrence of hepatic histopathologic lesions (t-test,  $p=0.036$ ) than fish from the northern region. Our results demonstrated the importance of local variations in morphometry and stratification in controlling the methylation and bioaccumulation of mercury and its ecotoxicological consequences in this Amazon floodplain lake.

#### 18 Metal Bioaccumulation and Metallothioneins induction in blue crabs *Callinectes danae* exposed to Lead (Pb)

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acclimatization and depuration period, exposure assays were performed during 2 periods (7 and 14 days), considering two test-concentrations of Pb ( $0.5$  e  $2.0 \mu\text{g g}^{-1}$ ) in 4 treatments: 1) control, using non-contaminated artificial salinized water and non-contaminated artificial food; 2) contaminated water and non-contaminated food; 3) non-contaminated water and contaminated food; 4) combined treatment using contaminated water and food). The partial results for the exposure tests suggest that absorption through the gills is the most effective pathway for accumulation of Pb in the evaluated periods at the concentration of  $2 \mu\text{g g}^{-1}$  Pb in water. For the other treatments, possibly the evaluated periods were apparently too short to verify an effective accumulation of Pb in the tissues, which does not mean that it could not occur in longer periods of time. Other hypotheses would be that the depuration systems were effective or that the absorption simply did not occur, regardless of the time it was evaluated. For hepatopancreas, two-way ANOVA did not detect any significant statistical differences in results of metallothioneins. It was observed that the combined treatments were more effective in inducing the activity of metallothioneins in gills, which suggests that the pathways act simultaneously.

#### 19 Genetic biomarkers of Chilean northern scallop *A. purpuratus* in San Jorge Bay. Addressing potential risk of metals and hypersaline discharges

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Coastal marine areas are among the most important places for human settlements however, the rapid urbanization and industrialization have continuously pressure the coastal ecosystems and frequently, simultaneously and synergistically contribute its degradation. In Chile, recent scientific research in the northern region, particularly San Jorge Bay (Antofagasta), indicate multiple stressors including a high degree of metal contamination along the bay's coast line as evidences of notorious effects of the mining industrial port activity and increasing hypersaline discharges as result of sea water desalination for both domestic and industrial purpose. Our research approach included an iterative process focused in temporal and spatial trends assessment of key-stressors mass balance and its specific causal-effects relationship models using genetic molecular specific biomarkers in a key-bioindicator organism (*A. purpuratus*), in order to differentiate it from other recurrent natural events in this bay (e.g upwelling periods). Starting from RT-PCR primers design and validation under field semi-controlled and lab condition, our specific scallop biomarkers for metal (metallothioneins, MTs) and hypersaline water exposure (osmotic regulation kinase, OsRK) measured in several scallop tissues, have proven to be reliable specific biomarkers indicating a zonal restricted impact and time-sensitive variation of stressors in San Jorge Bay. Furthermore, differential hypersaline effluent effects were observed. It is expected that these real-time genetic/molecular responses when coupled with environmental physicochemical and available long-term ecological monitoring data sets (currently under analysis), will provide a useful starting point for developing high throughput models and foundation for ecological risk assessment, focus in development, compatibility, long-term sustainability of this essential human activities in northern Chile, ensuring the protection of marine aquatic receiving environments. Keywords: Genetic biomarkers, metals, water desalination, *A. purpuratus*.

#### 20 DNA damage in the freshwater fish *Australoheros facetus* acutely exposed to imidacloprid: possible explanation through an oxidative mechanism.

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The presence of neonicotinoid insecticides in a wide type of environments around the world and its possible negative effects in non-target organisms are important topics in environmental risk assessment. Particularly, there is a large amount of reports about imidacloprid (IMI) presence in freshwater bodies, and its effects on aquatic invertebrates. Nevertheless, negative effects in freshwater fish are usually limited to mortality endpoints, and there is a lack of information about sublethal effects in this