NEW METHODOLOGY TO DETECT PRIMARY CELLULAR RESPONSES AND EARLY SIGNS OF ENVIRONMENTAL PATHOLOGY AND CLASTOGENICITY IN MARINE BENTHIC COMMUNITIES

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Detection of primary and secondary responses of living organisms to various environmental actions is the major problem of modern ecological toxicology. Since all normal and pathological responses start at molecular and subcellular level, they may be discovered by examination of molecular organization and properties of the main chemical cellular components (DNA, RNA, enzymes, carriers, second messengers, etc.) as well as supramolecular structures (nuclear chromatin, membranes, respiratory chain, chromosomes, etc.).

Compounds and structures that are involved in chemosensory responses or cellular defense, naturally enough, are of great value for this purpose. Over the past decade, studies that use molecular parameters as indicators of environmental health have been strongly intensified. However, many important general molecular defense mechanisms (i.e. carrier-mediated transport systems for xenobiotics' elimination, diffusion barriers, binding proteins and structures, some enzymes, activation or amplification of some gene locuses) are rarely used for this purpose. Unfortunately, the study of such indicators by using conventional methods is very labour-intensive and expensive.

Therefore, we developed a set of vital quantitative microscopic biophysical, cytophysiological, cytochemical and morphological methods as well as special devices that can expose both primary responses of eukaryotic cells to any environmental actions and early signs of environmental pathology and genotoxicity. Especially fluorescent contact microscopy allows to examine such integral cellular characteristics for populations and communities. Our studies were focused on examination of dominant species of benthic foraminifera and bivalve mollusks, that dwell along the Israeli Mediterranean shore. However, we also studied some other marine protists (i.e. gastropods and benthic fishes).

These studies discovered numerous defense mechanisms against xenobiotics in all investigated species and showed the importance of these mechanisms for survival and interactions between species and ecosystem stability. Members of benthic communities can affect the chemical composition and properties of their microenvironment and modify toxicity of some pollutants. The detected mechanisms, involved in adaptation and defense, can be used for early exposure of environmental stress (BRESLER and FISHELSON, 1994; BRESLER and YANKO, in press).

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THE MCS PRISMED CRUISE, PART 1 : THE OUTER AND CENTRAL MEDITERRANEAN RIDGE

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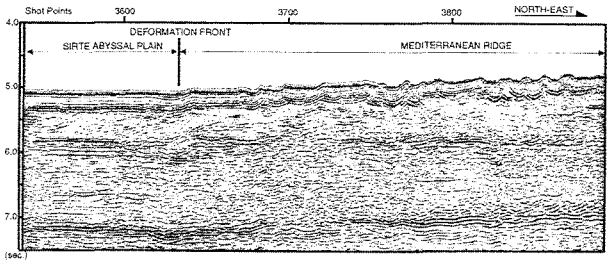
In eastern Mediterranean, the Mediteranean Ridge (M.R.) consists of a huge pile of accreted sediments in response to the convergent motions between the African, European and Aegean plates respectively. The multichannel seismic reflection Primed cruise (March 1993) has provided new images of internal deformations occurring within this specific pre-collisional sedimentary wedge.

1 - Between the Sirte abyssal plain and the western Hellenic trench area, the occurence of southward-directed thrusts, northward-directed back-up thrusts as well as the presence of a well evidenced decollement level clearly substantiate the accretionnary mechanism at the origin of the MR. Messinian evaporitic layers likely play the major part within the MR recent deformation history.

2 - South of Crete and facing the undeformed continental margin and Lybian promontory, the outer MR is chiefly expressed by an highly deformed wedge of sediments bounded by steep and rather irregular slope. Messinian sediments are also clearly involved in the tectonic accretion processes. In this area the central M.R., characterized by mud diapiric activities, is bounded, both northward and southward, by major thrust zones.

3 - In its eastern sector, facing the thickly sedimented Herodotus abyssal plain, the MR deformation outer front is characterized by steep reverse faulting and associated wide anticlines and accompanying piggy-back basins. There, the central M.R. exhibits large wave-lenght folding and is bounded, on its northward side, by major back thrust features.

The dominant factors that seem to control the present day M.R. structural styles relate to the nature and thickness of, both, the sedimentary cover and crust of the subducting forelands. The maximum shortening characterizes the central M.R. domain clearly directly involved in collisional processes against the Lybian promontory.



The M. R. outer deformation front facing the Sirte abyssal plain