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Pollution in Living and Working Environments and Health

Abstracts

Conference proceedings

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Conclusions

The results demonstrate a coincident TOTM metabolism pathway under in vitro and in vivo conditions. In fact, TOTM was resorbed and metabolized in the human body, as TOTM and its postulated metabolites were detectable in blood and urine, now enabling the establishment of a biomonitoring procedure for TOTM for the first time.

References

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Biological monitoring of workers exposed to carcinogens using the buccal or nasal micronucleus approach

Nancy B Hopf (1), Claudia Bolognesi (2), Brigitta Danuser (1), Pascal Wild (1,3)

Corresponding author:
Nancy B Hopf
(Nancy.Hopf@hospvd.ch)

(1) IST, Institute for Work and Health, Universities of Lausanne and Geneva, Lausanne-Epalinges, Switzerland. Nancy.Hopf@hospvd.ch; Brigitta.Danuser@hospvd.ch
(2) Ospedale Policlinico San Martino, National Cancer Institute, San Martino-IST Environmental Carcinogenesis Unit, IRCCS Genoa, Italy claudia.bolognesi@hsanmartino.it
(3) INRS, French Institute for Research and Safety, Vandoeuvre, France, pascal.wild@inrs.fr

Background

A biomarker-based approach using micronuclei (MNs) (extranuclear DNA-containing bodies) frequencies in nasal and buccal cells has been proposed to monitor workers exposed to aero-digestive carcinogens to reduce the occurrence of occupational cancer. To assess this non-invasive MN approach, we sought to understand: [1] What are the MN frequency ratios of occupationally exposed over non-exposed populations across studies published in the scientific literature for both buccal and nasal cells; and [2] Which type of exposures give the highest mean MN ratio across studies published in the scientific literature.

Methods

A systematic literature review was performed with the following search terms: “micronucleus” and/or “micronuclei” in combination with “occupational”, “buccal” and/or “nasal”. The search was last conducted on October 3rd 2017. The MN frequency ratios for buccal and nasal cells were calculated for each study.

Results

DiMoPEx made this project collaboration possible by bringing together toxicologists, medical doctors, statisticians, and exposure assessors. This multidiscipline approach is needed especially when using biomarkers in population surveys. Our search identified 519 articles that we examined closely. From the 102 studies selected, 128 exposures were identified, which allowed us to compute risk ratios (RRs). These exposures were classified in 12 different exposure groups, which represented either carcinogen type or occupation. The highest summary RRs were obtained for inorganic dusts (4 studies in coal mines or quarries) and formaldehyde (5 exposure groups of hospital lab workers). The large variability across studies could be related to the currently unknown genotoxic agents' mechanisms to alter DNA structure and affect nuclear integrity. Automating the MN cell counting process would also reduce the variability introduced by different laboratories.

Conclusions

The MN frequency biomonitoring approach is a promising tool, especially among populations exposed to multiple carcinogens simultaneously. This MN frequency tool would be even more valuable if the MN frequencies in buccal and nasal cell methods were standardized and shown to be predictive of cancer risk.

Development of biomarkers for identification of frailty in the elderly

Vanessa Valdiglesias (1), María Sánchez-Flores (1), Diego Marcos-Pérez (1), Ana Maseda (2), José C. Millán-Calenti (2), Laura Lorenzo-López (2), Eduardo Pásaro (1), Blanca Laffon (1)

Corresponding author:
Blanca Laffon
(blaffon@udc.es)

(1) Universidade da Coruña, DICOMOSA Group, Department of Psychology, Area of Psychobiology, A Coruña, Spain
(2) Universidade da Coruña, Gerontology Research Group, Instituto de Investigación Biomédica de A Coruña (INIBIC), Complexo Hospitalario Universitario de A Coruña (CHUAC), SERGAS, A Coruña, Spain

Background

Currently, progressive population aging has brought about an increase in age-dependent pathologies and, therefore, a higher possibility of developing disability and/or dependence, along with corresponding socioeconomic and healthcare implications. "Frailty" is a multidimensional syndrome with mental and physical connotations involving an increase in vulnerability and a risk factor for poor health outcomes. Epidemiologic research has led to the identification of a number of risk factors for frailty, including pathologic events closely related to exposure to environmental factors.
Frailty assessment is currently based on phenotypic features, namely unintentional weight loss, exhaustion, low physical activity, slow walking speed and low grip strength.[1] However, a better knowledge of the biological basis of frailty would lead to the development of biological markers which would eventually allow a more objective and earlier identification of frail individuals.