

LIFESTYLE FACTORS INFLUENCE IN THE FREQUENCY IN BUCCAL MICRONUCLEUS



C LADEIRA 1,2 MC GOMES 3 M BRITO 1

- 1 -Higher School of Health Technologies of Lisbon, Polytechnic Institute of Lisbon
2 - CIESP National School of Public Health, New University of Lisbon;
3 - Faculty of Sciences, University of Lisbon



INTRODUCTION

Genomic damage is probably the most important fundamental cause of development and degenerative disease. It is also well established that genomic damage is produced by environmental exposure to genotoxins, medical procedures (e.g. radiation and chemicals), micronutrient deficiency (e.g. folate), lifestyle factors (e.g. alcohol, smoking, drugs and stress), and genetic factors such as inherited defects in DNA metabolism and/or repair. Tobacco smoke has been 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. Alcohol is definitely a recognized agent that influence cells in a genotoxic form, been cited as a strong agent with potential in the development of carcinogenic lesions. Epidemiological evidence points to a strong synergistic effect between cigarette smoking and alcohol consumption in the induction of cancers in the oral cavity. 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 MN assay in buccal cells was also used to study cancerous and precancerous lesions and to monitor the effects of a number of chemopreventive agents.

AIM OF THE STUDY

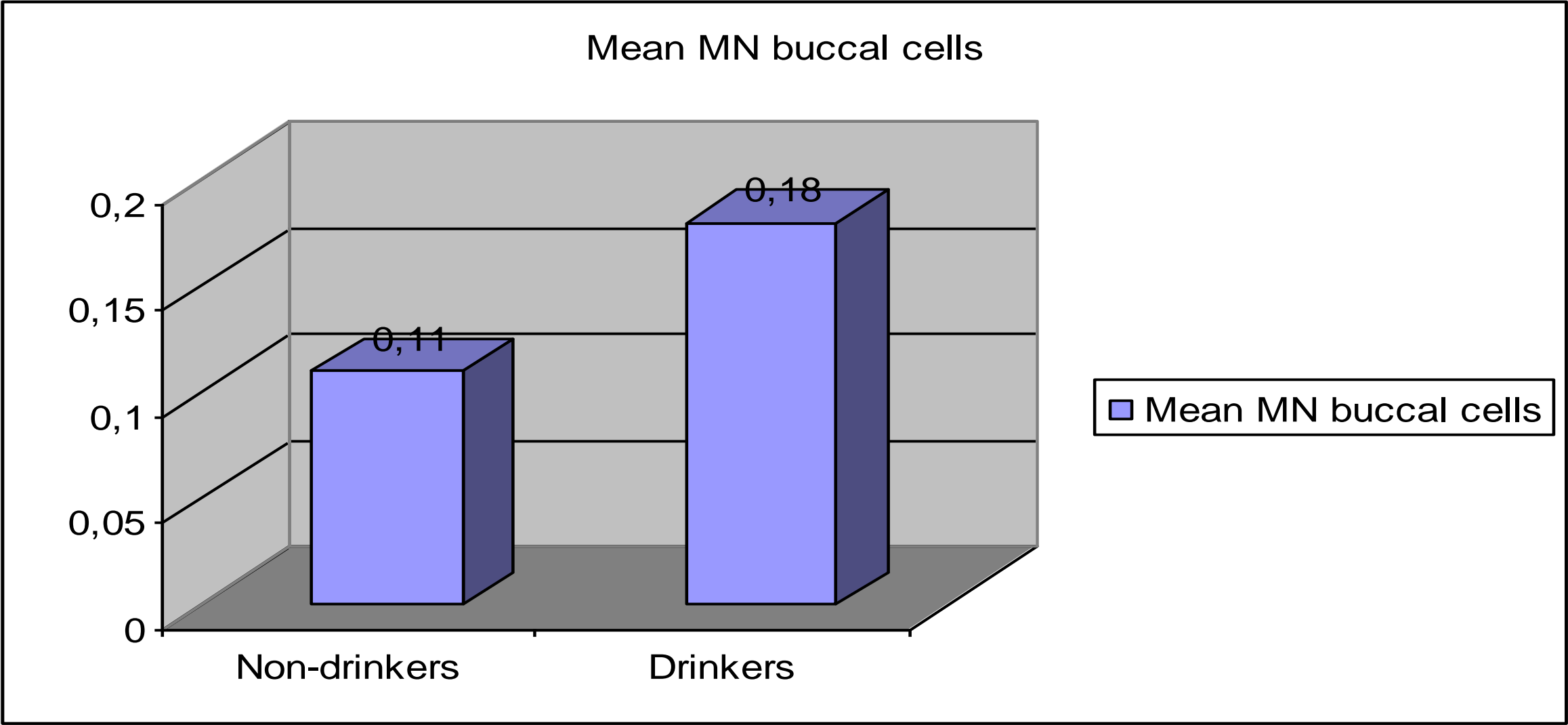
Determine the influence of lifestyle factors such as alcohol consumption and smoking habits by measuring the frequency of micronucleus in buccal mucosa cells

METHODOLOGY

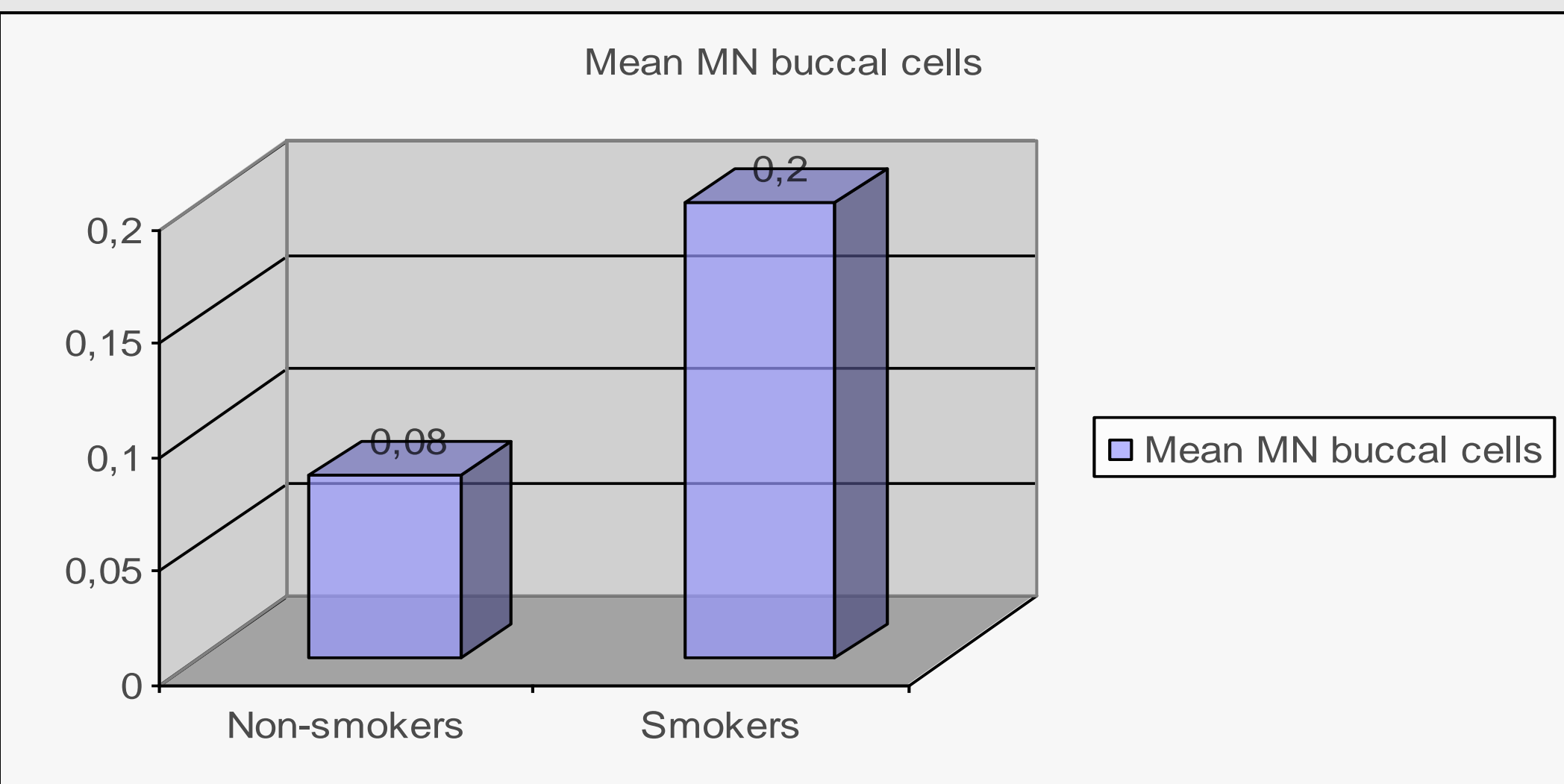
The study was carried out in Portugal in a sample 85 subjects without any occupational exposure and was asked about their smoking and drinking habits. The evaluation of genotoxic effects was conducted by applying MN test in exfoliated cells from buccal mucosa. Buccal cells were removed by endobrush and stained with Feulgen technique without counterstain.

RESULTS

ALCOHOL CONSUMPTION



SMOKING HABITS



Subjects in study presented higher means of MN in drinkers (0.18 ± 0.068) and in smokers (0.2 ± 0.074) in comparison with non-drinkers (0.11 ± 0.105) and non-smokers (0.08 ± 0.08) without statistical significance (Mann-Whitney test, $p > 0.05$). The analysis of the interaction between the alcohol consumption and smoking habits showed statistical signification ($p = 0.043$) with a stronger effect from tobacco smoke than alcohol consumption.

CONCLUSIONS

Epidemiological evidence points to a strong effect between cigarette smoking and alcohol consumption in the induction of cancers in the oral cavity. The interaction between alcohol consumption and smoking habits for the mean frequency of MN in buccal cells showed that subjects that do not smoke and do not drink tend to have lower frequencies than those who drink and smoke and in this interaction tobacco has a preponderant effect than alcohol.

REFERENCES

[1] - W. Au, Usefulness of biomarkers in population studies: From exposure to susceptibility and to prediction of cancer, Int. J. Environ.-Health 210 (2007) 239-246. [2] - P. Thomas, K. Umegaki, M. Fenech, Nucleoplasmic bridges are a sensitive measure of chromosome rearrangement in the cytokinesis-block micronucleus assay, Mutagenesis 18 (2003) 187 - 194 [3] - K. Utani, J. Kawamoto, N. Shimizu, Micronuclei bearing acentric extrachromosomal chromatin are transcriptionally competent and may perturb the cancer cell phenotype, Mol. Cancer Res. 5 (2007) 695 - 704. [4] - R. El-Zein, M. Schabath, C. Etzel, M. Lopez, J. Franklin, M. Spitz, Cytokinesis-Blocked Micronucleus Assay as a Novel Biomarker for Lung Cancer Risk, Cancer Res. 66:12 (2006) 6449 - 6456. [5] - R. El-Zein, M. Fenech, M. Lopez, M. Spitz, C. Etzel, Cytokinesis-Blocked Cytome Assay Biomarkers Identify Lung Cancer Cases amongst Smokers, Cancer Epidemiol. Biomarkers Prev 17 (2008) 1111 - 1119. [6] - J. M. Battershill, K. Bumett, S. Bull, Factors affecting the incidence of genotoxicity biomarkers in peripheral blood lymphocytes: impact on design of biomonitoring studies, Mutagenesis 6 (2008) 423-237. [7] - S. Bonassi, M. Neri, C. Lando, M. Ceppi, Y. Lin, W. Chang, N. Holland, M. Kirsch-Volders, E. Zeiger, M. Fenech, Effect of smoking habit on the frequency of micronuclei in human lymphocytes: results from the Human MicroNucleus project, Mutat. Res. 543 (2003) 155-166. [8] - A. Ramirez, P. Saldanha, Micronucleus investigation of alcoholic patients with oral carcinoma, Genetics and Molecular Research 1 (2002), 246 - 260. [9] - H. Stich, M. Rosin, Quantitating the synergistic effect of smoking and alcohol consumption with the micronucleus test on human buccal mucosa cells, Int. J. Cancer 31 (1983), 305 - 308.