

Mapping genes for memory, attention and cognitive abilities

Gosso MF, Posthuma D, De Geus EJC, Van Belzen M\*, Sondervan D\*, Heutink P\*, Boomsma DI

Dept of Biological Psychology, Free University, Amsterdam, \*Dept of Medical Genomics, VU University Medical Center, Amsterdam

Extensive research based on twin, family and adoption data has documented that more than half of the variability in cognitive ability is due to genetics factors.

Genetic influences on cognition are likely to be determined by a complex interaction of multiple subcortical and cortical structures, each influenced by its own set of genes. Studying so-called endophenotypes of cognitive ability, as opposed to study cognitive ability itself, will ease isolation and identification of the effects of each of these subsets of genes.

To identify the genes involved in memory, attention and cognitive abilities in the Dutch population, we have initiated a large-scale study in 2413 subjects. The cohort consists of twin pairs from the Netherlands Twin Registry and additional siblings. Detailed phenotypic cognition data is available for all subjects. The investigated endophenotypes have been selected from three major functional domains of cognition: speed of information processing, attention and working memory capacity. In addition to functional endophenotypes derived from these domains, structural/anatomical endophenotypes were incorporated. DNA samples of a subset of this cohort have already been collected, and candidate gene studies are underway. Candidate gene selection was based on two main approaches: animal studies and endophenotypes approach. Furthermore, a genome-wide screen will be performed on all dizygous twin pairs. This will allow combined linkage and within/between family association studies in order to assess the contribution of these polymorphisms to variation in attention and memory functions.

M Florencia Gosso, Department of Biological Psychology, Free University, Amsterdam, Van der Boechorststraat 7, 1081 BT Amsterdam, t +31-20-4447025, e-mail [gosso@cncr.vu.nl](mailto:gosso@cncr.vu.nl)

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