GENOTOXIC EFFECTS IN CHILDREN EXPOSED TO POLYNUCLEAR AROMATIC HYDROCARBONS (PAH’s) IN THE ATMOSPHERE OF TABASCO, MÉXICO.

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Abstract: The Tabasco State is located at southern Mexico. Petroleum extraction, transportation, and storage have been its main economic activity for several decades. As in other countries, these activities have severely impacted the environment. Petroleum hydrocarbons, as Polycyclic Aromatics (PAH’s) can be found in the soil, water, and sediments of this region. These compounds have a well-known genotoxic activity and because of their chemical characteristics, they might reach humans and animals through different pathways. In spite of its toxicological importance, there are very few studies initiated to chart the presence of PAH’s in the atmosphere of this zone, and this is the first one to relate them with health effects in a sensitive sector of the population. In order to measure DNA damage associated to PAH’s exposure, single cell gel electrophoresis assay (Comet Assay) was used on peripheral blood lymphocytes of three children groups between six and 15 years old, with different exposures to atmospheric hydrocarbon. Air samples were collected, extracted, and analyzed by gas chromatography according to EPA TO-13-A method. Results showed the presence of all the 16 EPA primary PAH’s in the atmosphere of oil extraction zones. Total PAH’s levels were higher in gas component of the sample when compared to the particulate component. The analyzed juvenile groups showed moderate to high levels of genotoxic damages (Tail Length: 14,2 - 42,14 µm and Tail/Head ratio: 0,97-2,83) when compared to the control group (12,25µm and 0,63 respectively). The group with greater cellular damage was located at the higher oil extraction activity site. Our study proved that health risk is greater in locations in the petroleum extraction activity region (p<0.05), as compared to non-petroleum extraction regions. This could be related to a chronic exposure of the population to PAH’s in the atmosphere of those sites.

Keywords: genotoxicity, polycyclic hydrocarbons, single cell gel electrophoresis, comet assay, PAHs.