Mattias De Coninck

Laboratory of Neurochemistry and Behaviour
Institute Born-Bunge
Department of Biomedical Sciences
University of Antwerp

BSc of Applied Psychology, Lessius Hogeschool Antwerpen, 2008
MSc in Psychology, Vrije Universiteit Brussel, 2011
PAVO Laboratory Animal Sciences: Felasa type C, 2011
PhD Student at the University of Antwerp, since 2011

E-mail: mattias.deconinck@uantwerpen.be
Phone: +32 (3) 265 26 78
Fax: +32 (3) 265 26 18

Keywords
Cerebellum – Hemicerebellectomy - Higher order cognitive functions – Cerebellar cognition - Surgical Mouse models - Behavioural phenotyping – Neuroimaging

Science

Traditionally, the regulation and coordination of complex motor functions is ascribed to the cerebellum, while interest in the cerebellar role in cognition and behavioural functions is rising during the last decades. The relevant reciprocal cerebro-cerebellar connections for cognition and behaviour are comprised of a feedforward (cortico-ponto-cerebellar projection) and a feedback limb (cerebello-thalomo-cortical pathway). Affected higher-order functions observed in cerebellar patients are often attributed to the reversed cerebro-cerebellar diaschisis phenomenon: a lesion in the cerebellum might be responsible for a distant functional depression of the supratentorial association areas following a loss of transmission of excitatory impulses through the cerebello-cerebral pathways.

Surgical ablation of a cerebellar hemisphere in rodents offers the unique possibility to investigate the consequences of a pure cerebellar lesion on motor, cognition and behaviour without the interference of extracerebellar damage. Such an hemicerebellectomy results in disturbed motor functions and cognitive deficits, e.g. the inability to learn the location of the platform in a Morris Water Maze task. Most researchers attribute these deficits to the cerebellar lesion, while the possible influence of the cerebello-thalamo-cortical pathway on higher order functions never has been investigated. Longitudinal glucose consumption at the supra- and infratentorial level will be used in this research project as a tool to identify the plasticity processes that take place after a hemicerebellectomy. Secondly, classic behavioural assessment will be conducted at crucial time points in the post-surgical recovery process to correlate the cognitive and motor deficits to the neuroimaging results. Finally the possibility of disturbed frontal functions, such as deficits in cognitive flexibility, due to the reciprocal diaschisis will be investigated in hemicerebellectomized mice.