IEH Institute of Environment and Health

Cranfield UNIVERSITY

Manganese Health Research Program: Recent published literature

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Introduction

This report presents the bibliographic details of papers identified as being first published during the period March 2010 to May 2010.

The papers were selected because they address research areas that are considered of direct relevance to the health effects of manganese (Mn); in order to aid review, the papers are presented under the following categories:

Section 1 - EXPOSURE MEASUREMENT AND MODELLING: Papers relating to the measurements or modelling of environmental and occupational Mn exposure, the development of biomarkers of exposure or effect.

Section 2 - HEALTH EFFECTS: Papers on the influence of Mn on health, disease and dysfunction.

Section 3 - MECHANISM: Papers on the physiological, biochemical and cellular mechanisms underlying the toxic effects of Mn.

Section 4 - HUMAN SUSCEPTIBILITY: Papers relating to assessment of the influence of genetic and epigenetic factors on human susceptibility to the effects of Mn.

Section 5 - TREATMENT AND IMAGING: Papers on the development and implementation of new medical approaches to the treatment of excessive Mn exposure.

Section 6 - MISCELLANEOUS: Other papers considered of interest or potential relevance to the study of the health effects of Mn.

The papers presented herein were identified using a series of structured searches of the following on-line databases: Medline, Toxline, Biological Sciences and Scopus. The paper abstracts were reviewed and categorised by an experience Scientist to confirm their relevance before inclusion in this report.

1. EXPOSURE MEASUREMENT AND MODELLING

Abdelouahab, N., Huel, G., Suvorov, A., *et al.* (2010) Monoamine Oxidase Activity in Placenta in Relation to Manganese, Cadmium, Lead, and Mercury at Delivery. *Neurotoxicology and Teratology,* 32(2), 256-261.

Chang, Y., Woo, S., Kim, Y., *et al.* (2010) Pallidal Index Measured with Three-Dimensional T1-Weighted Gradient Echo Sequence is a Good Predictor of Manganese Exposure in Welders. *Journal of Magnetic Resonance Imaging,* 31(4), 1020-1026.

Choi, J.Y., Lee, S.H., Na, H.B., *et al.* (2010) In Vitro Cytotoxicity Screening of Water-Dispersible Metal Oxide Nanoparticles in Human Cell Lines. *Bioprocess and Biosystems Engineering,* 33(1), 21-30.

Fukushima, T., Tan, X., Luo, Y., *et al.* (2009) Relationship between Blood Levels of Heavy Metals and Parkinson's Disease in China. *Neuroepidemiology,* 34(1), 18-24.

Takács, S., Bankó, S. & Papp, A. (2009) Altered Stimulus Frequency and Intensity Dependence of the Somatosensory Evoked Potential in Rats After Acute Application of Two Mitochondrial Toxins. *Acta Biologica Szegediensis,* 53(2), 99-103.

2. HEALTH EFFECTS

Farias, A.C., Cunha, A., Benko, C.R., *et al.* (2010) Manganese in Children with Attention-deficit/hyperactivity Disorder: Relationship with Methylphenidate Exposure. *Journal of Child and Adolescent Psychopharmacology,* 20(2), 113-118.

Fukushima, T., Tan, X., Luo, Y., *et al.* (2009) Relationship between Blood Levels of Heavy Metals and Parkinson's Disease in China. *Neuroepidemiology,* 34(1), 18-24.

Sikk, K., Taba, P., Haldre, S., *et al.* (2010) Clinical, Neuroimaging and Neurophysiological Features in Addicts with Manganese-Ephedrone Exposure. *Acta Neurologica Scandinavica,* 121(4), 237-243.

Spangler, J.G. & Reid, J.C. (2010) Environmental Manganese and Cancer Mortality Rates by County in North Carolina: An Ecological Study. *Biological Trace Element Research,* 133(2), 128-135.

Wirth, J.J. & Mijal, R.S. (2010) Adverse Effects of Low Level Heavy Metal Exposure on Male Reproductive Function. *Systems Biology in Reproductive Medicine,* 56(2), 147-167.

3. MECHANISM

Avila, D.S., Colle, D., Gubert, P.*, et al.* (2010) A Possible Neuroprotective Action of a Vinylic Telluride Against Mn-Induced Neurotoxicity. *Toxicological Sciences,* 115(1), 194-201. .

Bastiaansen, J.A., Zhang, X., Janvelyan, D.*, et al* Dynamics of Mn Transport in the Mesolimbic System Reveal Neural Projections from the Nucleus Accumbens in Vivo. Abstract presented at the 2010 Joint Meeting of the Swiss Society for Neuroscience with the Swiss Society of Sleep Research, Sleep Medicine and Chronobiology, Lausanne, 13 Mar 2010.

dos Santos, A.P.M., Milatovic, D., Au, C.*, et al.* (2010) Rat Brain Endothelial Cells are a Target of Manganese Toxicity. *Brain Research,* 1326, 152-161.

Fan, X., Luo, G., Yang, D.*, et al.* (2010) Critical Role of Lysosome and its Associated Protein Cathepsin D in Manganese-Induced Toxicity in Cultured Midbrain Astrocyte. *Neurochemistry International,* 56(2), 291-300.

Fernandes, A., de Oliveira, E.F., de Rezende, I.C.V.*, et al.* (2010) Manganese Neurotoxic Time Course is Not Influenced by l-Deprenyl Systemic Treatment. Influence of l-Deprenyl in Manganese Neurotoxic Time Course. *Brain Research,* 1317(C), 277-285.

Geszvain, K. & Tebo, B.M. (2010) Identification of a Two-Component Regulatory Pathway Essential for Mn(II) Oxidation in Pseudomonas Putida GB-1. *Applied and Environmental Microbiology,* 76(4), 1224-1231.

Kern, C.H., Stanwood, G.D. & Smith, D.R. (2010) Preweaning Manganese Exposure Causes Hyperactivity, Disinhibition, and Spatial Learning and Memory Deficits Associated with Altered Dopamine Receptor and Transporter Levels. *Synapse,* 64(5), 363-378.

Mukhopadhyay, S., Bachert, C., Smith, D.R.*, et al.* (2010) Manganese-Induced Trafficking and Turnover of the Cis-Golgi Glycoprotein GPP130. *Molecular Biology of the Cell,* 21(7), 1282-1292.

Park, E-J. & Park, K. (2010) Induction of Oxidative Stress and Inflammatory Cytokines by Manganese Chloride in Cultured T98G Cells, Human Brain Glioblastoma Cell Line. *Toxicology in Vitro,* 24(2), 472-479.

Roth, J.A., Singleton, S., Feng, J.*, et al.* (2010) Parkin Regulates Metal Transport Via Proteasomal Degradation of the 1B Isoforms of Divalent Metal Transporter 1. *Journal of Neurochemistry,* 113(2), 454-464.

Williams, J.M., Milatovic, D., Gore, J.C.*, et al.* (2010) Chronic Exposure to Manganese Alters Brain Responses to Amphetamine: A Pharmacological Magnetic Resonance Imaging Study. *Toxicological Sciences,* 114(2), 310-322.

Xu, B., Xu, Z.F. & Deng, Y. (2010) Manganese Exposure Alters the Expression of N-Methyl-d-Aspartate Receptor Subunit mRNAs and Proteins in Rat Striatum. *Journal of Biochemical and Molecular Toxicology,* 24(1), 1-9.

Xu, Z., Jia, K., Xu, B.*, et al.* (2010) Effects of MK-801, Taurine and Dextromethorphan on Neurotoxicity Caused by Manganese in Rats. *Toxicology and Industrial Health,* 26(1), 55-60.

Yin, Z., Jiang, H., Lee, E.S., *et al.* (2010) Ferroportin is a Manganese-Responsive Protein that Decreases Manganese Cytotoxicity and Accumulation. *Journal of Neurochemistry,* 112(5), 1190-1198.

4. HUMAN SUSCEPTIBILITY

No relevant papers identified.

5. TREATMENT AND IMAGING

No relevant papers identified.

6. MISCELLANEOUS

No relevant papers identified.