2017 SCIENTIFIC MEETING

ITALIAN ASSOCIATION FOR THE STUDY OF TRACE ELEMENTS IN LIVING ORGANISMS - AISETOV

REGGIO NELL'EMILIA (ITALY), OCTOBER 20, 2017

Prampolini square and the Dome of Reggio Emilia

TRACE ELEMENTS IN HUMAN AND ANIMAL HEALTH: FOCUS ON NEUROLOGICAL DISEASE

ABSTRACT BOOK

Organized by:

AISETOV and UNIVERSITY OF MODENA AND REGGIO EMILIA

P-08. Comparative methods to estimate cadmium intake in an Italian population

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Background and aim: Cadmium (Cd) is a human toxic and carcinogens which represents one of the prioritized substances included in the current European Human Biomonitoring (HMBI4EU). Chronic Cd exposure is generally lead to kidney and bone disease, but recent findings have point out such association between Cd exposure with cardio-cerebrovascular risk factors, including glucose intolerance, diabetes and atherosclerosis. Diet is the main source of exposure in non-smoking and non-occupationally exposed subjects. The Tolerable Weekly Intake (TWI) for this heavy metal of 2.5 µg/kg body weight (bw) has been recently set by the European Food and Safety Authority (EFSA) in order to guarantee a high protection to general population. In this study we are going to compare two different methods to estimate weekly intake of Cd.

Methods: In a random sample of the adult general population of Modena, Northern Italy, we collected information about personal characteristics, life styles and dietary habits using the EPIC semi-quantitative self-administered food frequency questionnaire. Then we measured Cd levels in a fasting serum sample using ICP-MS.
Two methods assessing cadmium intake were used implemented, the first through dietary questionnaire and the second from levels of biomarker. To do that, we considered the ratio between total and circulating Cd, the percentage of absorption of Cd ingested with foods and the contribution of tobacco smoke.

Results: We recruited 51 subjects, with mean (standard deviation, SD) dietary Cd intake estimated with the questionnaire of 14.1 (SD 6.5) µg/day and serum Cd level of 0.045 (SD 0.024) µg/L. The weekly intake (WI) of Cd was of 1.38 µg/kg/bw (SD 0.41, range 0.26-3.18) and 0.78 µg/kg/bw (SD 0.68, range 0.27-2.47) based on dietary questionnaire and biomarker data, respectively.

Conclusions: In this Italian population, we found higher WI of Cd intake using the dietary questionnaire than using serum sample. This difference highlight the importance of the evaluation of the relationship between dietary intake and levels of biomarker when assessing the individual exposure to this metal. Dietary assessment methods based on food frequency questionnaires might therefore overestimate Cd intake, or alternatively a higher ratio between dietary and serum Cd has to be considered compared to what predicted by literature data. Finally, based on dietary assessment method, as Cd intake may exceed the reference TWI provided by EFSA, possible health concerns could be highlighted for some subjects of the study population.

Printed in Reggio Emilia (Italy)

ISBN 978-88-943098-0-5

20 October 2017