ADRESS Colloquia

Centre for Addiction Research und Science (AddRess)

Wednesday, 05.06.2019 14:00 s.t. Host: Harald H. Sitte

„Neurochemical and psychopharmacological study of the abuse of 3,4-methylenedioxypyrovalerone (MDPV) in adolescence and subsequent vulnerability to cocaine in adhulthood"

Letitia Duart Castells
University of Barcelona, Spain

Venue: Medical University Vienna, Center for Physiology and Pharmacology,
Institute of Pharmacology, **Lecture hall (Leseraum)**
Waehringerstrasse 13a, 1090 Vienna,
(Harald H. Sitte, Tel.: +43 1 40160 31323, harald.sitte@meduniwien.ac.at)

Abstract:

3,4-Methylenedioxypyrovalerone (MDPV) is one of the most abused synthetic cathinones and one of the main ingredients of 'bath salts'.

It selectively blocks the dopamine transporter, similarly to cocaine, but with higher potency. Moreover, MDPV exerts powerful psychostimulant, rewarding and reinforcing effects related to cocaine at one tenth-doses, pointing to a high abuse liability and thus a presumable upward consumption of this substance in the next years.

Given the close relationship between MDPV and cocaine, in a first study of our group we reported that the exposure of male adolescent Swiss CD-1 mice to MDPV induces long-lasting adaptative changes that lead to a major responsiveness and vulnerability to cocaine in adulthood, as well as the existence of a cross-sensitization between both.

Considering these results, we studied the neuroadaptative changes induced by an MDPV sensitizing regime that could explain such increase of cocaine effects.

Although the expression of several specific neuronal markers was evaluated, the most important finding was that cocaine-behavioral alterations could be associated with an accumulation of ΔFosB, as well as with the long-lasting hyperdopaminergic status induced by the drug.

Although MDPV and cocaine share the same mechanism of action and trigger a similar transcriptional machinery, some differences must be highlighted.

In this sense, the role of the brain-derived neurotrophic factor (BDNF) is of special interest. In a recent study we demonstrate that BDNF-TrkB signaling is only involved in the development of behavioral sensitization to MDPV, but not to cocaine, pointing TrkB agonists such as 7,8-dihydroxyflavone as potential therapeutic drugs for treating MDPV abuse.

To sum up, although both psychostimulants are similar enough to produce cross-sensitization, the neuroplasticity mechanisms that they activate differ notably.

Therefore, increasing knowledge of the MDPV neuropsychopharmacological profile is necessary to better understand its effects, even more considering the newly emerging structural variants of this drug.