PLASMA AND EXHALED BREATH CONDENSATE NITRITE/NITRATE LEVEL IN RELATION TO ENVIRONMENTAL EXPOSURES IN ADULTS. THE EGEA STUDY

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Background and Aims: Nitrites and nitrates, stable end products of NO synthesis, are generated from endogenous and environmental sources but the association with environmental exposures has been poorly investigated in epidemiology. The aim was to evaluate the associations between tobacco smoke, diet, air pollution, occupational and domestic exposures to chlorine agents with total nitrite/nitrate level (NO_2^-/NO_3^-) in plasma and exhaled breath condensate (EBC) among adults from the French Epidemiological case-control and family-based study on Genetics and Environment of Asthma (EGEA).

Methods: Total NO_2^-/NO_3^- level was measured using the Griess Reaction in 956 subjects (48.4% men, 43 yrs, 45% asthmatics) both in plasma and EBC. Smoking and dietary habits were assessed using standardized questionnaires, exposure to ambient air pollutants was estimated by using geostatistical models and occupational exposure was assessed with a job exposure matrix. All the estimates were obtained through generalized estimating equations (GEE) for linear regression models to account for family dependence.

Results: Geometric means (Interquartile Range) of NO_2^-/NO_3^- level were 35.6 µM (25.6, 51.1) in plasma and 1.9 µmol/mg (0.9, 3.9) in EBC. Total plasma NO_2^-/NO_3^- level was positively associated with age in women (b=0.12, p<0.001) and with a high consumption of leafy vegetables (b=0.05, p=0.02), while it was negatively associated with smoking status (b=-0.07, p=0.004). In EBC, negative associations were found with smoking (b=-0.11, p=0.01) and with ambient annual ozone concentrations (b=-0.16, p<.001). Multivariate analyses confirmed these results.

Conclusions: Besides smoking, the effect of environmental exposures was not similar in plasma and EBC. Environmental exposures probably activate different mechanisms at the systemic and lung level, and they should be taken into account in future epidemiological studies.