

Assessment of the toxicity of sediments from the Mediterranean basin: an –omic approach



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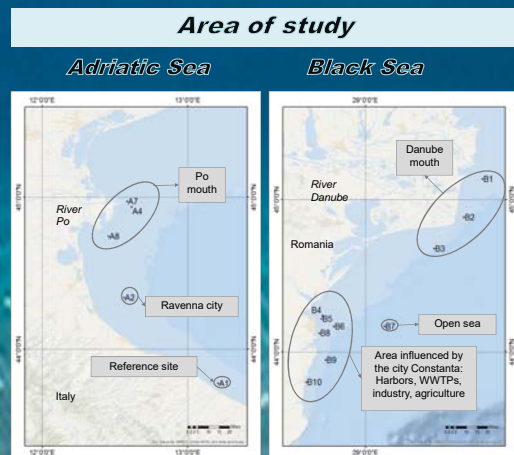


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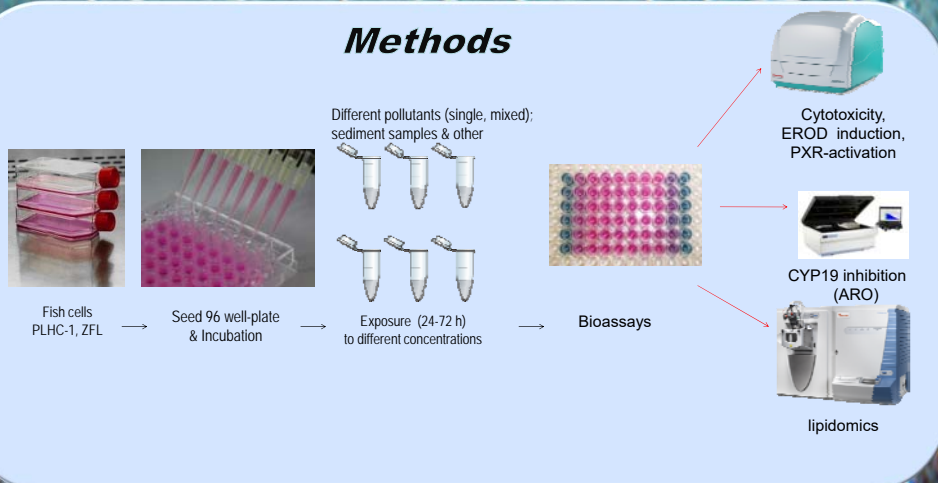
Objectives

To develop a combination of in-vitro methods for an accurate characterization of the toxic potential of complex environmental samples

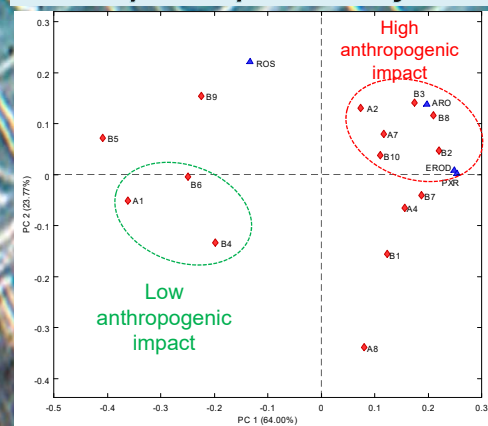
- **PXR activation.** Some xenobiotics can activate/antagonize with the receptor. PXR activators are expected to affect lipid metabolism and induce hepatic lipid accumulation.
- **Cod liver slice technology** with a transcriptomic approach to detect the response of multigene systems to pollutants.
- **Lipidomics analysis** by UPLC/HRMS to characterize alterations of cellular lipids in cod liver slices & zebra fish cells exposed to pollutants.



Methods



Principal Component Analysis



Results

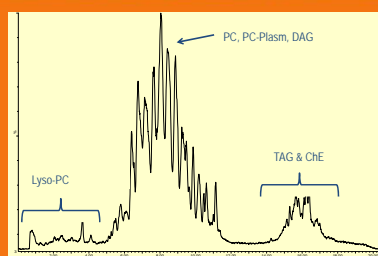
- The selected bioassays allowed to identify those sediments that could pose a risk to aquatic organisms and that require further action in order to improve their environmental quality. They are useful as a first screening tool for the assessment of the quality of benthic ecosystems.
- Sediments from harbours, river mouths and coastal cities showed the highest response in the bioassays (high anthropogenic impact). Sediments from Danube mouth (higher flow and boat traffic) were more impacted than those from Po area. They require further action in order to improve their environmental quality.
- This approach allows a significant reduction of the costs and the number of bioindicator organisms to be used in environmental monitoring studies. of the selected bioassays.

E. Pérez-Albaladejo, J. Rizzi, D. Fernandes, R. Lille-Langøy, O.A. Karlsen, A. Goksøyr, A. Oros, F. Spagnoli, C. Porte. Assessment of the environmental quality of coastal sediments by using a combination of in vitro bioassays. *Marine Pollution Bulletin* (in press)

Future collaboration

Characterization of the lipidome of cod liver slices and zebra fish liver (ZFL) cells under exposure to different stressors, financed through projects:

- * iCod 2.0: Integrative environmental genomics of Atlantic cod (*Gadus morhua*); a holistic approach to characterize the biological effects of emerging contaminants and mixed exposure regimes – Project No.: 244564/E40
- * dCod 1.0: Decoding systems toxicology of cod (*Gadus morhua*) – environmental genomics for ecosystem quality monitoring and risk assessment (Forskerprosjekt - BIOTEK2021)



UPLC-LTO-Orbitrap-MS chromatogram. ESI (+) of an extract of lipids from ZFL cells

