

Gene expression correlates for individual differences in impulsive decision-making in Wistar rats

Loos M, Van Gaalen MM*, Schoffemeer ANM*, Smit AB, Spijker S

Dept of Molecular and Cellular Neurobiology, VU, Amsterdam, *Medical Pharmacology, VUMC, Center for Neurogenomics and Cognitive Research, Amsterdam

High impulsivity is a prominent symptom in several psychiatric disorders, such as personality disorders, substance abuse disorders and attention deficit and hyperactivity disorder (ADHD). Understanding the neurobiological basis of impulsive behavior will gain insight into these disorders. Different forms of impulsivity can be distinguished in humans. In ADHD and substance abuse disorders, impulsivity is higher in terms of sensitivity to delay of reinforcement. This can be measured in the delayed reward test (DRT), in which subjects have to decide between choosing an immediate small reward or a delayed larger reward. During the test, the delay between choosing and receiving the larger reward increases. In humans and rodents, impulsivity in the DRT is defined as the tendency to prefer the immediate small reward when the delay on the large reward increases. In the present study, male Wistar rats ($n = 24$) were trained in the DRT and impulsivity was measured over multiple sessions (> 5 weeks). Impulsive decision-making is a stable behavioral trait. Comparing high ($n = 6$) versus low impulsive rats ($n = 6$) yielded a significant ($p < 0.001$) difference in impulsive decision-making. After the last DRT-session brains were collected and total RNA of various forebrain areas was isolated (orbitofrontal cortex, insular cortex, medial prefrontal cortex, nucleus accumbens shell, nucleus accumbens core and caudate putamen). Gene expression of monoamine receptor subtypes was measured using real-time quantitative PCR in these brain areas and different correlations with impulsivity were found.

Maarten Loos, Department of Molecular and Cellular Neurobiology, Center for Neurogenomics and Cognitive Research, Vrije Universiteit Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, t 020 4449281, e-mail maartenl@bio.vu.nl

Poster presenter: Neuroscience 2 on Wednesday 4