

EXPAH Effects of polycyclic aromatic hydrocarbons (PAHs) in environmental pollution on exogenous and endogenous DNA damage – oxidative damage

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Introduction

The project has been evaluating the hypothesis that PAHs are the major source of genotoxic activities of organic mixtures associated with air pollution. The relationship between exogenous DNA damage caused by exposures to these genotoxic compounds and oxidative DNA damage has been evaluated in different human populations exposed to PAHs. The populations monitored were traffic police from Prague (Czech Republic), Kosice (Slovak Republic) and Sofia (Bulgaria), which also included bus drivers. As measures of oxidative DNA damage we have determined 8-oxo-2'-deoxyguanosine (8-oxodG) by liquid chromatography-tandem mass spectrometry (LC/MS/MS) and malondialdehyde-2'-deoxyguanosine (M₁dG) by the immunoslot blot assay.

8-oxo-2'-deoxyguanosine

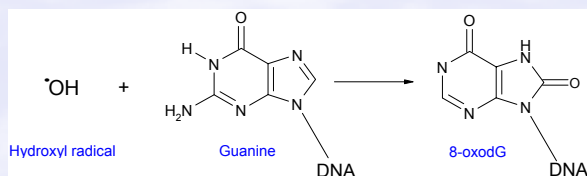


Figure 1 Formation of 8-oxodG by the reaction of hydroxyl radicals with guanine in DNA

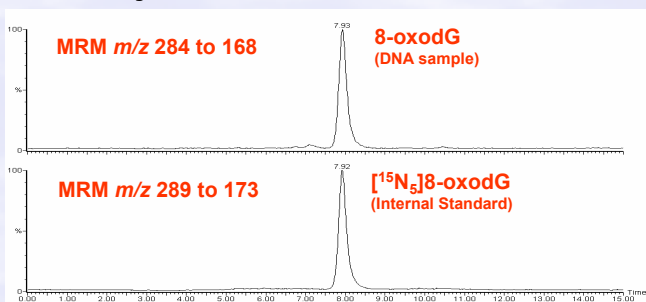


Figure 2 Determination of 8-oxodG in blood DNA samples using LC/MS/MS

Malondialdehyde-2'-deoxyguanosine

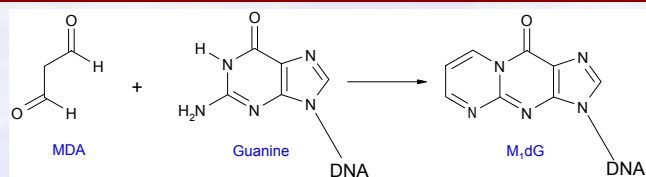


Figure 3 Formation of M₁dG by the reaction of malondialdehyde (MDA) with guanine in DNA

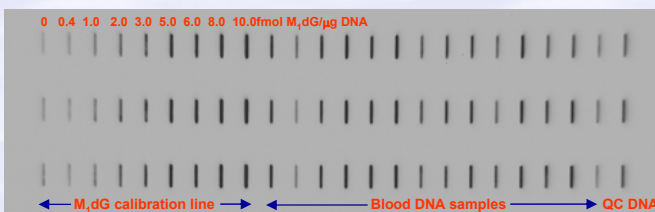


Figure 4 Determination of M₁dG using the immunoslot blot assay

Results

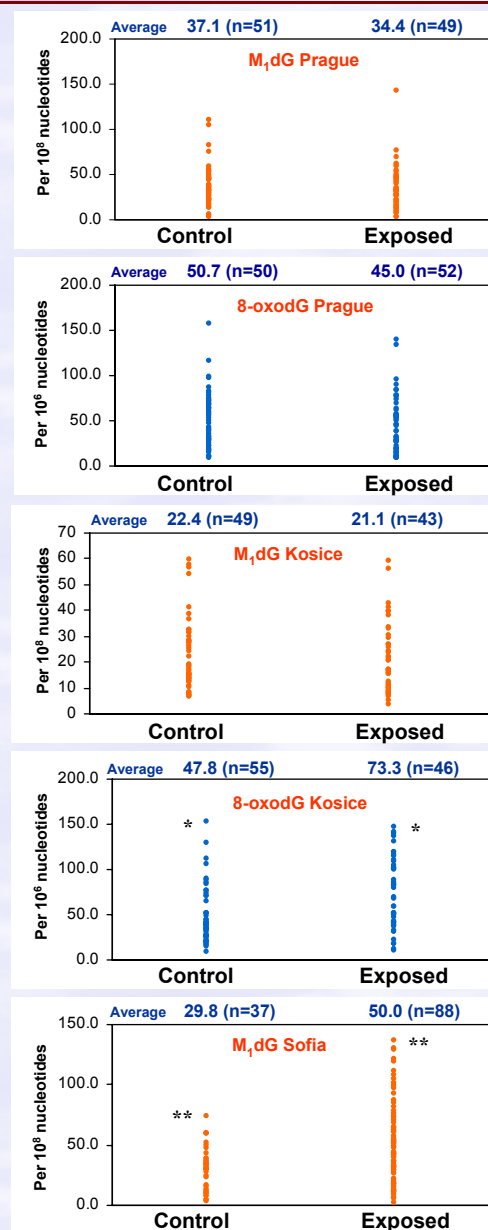


Figure 5 The levels of M₁dG and 8-oxodG in control and exposed groups from Prague, Kosice and Sofia (Statistical analysis was performed using the Student *t*-test).

Conclusions

- There was no significant difference in the level of M₁dG between control and exposed groups from Prague and Kosice and the level of 8-oxodG between control and exposed groups from Prague.
- There was a significant difference (**p* = 0.0003) in the level of 8-oxodG between control and exposed groups from Kosice. There was also a significant difference (***p* = 0.0005) in the level of M₁dG between control and exposed groups from Sofia.
- The average level of M₁dG was lower in control and exposed groups from Kosice compared to those from Prague and Sofia (*p* < 0.0001).

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