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SEROTONIN TRANSPORTER CONCENTRATION IS DECREASED IN CEREBRAL CORTEX BUT NOT IN STRIATUM OF CHRONIC MDMA (ECSTASY) USERS

S.J. Kish[1], T. McCluskey[1], J. Meyer[2], J.J. Warsh[3], D. Wilkins[4], A.A. Wilson[2], S. Houle[2]

[1]Human Neurochemical Pathology Laboratory, [2]PET Centre, [3]Laboratory of Cellular and Molecular Pathophysiology, Centre for Addiction and Mental Health, Toronto, Canada, [4]Center for Human Toxicology, University of Utah, Salt Lake City, USA

Background: Ecstasy (3,4-methylenedioxymethamphetamine, MDMA) is an amphetamine derivative that is used recreationally and is now being tested in clinical trials for treatment of posttraumatic stress disorder. Ecstasy can damage serotonin neurones in brain of experimental animals; however, relevance of these findings to the human is debated.

Aim: To measure by positron emission tomography (PET) levels of binding to the serotonin transporter (SERT), a marker of serotonin neurones, in brain of chronic ecstasy users and in matched controls.

Methods: An estimate of brain SERT levels was obtained, using the PET tracer ^{11}C-DASB, in 50 chronic (confirmed by drug hair testing) ecstasy users (mean age, 26 years; mean duration of drug use, 3.9 years; median drug withdrawal time, 38 days) and 50 (drug-hair negative) control subjects (mean age 26 years).

Results: SERT binding levels in the ecstasy group were significantly decreased by 22 to 46% in frontal, temporal, cingulate, insular and occipital cortices, and by 23% in hippocampus. However, concentrations were distinctly normal in the SERT-rich caudate, putamen, ventral striatum and thalamus.

Conclusion: Our imaging data suggest that cerebral cortical SERT concentration is below normal in some ecstasy users for at least one month after last use of the drug. However, it remains to be established whether low SERT might have preceded drug use, reflects actual loss of brain serotonin neurones, or is causally related to any functional impairment in the ecstasy users. (Supported by US NIH NIDA DA017301).

https://doi.org/10.1016/S0924-9338(09)70667-4 Published online by Cambridge University Press