OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Biomarkers & Clinical Research
July 15-17, 2013 Courtyard by Marriott Philadelphia Downtown, USA

Genotoxic biomonitoring in children exposed to heavy metals in north of Guerrero state, Mexico

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A genotoxic biomonitoring study was conducted with children from the Dolores suburban community, which is located beside the Fraile mine tailings and near the abandoned Fraile mine, 17 km from Taxco of Alarcon City, North of Guerrero State, Mexico. In this community, people occasionally use leachates as an alternative source of domestic water during the dry (winter/spring) seasons. Furthermore, edible plants like tomatoes, peppers, and corn for human consumption are grown in the nearby soil, and animals also consume plants that grow near the Fraile tailings, thus, increasing the health risk in the trophic chain. Many studies in the area have indicated that water, soil, and plants contain heavy metals such as Pb, As, Cd and other elements like Fe, Mn, Cu (e.g., Talavera-Mendoza et al., 2005; Romero et al., 2008). High heavy metals levels in human urine, vegetal tissues, soil, and water clearly indicate high exposure of the general population (Moreno et al., 2010). However, the developing child is the most sensitive population group for adverse effects. We evaluated the genotoxic effects in 101 children (51 girls and 50 boys) exposed to heavy metals, with a range of 6 to 12 years of exposure. For this, we used the alkaline comet assay in buccal exfoliated cells using three genotoxic parameters: comet frequency (FC), tail moment (TM), and tail length (TL). The oxidative DNA damage was determined via the detection of 8-hydroxyl-2'-deoxyguanosine (8-OHdG) urinary levels by enzyme-linked immunosorbent assay (ELISA). We also evaluated a comparison group consisting of 101 non-exposed children (54 girls and 47 boys) in the same age range, from the city of Chilpancingo, Guerrero, Mexico. Significant differences between the exposed group and the comparison group were observed in the three genotoxic parameters and in the urinary 8-OHdG levels. Analysis of t student revealed that age and sex did not have a significant effect on genetic damage. However, there was a positive correlation between time of exposure to heavy metals and DNA damage ($P<0.05$). These results might be due to the exposure of children to a heavy metal mix. This study provides with valuable data to estimate children's health risks associated with heavy metals exposure.

Biography

Maria Elena Calderón Segura received her Bachelor in Cellular Biology, Master of Science (Cellular Biology) and Ph.D. in Science (Biology) from the Universidad Nacional Autónoma de México in 1993 and 1998, respectively. She conducted postdoctoral research at The University of Calgary, in the Department of Biochemistry and Molecular Biology, Faculty of Medicine and Biology Professor in Faculty of Science 1989. Dr. Calderón research laboratory (Environmental toxicology), Environmental Genotoxicology Group), Center of Atmospheric Science, analyses genotoxic and inmunotoxic effects *in vitro* and *in vivo* of the environmental pollution and induced apoptosis. She has graduated to 18 students.

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