EVALUATION OF DAMAGES CAUSED BY OCCUPATIONAL AND ENVIRONMENTAL EXPOSURE TO XENOBIOTICS AND THEIR INTERRELATION WITH BIOMARKERS

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Introduction: The increase of disease caused or aggravated by occupational and/or environmental exposure, resulting from chronic contact to xenobiotics and pollutants of internal and external environment, has been increasing concern. It is known that prolonged contact to some xenobiotics, such as organic solvents, heavy metals and environmental pollutants may cause increased reactive species, especially reactive oxygen species, as well as depletion of antioxidants, which contributes to generation of a process known as oxidative stress. The main oxidative damages are represented by modification of proteins and/or enzymes, causing loss of its biological function, by lipid peroxidation, which increases the loss of integrity of cell membranes, and DNA damage, being that in all situations there are tissue damage. The biological monitoring or biomonitoring is a fundamental tool in occupational health risk assessment and occupational health practice, since it deals with the assessment of individual human exposure, effects and susceptibility to occupational risk factors.
Objective: Study the possible interrelation of the levels of occupational and environmental exposure to organic solvents, heavy metals and benzopyrene through biomarkers of exposure and effect with oxidative stress, micro-nutrition and exposure time.
Materials and Methods: This study will be performed with workers exposed to occupational and environmental xenobiotics (n=200) and with a control group composed by nonexposed subjects (n=50). The biological monitoring will be accomplished through the quantification of urinary biomarkers of exposure for toluene, xylene, styrene, benzene and benzopyrene, as well as blood biomarkers of exposure to lead and cadmium. Oxidative stress will be assessed through the quantification of biomarkers of lipid and protein damage (malondialdehyde and protein carbonyl, respectively), by the levels of reduced glutathione, vitamins and carotenoids, as well as, by the antioxidant enzyme activities. The nephrotoxic effects caused by organic solvents and heavy metals will be studied through the urinary biomarkers of effect, N-acetyl-β-D-glucosaminidase, β 2-microglobulin and retinol-binding protein. The genotoxic effects will be evaluated through the comet and micronuclei assay, and more specifically to benzopyrene, the genotoxic effects will be detected through DNA adducts.

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