

Environmental OMICs: high-throughput strategies to decipher mechanism of response to stressors

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The latest environmental high-throughput technologies OMICS such as transcriptomics, proteomics, metagenomics are providing novel insights into the prediction of the effects of pollution and the study of mechanism of response to environmental stressors, both in laboratory exposures with model organisms and with animals exposed in the field. The environmental OMICs strategies are focused on analyzing the dynamic variations that occur in the genes, proteins or metabolites of single organisms exposed to environmental stressors or changes in the communities or populations. The main goal of ecotoxicology is to predict the effects of environmental stressors to prevent or remediate any detrimental effect in individuals and populations. This field has traditionally focused on bioassays, e.g. measuring effects at the organism level, such as survival and reproduction or community studies. In the last years, functional OMICs data has provided novel insights into the processes that drive cellular metabolism and the detailed interactions between them. By measuring toxicological effects at the gene, cellular and population level, a better insight can be generated into the mode of action of environmental stressors, and provides the possibility to prevent effects in a more targeted way. Therefore it becomes urgent to present methods to measure, anticipate, and even predict such effects, as well as to understand their consequences for ecosystems, including species distribution and long term persistence. This session intends to focus on research on various OMICSs strategies that integrates the effects of stressors across all levels of biological organization from the molecular to whole communities and ecosystems, and highlighting the relationships between changes at gene, protein or metabolite and higher levels of organization. The interest is also focused on the development of metagenomics and metaproteomics strategies to understand or predict the effects of exposure to pollutants and environmental stressors. The analysis of datasets including multi-level omics from non-model species, sampled from field populations is important challenge including in this session.

SESSION TYPE: Platform and Poster