Absence of Malignancy in Oral Epithelial Cells from Individuals Occupationally Exposed to Organic Solvents Working in the Shoe Industry

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Abstract : The monitoring of populations occupationally exposed to organic solvents has been an important issue for several shoe factories for years since the International Agency for Research on Cancer (IARC) has advised on the potential carcinogenic risk of chemicals related to occupations. In order to detect if exposition to organic solvents used in some Mexican shoe factories contributes to oral carcinogenesis, we performed monitoring in three factories. Occupational exposure was determined by using monitors 3M. Organic solvents were assessed by gas chromatography. Then, we recruited 30 shoe workers (30.2 ± 8.4 years) and 10 unexposed subjects (43.3 ± 11.2 years) for the micronuclei (MN) test and immunodetection of some cancer biomarkers (ki-67, p16, caspase-3) in scraped oral epithelial cells. Monitored solvents detected were acetone, benzene, hexane, methyl ethyl ketone, and toluene in acceptable levels according to Official Mexican Norm. We found by MN test higher incidence of nuclear abnormalities (karyorrhexis, pycnosis, karyolysis, condensed chromatin, and macronuclei) in the exposed group than the non-exposed group. On the other hand, we found, a negative expression for Ki-67 and p16 in exfoliated epithelial cells from exposed and non-exposed to organic solvents subjects. Only caspase-3 shown positive patter of expression in 9/30 (30%) exposed subjects, and we detected high karyolysis incidence in caspase-3 subjects (p = 0.021). The absence of expression of proliferation markers p16 and ki-67 and presence of apoptosis marker caspase-3 are indicating the absence of malignancy in oral epithelial cells and low risk for oral cancer. It is a fact that the MN test is a very effective method to detect nuclear abnormalities in exfoliated buccal cells from subjects that have been exposed to organic solvents in the shoe industry. However, in order to improve this tool and predict cancer risk is it is mandatory to implement complementary tests as other biomarkers that can help to detect malignancy in individuals occupationally exposed.

Keywords : biomarkers, oral cancer, organic solvents, shoe industries
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