

Poster presentation

Gene-environment interaction and personality/behaviour

Lars Oreland*¹, Jarmila Hallman¹, Leif Lindström², Kent Nilsson², Rickard Sjöberg², Ingrid Olerud¹, Hanna Wargelius¹, Camilla Göktürk¹, John Öhrvik² and Jerzy Leppert²

Address: ¹Dept Neurosci, Uppsala University, Sweden and ²Centr Clin Res., Västerås, Sweden

* Corresponding author

from International Society on Brain and Behaviour: 2nd International Congress on Brain and Behaviour Thessaloniki, Greece. 17–20 November 2005

Published: 28 February 2006

Annals of General Psychiatry 2006, **5**(Suppl 1):S77 doi:10.1186/1744-859X-5-S1-S77

Background

Genes and environment interact to form an individual's personality. Abnormal or extreme behaviour could thus be explained by hereditary factors in combination with poor environmental conditions, as shown by Caspi *et al.*, 2002 and replicated e.g. by Foley *et al.*, 2004.

Materials and methods

The MAO-A and 5-HTT genes are two key players in the regulation of serotonin turnover within the brain. Functional variations in the promoter regions allow for division of both these genes into a short and a long allele proven to exert low and high transcriptional activities, respectively (Sabol *et al.*, 1998; Lesch *et al.*, 1996). AP-2 β is a transcription factor of importance for development and maintenance of, among other structures, the monoamine brain-stem nuclei. An AP2 β gene polymorphism has been shown to be associated with personality and monoamine turnover (see Damberg, 2005).

Results

The results were in the same direction for all behavioural phenotypes/disorders, showing that genotype is dependent on psychosocial factors for penetration. The short MAO-A allele interacted with psychosocial factors with regard to risk for criminal activity (60% of the variance) and destructive behaviour when drunk. With regard to 5-HTT genotype, heterozygous subjects reporting Bad family relations showed a 13 fold increased risk for high intoxication frequency. Increased anorectic problems were seen in individuals carrying the short allele, if in interaction with Bad family relations ($p = 0.009$). AP-2 genotype interacted significantly with psychosocial envi-

ronment with regard to risk for criminality, alcohol intake as well as depressive symptoms in girls.

Discussion

In conclusion, genotype and a wide variety of psychosocial factors interact significantly, above what would be expected from simple additive effects, to precipitate a variety of behavioural and psychiatric disorders. Background, methods and some results are to be found in ref 1–4

References

1. Nilsson KW, Sjöberg RL, Damberg M, Leppert J, Öhrvik J, Alm P-O, Lindström L, Oreland L: **Role of MAO-A genotype and psychosocial factors in male adolescent criminal activity.** *Biol Psychiat* 2005 in press.
2. Nilsson KW, Sjöberg RL, Damberg M, Alm PO, Öhrvik J, Leppert J, Lindström L, Oreland L: **The role of the 5-HTT gene and family function in adolescent alcohol consumption.** *Alc Clin Exp Res* 2005, **29**:564-70.
3. Sjöberg RL, Nilsson KW, Nordquist N, Öhrvik J, Leppert J, Lindström L, Oreland L: **Development of depression: sex and the interaction between environment and promoter polymorphism of the serotonin transporter gene.** *Int J Neuropsychopharmacology* 2005 in press.
4. af Klinteberg B, von Knorring L, Oreland L: **On the psychobiology of impulsivity.** *On the psychobiology of personality: essays in honour of Marvin Zuckerman.* Edited by Stelmack RM. Amsterdam: Elsevier 2004:455-478.