UNVEILING COPING STRATEGIES WITH MERCURY IN AQUATIC AND SEMI-AQUATIC INHABITANTS

I. Ahmad[1,2], N. A. Anjum[1], J. P. Coelho[1], I. Mohmood[1], M. Pacheco[2], M. A. Santos[2], A. C. Duarte[1] and E. Pereira[1]

Despite the credible information on environmental hazards identification/characterization, risk assessment and coping strategies in aquatic/semi-aquatic inhabitants, lacunae on mechanistic aspects entangling the previous issues are perceptible in literature. Considering the primary consumers (bivalves) and essential marsh ecosystem base components (salt marsh macrophytes), the current work aimed to assess mercury's potential toxicity and to discuss organisms' survival strategies under conditions with well-defined mercury gradient at Laranjo Basin, Ria de Aveiro, Portugal. Inter-age (2^+, 3^+, 4^+ and 5^+ year) approach was applied in bivalve *Scrobicularia plana* and mercury accumulation as well as endpoints combining damage and defence responses were determined (Figure 1). Mercury induced peroxidative damage reflected enzymatic antioxidants insufficiency. The adaptive capacity expressed as antioxidant induction and lesser vulnerability to enzyme inhibition, increased with age. Concerning non-enzymatic antioxidants, *S. plana* adaptive skills evolution over time depends on the contamination extent; under moderate contamination, the different antioxidants intervention took place harmoniously, evidencing an adjustment capacity increasing with age. Contrarily, under higher contamination, *S. plana* failed to cope with mercury threat. We also unveiled mercury's body burdens and its link to increased immunomodulation risk in 4^+ year animals. The antioxidants modulation was substantiated with animal polypeptide pattern revealing its mercury stress adaptation.

Salt marsh macrophyte *Halimione portulacoides* exhibited organ-specific biochemical strategies to cope with environmental mercury-accrued anomalies . *H. portulacoides* relied to a greater extent, on its root-specific adoption of tolerance strategies; though, the exhibition of mercury burden-dependent elevated damages in concurrence with polypeptide patterns in roots is obvious when compared with leaf-specific stress-coping strategies. Conclusively, the current findings unveiled a successful contamination gradient dependent differential coping strategies adoption substantiated by polypeptide patterns in *S. plana* and *H. portulacoides* for their survival in mercury-contaminated coastal lagoon.

(1) Department of Chemistry & CESAM, University of Aveiro

(2) Department of Biology & CESAM, University of Aveiro

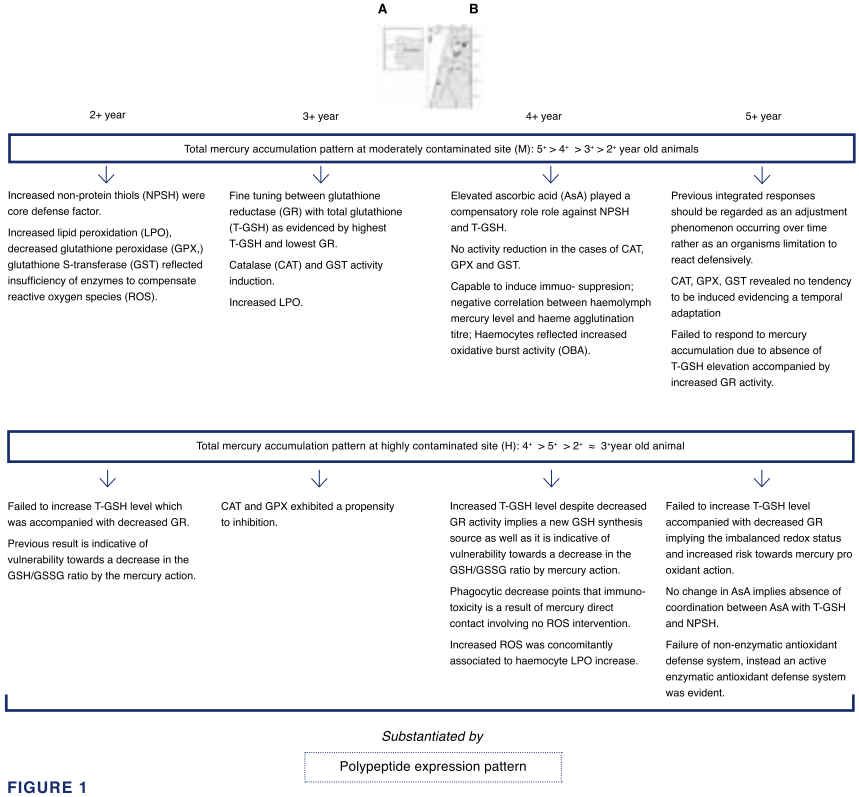

FIGURE 1

(A) Location of Ria de Aveiro (Portugal); (B) Location ( ) of sampling sites moderately (M) and highly (H) mercury contaminated sites at Laranjo basin, and a site at Vagueira assumed as reference R; (C) Coping strategies adopted by bivalve *Scrobicularia plana*.