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ABSTRACT

Heavy metals induced morphometrical alterations in different bioindicators granulocytes.

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In the last two decades, biomarker approach has been incorporated worldwide into several pollution monitoring programmes for the ecotoxicological assessment of marine terrestrial and fresh water ecosystems. The interest in the use of biomarkers in environmental risk assessment (ERA) has been steadily. Among the various types of biomarkers studied, morphometric alteration of bioindicators immune systems cells is particularly interesting from a toxicological perspective for the development of novel cellular biomarkers of pollutant exposure. In this work a comparison of three different bioindicators (mussel, earthworm and snail) are executed on granulocytes cells exposed to heavy metals. Morphometric alterations were determined by image analysis on Diff-Quick® stained cells. A considerable enlargement of organisms granulocytes was observed in heavy metals (Cd, Hg) exposed with respect to control group. The enlargement was quantified by measuring the area of 2D digitalised granulocyte images. Moreover, in heavy metals exposed animals the increase in the granulocyte dimension was accompanied by cell rounding with loss of pseudopods. This effect could be ascribed to toxic chemical-induced reduction of the microfilament and microspine number. Due to the important immunological role of granulocytes, the observed heavy metal induced adverse effects on these cells may increase the susceptibility of animals to diseases and reduce their survival ability. Therefore, early subtle alterations in some of the components of the immune system can be used as early indicators of altered organism health with possible applications as sensitive, simple, and quick biomarker for monitoring and soil risk assessment.

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