Exposure to environmental tobacco smoke in childhood and GMT1 polymorphism are associated to lung function in adults

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Risikofaktorer for Astma hos Voksne

Exposure to environmental tobacco smoke (ETS) during fetal and early post natal life is one of the most hazardous environmental exposures to a child. Their defence mechanisms are still envolving and they inhale a larger volume of air per body weight than adults. The developing lung is highly susceptible to ETS, and prenatal maternal smoking and ETS exposure to children induces decreased lung growth. The defence of the developing lung against ETS and other reactive oxygen species will play a central role in lung growth. We have analysed associations between gene polymorphisms of enzymes in the oxidative defence and lung function in 1164 subjects aged 20-44 years enrolled in a cross-sectional Danish case-base study of asthma (ECRHS protocol).

Methods: Polymorphisms in Glutathione Peroxidase (GPx1: pro198leu, nucleotide substitution c-t), Mangenese Superoxide dismutase (SOD: ala9val, nucleotide substitution c-t)

Table 1. Characteristics of study population n=1.191

Mean age, years (SD)	34.7 (7.1)
Female, n (%)	609 (56)
BMI, mean (SD)	25.7 (4.9)
Doctor diagnosed asthma, n (%)	331 (30)
Current asthma symptoms, n (%)	311 (29)
Steroid, n (%)	130 (12)
BHR, n (%)	239 (25)
Atopy, n (%)	415 (39)
Blood eosinophilia (>0.4 * 10^9 /l blood), n (%)	111 (10)
Smoking	
Never, n (%)	578 (53)
Former, n (%)	185 (17)
Current, n (%)	326/ (30)

Table 2. Linear regression analysis adjusted for polymorphisms, age, gender, and smoking. Dependent variable FEV_1/FVC. N=1116

Variable	Coefficient	p value
ETS one parent	-1.17	0.035
ETS two parents	-1.57	0.004
GSTM1 one copy	0.93	0.023
Age	-0.21	0.0001
Gender (male)	-1.49	0.0001
Current smoking	-2.2	0.0001
Constant		

and three Glutathione-S-Transferases (GSTT1: null, one or two copies, GSTM1: null, one or two copies and GSTP1: ile105val, nucleotide substitution a-g) were analysed
Information of the participants exposure to ETS in childhood was based on questionnaire. FEV1 and FVC were measured according to ATS and ERS recommendation.

Results: All polymorphisms were in Hardy Weinberg equilibrium. The mean FEV1/ FVC ratio (95% CI) was 79.7 (79.3 – 80.1). Restricting the analysis to non-smokers (n = 605) and smokers (N = 324) the effect of GSTM1 one copy polymorphism was only seen in non-smokers, while the effect of ETS in childhood was only seen in smokers.

Conclusion: Polymorphism to GSTM1 and ETS in childhood are associated to the mean FEV1/ FVC ratio in adults. Current smoking modulates the associations.

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