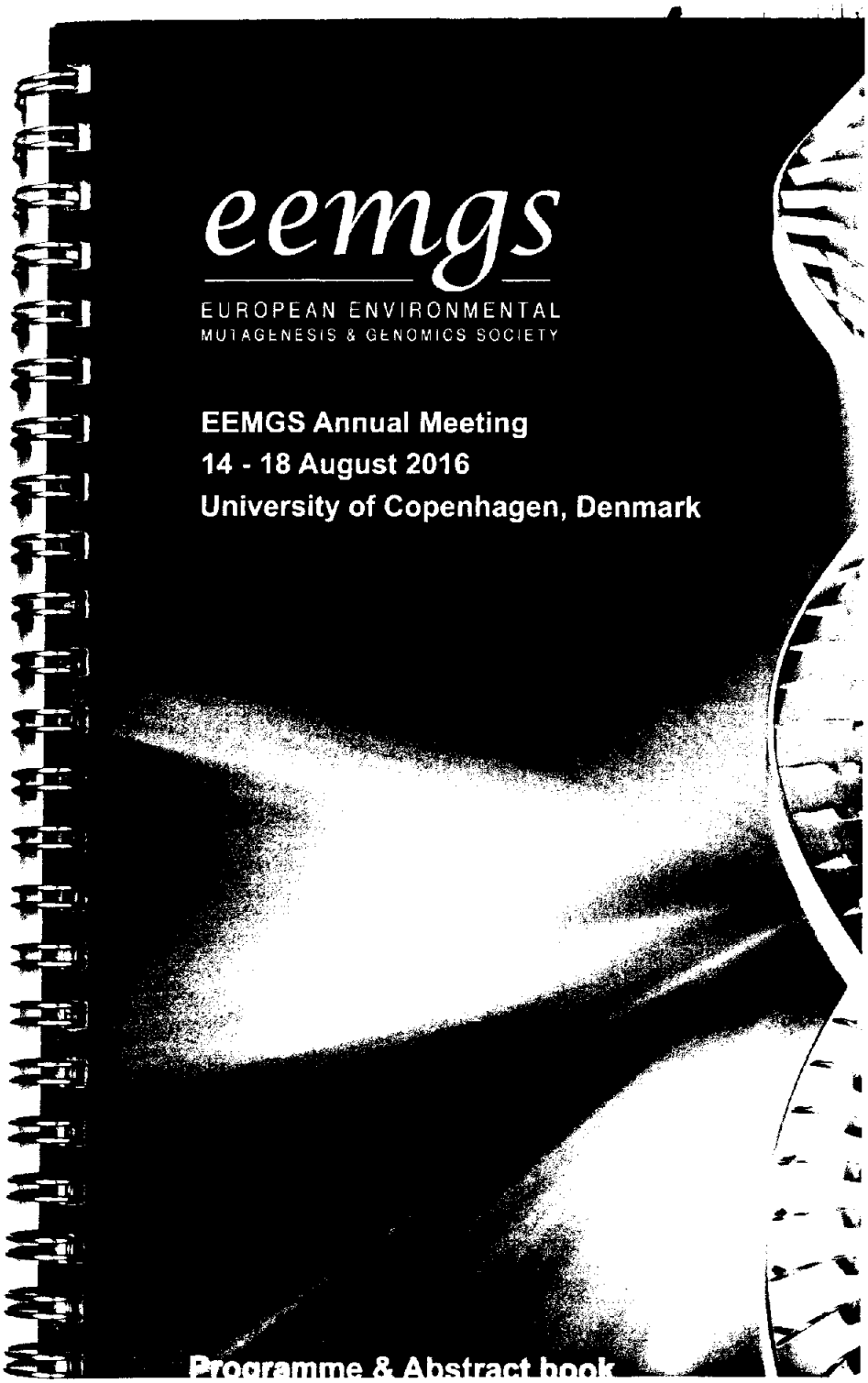
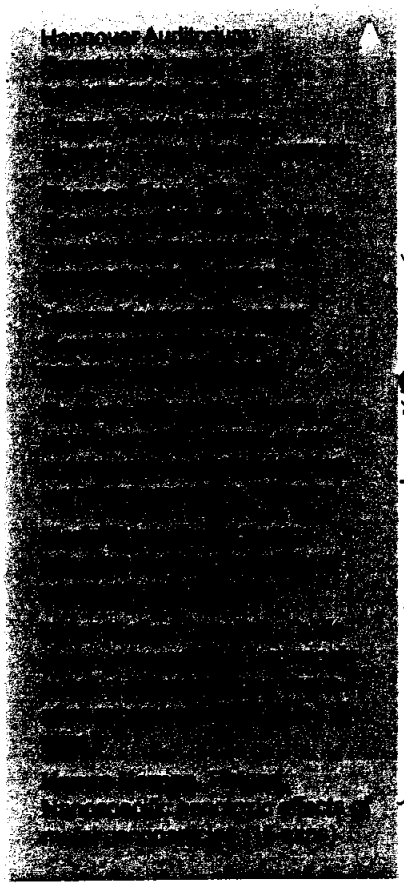

eemgs
EUROPEAN ENVIRONMENTAL
MUTAGENESIS & GENOMICS SOCIETY
EEMGS Annual Meeting
14 - 18 August 2016
University of Copenhagen, Denmark
Programme & Abstract book

07:30 - 19:00 Registration open

09:00 - 10:00 Hannover Auditorium
Welcome & Keynote address
Chair: Lisbeth E. Knudsen, Denmark
Theo de Kok, The Netherlands: Population toxicoge

10:00 - 12:30 Parallel Sessions



Haderup Auditorium: Environment
Effects linked to air pollutants
Chairs: Nina Ostenfeldt & Jesper I
Denmark

Jan Topinka, Czeck Republic: M
of organic compounds bound to e
(30 mins)

Robert Barouki, France:
Polyaromatic hydrocarbons toxicit
genic mechanisms mediated by th
Receptor system (30 mins)

Johan Øvrevik, Norway: Non-ger
combustion exhaust particles with
for carcinogenesis (30 mins)

Elisabeth Ceretti, Italy: Micronucl
exfoliated buccal cells of children
levels of air pollutants. The MAPE
(15 mins)

Kei-ichi Sugiyama, Japan: Estab
sal detection system for epimutag
ing human DNA methyltransferase

Yiyi Xu, Sweden: Assessment of
and telomere dysfunction in road
ers (15 mins)

Lilianne Abrahamsson-Zetterbe
you cook rice influences the arsen

Environmental health - Effects linked to air pollution

Micronucleus cytome assay in exfoliated buccal cells of children exposed to different level of air pollutants. The MAPEC_LIFE project

Elisabetta Ceretti[1], Gaia Claudia Viviana Viola[1], Donatella Feretti[1], Sara Levorato[2], Marco Verani[3], Francesco Bagordo[4], Sara Bonetta[5], Ilaria Zerbini[1], Tania Salvatori[2], Beatrice Casini[6], Antonella De Donno[4], Cristina Pignata[5], Samuele Vannini[2], Silvia Bonizzoni[7], Umberto Gelatti[1]

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Introduction: Air pollution is a global problem. In 2013, air pollution and particulate matter were classified as carcinogenic to human by the IARC. Children are a high-risk group in terms of the health effects of air pollution, and early exposure during childhood can increase the risk of developing chronic diseases in adulthood. The MAPEC_LIFE (Monitoring Air Pollution Effects on Children for supporting public health policy) is a project founded by EU Life+ Programme (LIFE12 ENV/IT/000614) which intends to evaluate the associations between air pollution and early biological effects in children and to propose a model for estimating the global risk of early biological effects due to air pollutants and other factors in children. This abstract aims to describe the association between micronuclei frequency in buccal mucosa cells of children and winter levels of air pollutants and other factors, as further outdoor and indoor exposures, socio-demographic aspects, lifestyle and diet.

Methods: During the winter campaign, lasted from November 2014 to March 2015, 1318 6–8-year-old children from 5 Italian towns (Brescia, Perugia, Pisa, Lecce and Torino), characterized by different air pollution levels, were enrolled in the project. Exfoliated buccal mucosa cells of these children were collected by a simple scraping of the cheeks and processed to perform the micronucleus cytome assay. The slides were stained using the Feulgen method. For microscope analysis the slides were examined under microscope at 100×magnification. Micronucleus frequency, biomarker of genome damage, was evaluated only in normal differentiated cells. Data on air quality during the study period were obtained from the Regional Agencies for Environmental Protection. Details of children diseases, socio-economic status, exposures to other pollutants and life-style, diet in particular, were collected using a questionnaire created ad hoc and administered to children's parents.

Results: Micronucleus frequency was evaluated only for 1089 children, because some samples were not suitable for test performing. Boys and girls were equally represented in the whole sample (50.6% male and 49.4% female) and the mean age was 7.4 ± 0.9 years. As about air quality, the levels of main pollutants during the sampling period were, as expected, higher in the North of Italy, with a PM10 mean values of 50 and 45 µg/m3 in Torino and Brescia, respectively, than in the other towns (29 µg/m3 for Pisa and Perugia, 27 µg/m3 Lecce). In contrast, micronucleus frequency in buccal cells of children was higher in Brescia (0.06/100 cells) than in any other towns (from 0.03 to 0.05/100 cells).

Conclusions: The results suggested that, in addition to air pollution exposure, some other factors, related to lifestyle or further exposures, may influence micronucleus frequency and cellular response to air pollutants. A tentative model to calculate the global absolute risk of having early biological effects for air pollution and other variables together will be proposed and may be useful to support policy-making and community interventions to protect children from possible health effects of air pollutants.

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Mutagenic/genotoxic effect of pm0.5 collected in five Italian towns in two seasons: results of the mapec study

Sara Bonetta[1], Silvia Bonetta[1], Elisabetta Ceretti[2], Gaia Claudia Viviana Viola[2], Ilaria Zerbini[2], Valeria Romanazzi[1], Sara Levorato[3], Tania Salvatori[3], Samuele Vannini[3], Tiziana Schilirò[1], Annalaura Carducci[4], Cristina Pignata[1], Tiziana Grassi[5], Giorgio Gilli[1], Silvia Bonizzoni[6], Alberto Bonetti[7], Elisabetta Carraro[1], Umberto Gelatti[2], - MAPEC_LIFE Study Group

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PM can be considered as the atmospheric pollutant that mostly affects human health. The International Agency for Research on Cancer (IARC) has recently classified air pollution and fine PM as carcinogenic to human (1 Group) (Loomis et al. 2013). Different studies showed that PM induces several kinds of adverse cellular effects as cytotoxicity, mutagenicity, DNA damage and stimulation of cytokine production (Moller et al., 2015). The aim of the MAPEC study is to evaluate the association between air pollution (in particular PM) and early biomarkers in oral mucosa of children recruited from first grade schools of 5 Italian towns characterized by different PM levels. This work aims to evaluate children exposure to urban air pollution investigating the mutagenic and genotoxic effect of PM0.5 samples. PM0.5 samples (n=36) were collected (72h) in the school area on the same days of biological samplings in two different seasons (winter 2014-2015 and spring 2015) using a high-volume air sampler. PM0.5 organic extracts were chemically analyzed (PAH, Nitro-PAH) and tested on A549 by the comet assay and micronucleus test and on Salmonella strains (TA100, TA98, TA98NR and YG1021) by Ames test. Results showed that PM0.5 represents a very variable PM10 percentage (range 19.6-63% and 9.9-55.9% in winter and spring respectively). In winter PM10 concentration was generally lower than 50µg/m3 (EU daily limit) with highest values in the towns of the Padana plain. Generally lower values were observed in spring. In winter all PM0.5 extracts showed at least one mutagenic dose with the TA98 strain (net revertant/m3 range 0.3-1.5) suggesting the presence of indirect mutagens (+S9), while a lower effect was observed with the TA100 strain. The results obtained with the TA98NR and YG1021 strains in both seasons showed the presence of nitroaromatic compounds as confirmed by the chemical analysis. Lower effects and also a lower nitroaromatic compounds level were generally observed in spring. No genotoxic or oxidative effect of PM0.5 extracts was observed using the comet assay (with/without Fpg enzyme) and micronucleus test in both seasons except for some sporadic samples. The low biological effect observed in winter could be related to the low level of air pollution observed in this winter sampling associated to a high atmospheric instability. The high variability of PM0.5 observed in this study should be more investigated. Moreover for a greater understanding of the relationship between PM size, composition and biological effects, the results obtained in this study suggest to investigate also the biological effect of the other PM fractions and in particular of the PM0.5-1 fraction. References: Loomis D., Grosse Y., Lauby-Secretan B., Ghissassi F., Bouvard V., Benbrahim-Tallaa, l., Guha N., Baan R., Mattock H., Straif K., Iarc (2013). The carcinogenicity of outdoor air pollution. Lancet Oncol. 14, 1262-1263. Moller P., Hemmingsen J.G., Jensen D.M., Danielsen P.H., Karottki D.G., Jantzen K., et al. (2015). Applications of the comet assay in particle toxicology: air pollution and engineered nanomaterials exposure. Mutagenesis 30, 67-83.