MACROALGAE STRESS METABOLISM: TOLERANCE MECHANISMS REVEAL POTENTIAL ADAPTATIONS TO ANTHROPOGENIC-MEDIATED ENVIRONMENTAL PRESSURES

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Abstract - Macroalgae or seaweeds are bioengineer organisms, base of trophic networks in coastal rocky shores from inter-tropical to polar latitudes; thus, their prevalence can determine the diversity of ecosystems with high economic and ecological importance. Macroalgae are constantly exposed to naturally driven environmental fluctuations, although anthropogenic activities have set important biological challenges for their future survival and distribution. I this presentation, several basic and applied investigations will be presented regarding macroalgae responses to environmental stress, mostly associated with pollution and Climate Change. In this context, macroalgae exposed to metal excess and hyperosmotic stress in the laboratory and the field have demonstrated several defense mechanisms, related to metal cellular exclusion/extrusion, antioxidant metabolism and the synthesis of cysteine-rich compounds; most of these induced by signaling pathways and subsequent transcriptomic regulation. Moreover, Antarctic macroalgae species exposed to increases in sea surface temperatures have revealed that potential adaptations to future conditions of Climate Change will be mostly based on enhanced antioxidant defenses and syntheses of heat shock proteins. In addition to basic mechanistic research, we have improved the use of stress signals in macroalgae for the development of biomarkers as biotechnology tools for environmental diagnosis and monitoring; these, to follow the extent of anthropogenic impacts on coastal ecosystems.

Index Terms - Macroalgae; pollution; climate change; ecotoxicology

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