

Exposure to second-hand smoke in occupational settings: biomarkers of DNA damage and susceptibility

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Portuguese legislation prohibits smoking in most indoor public spaces. However, some restaurants/bars remain, in which smoking is still allowed, representing a potential risk for employees, particularly for chronic respiratory diseases and cancer development.

The objectives of this project were to compare the indoor air quality of some restaurants with and without smoking permission and, in their workers, to search for associations between respiratory dysfunctions and biomarkers of exposure, biological effects (DNA and proteome alterations) and susceptibility. Herein, we present data on DNA damage and genetic susceptibility in 37 workers occupationally exposed to environmental tobacco smoke (ETS) and from 44 non-exposed workers. DNA damage was assessed by the comet assay in blood leukocytes and by micronucleus (MN) analysis in buccal cells. DNA repair capacity was evaluated by a challenge of blood cells with EMS (32 μ M), preceding the comet assay. Polymorphisms in metabolism (*GSTP1*, *GSTM* and *GSTT*) and DNA-repair genes (*hOGG1*, *XRCC1*, *XRCC3*, and *NBS1*) were analysed by PCR/RFLP.

No significant differences in the MN frequency and in level of DNA damage was observed between ETS and non-ETS groups. However, challenge with EMS resulted in a significantly lower level of DNA breaks in ETS-exposed as compared to non-exposed workers ($P < 0.0001$). Concerning polymorphisms analysis, *GSTP1* variant allele carriers showed a decreased frequency of MN in buccal cells, which was not influenced by ETS exposure. No association related to the other polymorphisms was detected.

In conclusion, the present data show that blood cells from ETS-exposed workers display a lower mutagenic response to EMS challenge, suggestive of an adaptive response elicited by the previous exposure to low levels of ETS.

Supported by Fundação Calouste Gulbenkian, ACSS and FCT/Pluriannual funding.