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

Vladimir BRESLER[1], Valentina YANKO[1] and Lev FISHELSON[2]

[1]Institute for Nature Conservation Research, [2] Department of Zoology, G.S. Wise Faculty of Life Sciences, Tel Aviv University, Ramat Aviv 69978, Israel

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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**REFERENCES**

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