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Dopaminergic system is differently altered in hippocampus and facial nucleus of trimethyltin rat model

Elena Pompili[1], Fiorenzo Mignini[2], Cinzia Nasuti[2], Marco Artico[3], Filippo Giovannetti[4], Cinzia Fabrizi[1], Giorgio Iannetti[4] and Lorenzo Fumagalli[1]

[1] Department of Anatomy, Histology, Forensic Medicine and Orthopedics, Sapienza University of Rome, Rome, Italy
[2] School of Pharmacy, Experimental Medicine Unit, University of Camerino, Camerino, Italy
[3] Department of Sensory Organs, Sapienza University, Rome, Rome, Italy
[4] Department of Maxillo-Facial Surgery, Sapienza University, Rome, Rome, Italy

Trimethyltin (TMT) is an organotin compound which is considered a useful tool to obtain an animal model of neurodegeneration associated with cognitive impairment (Pompili et al., 2011; Geloso et al., 2011). In the present work, this model was used in order to investigate the animal behaviour in association with the immunohistochemical expression of dopaminergic system (D1- and D2-like receptors and dopamine transporters DAT, VMAT-1 and -2) and cells viability (NEU-N) in the rat hippocampus and facial nucleus regions. TMT-treated group showed impaired spatial reference memory in a Morris water maze task compared to control group whereas the memory consolidation tested 24h after was preserved. In the open field, TMT-treated rats showed a decreased in time spent in rearing episodes reflecting a lower interest to explore a novel environment. In the hippocampal area of TMT-treated group, cell viability was significantly reduced by 45.9% whereas the D1, D2, DAT and VMAT-2 receptor proteins immunoreactivity was significantly decreased by 57.5, 72.8, 64.1, 72.1%. In the facial nucleus, immunoreactivity reduction was observed only for dopamine transporters (average: 60% about) while the NEU-N reduction was 40%. These data were confirmed by real time RT-PCR analysis.

These results suggest a differential involvement of the D1-type and D2-type receptors in the regulation of learning and memory. Besides, alterations on the functional ratio of DAT to VMAT-2 could predispose the cells to injury even at very low doses of TMT. The data obtained in facial nucleus demonstrate a different sensibility to xenobiotic of dopamine receptors and transporters. The TMT model could contribute to elucidate the role of dopaminergic system on two different CNS regions.

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References

Pompili et al. (2011) J Histochem Cytochem 59: 302-311.
Geloso et al. (2011) Neurochem Int.

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