

SILICA EXPOSURE BIOMARKERS: A NEW APPROACH IN THE DISEASE DETECTION

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Silicosis is a widespread pneumoconiosis attributed to inhalation of crystalline silica (SiO₂), one of the most abundant minerals on Earth. Silicosis still is a worldwide problem despite efforts has been made for many decades to its prevention. In most cases, the silicosis occurs due to intense occupational exposure to silica particles. Its occurrence outside of the workplace is restricted to specific climatic and geological situations, so silicosis is considered an occupational disease. This disease is characterized by an inflammatory process with intense production of ROS, and subsequent lung tissue fibrosis. Once initiated, it is irreversible and progressive. Moreover, diagnosis is almost late and the disease has no cure or treatment. Because of these characteristics, thereis great interest and practical consequence the evaluation of physiological responses as prospective biomarkers that could indicate initial exposure to crystalline silica or early silicosis development. So, this study aimed to establish biomarkers as cytotoxicity, the oxidative stress level and genotoxicity evaluation, that could be correlate with the beginning of silica exposure and development of the silicosis. The assays were carried out *in vitro* using cultures from A549 cell line (human pulmonary adenocarcinoma). Cultures of A549 were incubated with a silica solution (300µg/mL), during 30min, 1 and 2 hours. Another one sample was maintained in nutrient media as control of the experiment. The results shown an increase in the cytotoxicity and in the oxidative stress level according to the incubation time with silica. Besides, it was also observed an increase in the DNA damage after 2 h of silica exposure. Together, the obtained data indicate that the silica exposure is able to promote cytotoxicity and probably genotoxicity effects which seem to be mediated by the action of reactive oxygen species.

Key-words: genotoxicity, cytotoxicity, oxidative stress

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