

Biomarker development for marine environmental risk assessment

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Marine environment is continuously being affected by a large number anthropogenic contaminants and stressors that threaten its stability. In particular, contamination in coastal regions becomes serious due to various types of land runoffs and sewage. Currently, various methods for biotoxicity assessment have been developed, for example, the analyses of specific enzyme activity variations involved in cellular defense, the use of protein chip technology to follow proteomic profiles changes in organisms exposed to environmental toxicants, and the direct determination of DNA strand breaks or levels of toxicant metabolites in the polluted marine organisms. However, investigations on transcriptional changes in representative genes, which are known to respond to abiotic stressors, are rare in marine organisms. The integrated use of biomarkers and knowledge of the effects of oxidative stress, heavy metal toxicity, reproductive toxicity, and genotoxicity in living marine organisms may help us to better interpret the impact of pollutants on the marine coastal environment. The molecular tools introduced in this study can provide information on the health of species and thus contribute to our knowledge of marine ecosystem and provide information on the pollution status of coastal regions.