

Carcinogenesis

- [Oxford Journals](#)
- [Life Sciences](#)
- [Carcinogenesis](#)
- [Carcinogenesis Advance Access](#)
- [10.1093/carcin/bgn065](#)

Carcinogenesis Advance Access published online on March 10, 2008

Carcinogenesis, doi:10.1093/carcin/bgn065

© The Author 2008. Published by Oxford University Press. All rights reserved. For Permissions, please email: journals.permissions@oxfordjournals.org

Genomic Analysis Suggests Higher Susceptibility Of Children To Air Pollution

Danitsja M. van Leeuwen¹, Marie Pedersen², Peter J.M. Hendriksen^{1,3}, André Boorsma^{1,3}, Marcel H.M. van Herwijnen¹, Ralph W.H. Gottschalk¹, Micheline Kirsch-Volders⁴, Lisbeth E. Knudsen², Radim J. Šrám⁵, Edyta Bajak^{6,7}, Joost H.M. van Delft¹ and Jos C.S. Kleinjans¹

¹ Department of Health Risk Analysis and Toxicology, Maastricht University, Maastricht, the Netherlands

² Institute of Public Health, Department of Environmental and Occupational Health, University of Copenhagen, Copenhagen, Denmark

³ Business Unit BioSciences, TNO Quality of Life, Physiological Genomics, Zeist, the Netherlands

⁴ Faculty of Science, Laboratory of Cell Genetics, Vrije Universiteit Brussel, Brussel, Belgium

⁵ Institute of Experimental Medicine AS CR and Health Institute of Central Bohemia, Prague, Czech Republic

⁶ Department of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden

⁷ Department of Pharmacology and Toxicology, KU Medical Center, Kansas City, USA

Corresponding author: Danitsja M. van Leeuwen, Department of Health Risk Analysis and Toxicology, Maastricht University, PO Box 616, 6200 MD Maastricht, the Netherlands, phone: +31-43-3882127, fax: +31-43-3884146, email: d.vanleeuwen@GRAT.unimaas.nl

Differences in biological responses to exposure to hazardous airborne substances between children and adults have been reported, suggesting children to be more susceptible. Aim of this study was to improve our understanding of differences in susceptibility in cancer risk associated with air pollution by comparing genome-wide gene expression profiles in peripheral blood of children and their parents. Gene expression analysis was performed in blood from children and parents living in two different regions in the Czech Republic, with different levels of air pollution. Data were analyzed by two different approaches; one method first selected significantly differentially expressed genes and

This Article

- ▶ [Advance Access manuscript \(PDF\)](#)
- ▶ [Alert me when this article is cited](#)
- ▶ [Alert me if a correction is posted](#)

Services

- ▶ [Email this article to a friend](#)
- ▶ [Similar articles in this journal](#)
- ▶ [Similar articles in PubMed](#)
- ▶ [Alert me to new issues of the journal](#)
- ▶ [Add to My Personal Archive](#)
- ▶ [Download to citation manager](#)
- ▶ [Request Permissions](#)

Google Scholar

- ▶ [Articles by van Leeuwen, D. M.](#)
- ▶ [Articles by Kleinjans, J. C.S.](#)

PubMed

- ▶ [PubMed Citation](#)
- ▶ [Articles by van Leeuwen, D. M.](#)
- ▶ [Articles by Kleinjans, J. C.S.](#)

analyzed these gene lists for overrepresented biological processes, while the other applied the T-profiler tool to directly perform pathway analyses on the total gene set without pre-selection of significantly modulated gene expressions. In addition, gene expressions in both children and adults were investigated for associations with micronuclei frequencies. Both analysis approaches returned considerably more genes or gene groups and pathways that significantly differed between children from both regions than between parents. Very little overlap was observed between children and adults. The two most important biological processes or molecular functions significantly modulated in children, but not in adults, are nucleosome and immune response related. Our study suggests differences between children and adults in relation to air pollution exposure at the transcriptome level. The findings underline the necessity of implementing environmental health policy measures specifically for protecting children's health.

Received June 28, 2007; revised February 27, 2008; accepted March 2, 2008.

Disclaimer:

Please note that abstracts for content published before 1996 were created through digital scanning and may therefore not exactly replicate the text of the original print issues. All efforts have been made to ensure accuracy, but the Publisher will not be held responsible for any remaining inaccuracies. If you require any further clarification, please contact our [Customer Services Department](#).

Online ISSN 1460-2180 - Print ISSN 0143-3334

[Copyright](#) © 2008 Oxford University Press

Oxford Journals *Oxford University Press*

- [Site Map](#)
- [Privacy Policy](#)
- [Frequently Asked Questions](#)

Other Oxford University Press sites: