

EFFECTS OF EXPOSURE TO FORMALDEHYDE AND TOBACCO SMOKING ON GENOTOXICITY BIOMARKERS



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INTRODUCTION

Formaldehyde (FA) is a colourless gas widely used in the industry and hospitals as an aqueous solution, formalin. It is extremely reactive and induces various genotoxic effects in proliferating cultured mammalian cells. Tobacco smoke has been epidemiologically associated to a higher risk of development of cancer, especially in the oral cavity, larynx and lungs, as these are places of direct contact with many carcinogenic tobacco's compounds. Approximately 90% of human cancers originate from epithelial cells. Therefore, it could be argued that oral epithelial cells represent a preferred target site for early genotoxic events induced by carcinogenic agents entering the body via inhalation and ingestion.

The cytokinesis-blocked micronucleus assay (CBMN) in human lymphocytes is one of the most commonly used methods for measuring DNA damage, namely the detection of micronucleus, nucleoplasmic bridges, and nuclear buds.

AIM OF THE STUDY

Investigate a possible synergistic effect of smoking and exposure to formaldehyde upon micronucleus in lymphocytes and mucosa buccal cells, nucleoplasmic bridges and nuclear buds

METHODOLOGY

The study was carried out in Portugal in a sample of 56 workers occupationally exposed to FA in pathology anatomy laboratories and in 85 non-exposed subjects. Both groups were asked about their smoking habits among other items. The evaluation of genotoxic effects was conducted by applying CBMN in peripheral blood lymphocytes and the MN test in exfoliated cells from buccal mucosa. The data were analyzed statistically using Logistic Regression.

RESULTS

Colocar tabelas do exposto/não exposto/fuma/não fuma

The results concerning the micronucleus in buccal mucosa cells indicate that the FA exposure ($p=0,009$) and tobacco smoke ($p=0,036$) act together to increase this biomarker. The analysis of the interaction between the two variables demonstrate that tobacco smoke and exposure to formaldehyde act together in a synergistic way just for **nuclear buds and in micronucleus in buccal cells** ($p=0,036$ and $p=0,038$, respectively).

CONCLUSIONS

It is important to take into account that FA exerts its genotoxic action upon exposed human cells (both local and distant) whereas tobacco smoke acts mainly in situ upon buccal cells.

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