

# **Manganese Health Research Program: Recent published literature**

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**June 2009**

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# Introduction

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This report presents the bibliographic details of papers identified as being first published during the period March 2009 to May 2009.

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

Aelion, C.M., Davis, H.T., McDermott, S., *et al.* (2009) Soil Metal Concentrations and Toxicity: Associations with Distances to Industrial Facilities and Implications for Human Health. *The Science of the Total Environment*, 407(7), 2216-2223.

Afridi, H.I., Kazi, T.G., Kazi, N.G., *et al.* (2009) Evaluation of Arsenic, Cobalt, Copper and Manganese in Biological Samples of Steel Mill Workers by Electrothermal Atomic Absorption Spectrometry. *Toxicology and Industrial Health*, 25(1), 59-69.

Cowan, D.M., Fan, Q., Zou, Y., *et al.* (2009) Manganese Exposure among Smelting Workers: Blood Manganese-Iron Ratio as a Novel Tool for Manganese Exposure Assessment. *Biomarkers*, 14(1), 3-16.

Frisbie, S.H., Mitchell, E.J., Mastera, L.J., *et al.* (2009) Public Health Strategies for Western Bangladesh that Address Arsenic Manganese, Uranium, and Other Toxic Elements in Drinking Water. *Environmental Health Perspectives*, 117(3), 410-416.

Jayasekher, T. (2009) Aerosols Near by a Coal Fired Thermal Power Plant: Chemical Composition and Toxic Evaluation. *Chemosphere*, 75(11), 1525-1530.

Lidén, G. & Surakka, J. (2009) A Headset-Mounted Mini Sampler for Measuring Exposure to Welding Aerosol in the Breathing Zone. *The Annals of Occupational Hygiene*, 53(2), 99-116.

Ljung, K.S., Kippler, M.J., Goessler, W., *et al.* (2009) Maternal and Early Life Exposure to Manganese in Rural Bangladesh. *Environmental Science & Technology*, 43(7), 2595-2601.

Nong, A., Taylor, M.D., Clewell, H.J., III, *et al.* (2009) Manganese Tissue Dosimetry in Rats and Monkeys: Accounting for Dietary and Inhaled Mn with Physiologically Based Pharmacokinetic Modeling. *Toxicological Sciences*, 108(1), 22-34.

Varlibas, F., Delipoyraz, I., Yuksel, G., *et al.* (2009) Neurotoxicity Following Chronic Intravenous use of "Russian Cocktail". *Clinical Toxicology*, 47(2), 157-160.

Watanabe, K., Tanaka, T., Shigemi, T., *et al.* (2009) Mn and Cu Concentrations in Mixed Saliva of Elementary School Children in Relation to Sex, Age, and Dental Caries. *Journal of Trace Elements in Medicine and Biology*, 23(2), 93-99.

## 2. HEALTH EFFECTS

Aelion, C.M., Davis, H.T., McDermott, S., *et al.* (2009) Soil Metal Concentrations and Toxicity: Associations with Distances to Industrial Facilities and Implications for Human Health. *The Science of the Total Environment*, 407(7), 2216-2223.

Hollingsworth, K.G., Jones, D.E., Aribisala, B.S., *et al.* (2009) Globus Pallidus Magnetization Transfer Ratio, T(1) and T(2) in Primary Biliary Cirrhosis: Relationship with Disease Stage and Age. *Journal of Magnetic Resonance Imaging*, 29(4), 780-784.

Ljung, K.S., Kippler, M.J., Goessler, W., *et al.* (2009) Maternal and Early Life Exposure to Manganese in Rural Bangladesh. *Environmental Science & Technology*, 43(7), 2595-2601.

Stampfer, M.J. (2009) Welding Occupations and Mortality from Parkinson's Disease and Other Neurodegenerative Diseases among United States Men, 1985-1999. *Journal of Occupational and Environmental Hygiene*, 6(5), 267-272.

Varlibas, F., Delipoyraz, I., Yuksel, G., *et al.* (2009) Neurotoxicity Following Chronic Intravenous use of "Russian Cocktail". *Clinical Toxicology*, 47(2), 157-160.

### 3. MECHANISM

Ansari, K.I., Grant, J.D., Kasiri, S., *et al.* (2009) Manganese(III)-Salens Induce Tumor Selective Apoptosis in Human Cells. *Journal of Inorganic Biochemistry*, 103(5), 818-826.

Burton, N.C. & Guilarte, T.R. (2009) Manganese Neurotoxicity: Lessons Learned from Longitudinal Studies in Nonhuman Primates. *Environmental Health Perspectives*, 117(3), 325-332.

Chakraborty, R. & Mukherjee, A. (2009) Mutagenicity and Genotoxicity of Coal Fly Ash Water Leachate. *Ecotoxicology and Environmental Safety*, 72(3), 838-842.

Gitler, A.D., Chesi, A., Geddie, M.L., *et al.* (2009) A-Synuclein is Part of a Diverse and Highly Conserved Interaction Network that Includes PARK9 and Manganese Toxicity. *Nature Genetics*, 41(3), 308-315.

Han, J., Lee, J., Choi, D., *et al.* (2009) Manganese (II) Induces Chemical Hypoxia by Inhibiting HIF-Prolyl Hydroxylase: Implication in Manganese-Induced Pulmonary Inflammation. *Toxicology and Applied Pharmacology*, 235(3), 261-267.

Jayasekher, T. (2009) Aerosols Near by a Coal Fired Thermal Power Plant: Chemical Composition and Toxic Evaluation. *Chemosphere*, 75(11), 1525-1530.

Nong, A., Taylor, M.D., Clewell, H.J.,III, *et al.* (2009) Manganese Tissue Dosimetry in Rats and Monkeys: Accounting for Dietary and Inhaled Mn with Physiologically Based Pharmacokinetic Modeling. *Toxicological Sciences*, 108(1), 22-34.

Prabhakaran, K., Chapman, G.D. & Gunasekar, P.G. (2009) BNIP3 Up-Regulation and Mitochondrial Dysfunction in Manganese-Induced Neurotoxicity. *Neurotoxicology*, 30(3), 414-422.

Schmidt, K., Wolfe, D.M., Stiller, B., *et al.* (2009) Cd<sup>2+</sup>, Mn<sup>2+</sup>, Ni<sup>2+</sup> and Se<sup>2+</sup> Toxicity to *Saccharomyces Cerevisiae* Lacking YPK9p the Orthologue of Human ATP13A2. *Biochemical and Biophysical Research Communications*, 383(2), 198-202.

Schneider, J.S., Decamp, E., Clark, K., *et al.* (2009) Effects of Chronic Manganese Exposure on Working Memory in Non-Human Primates. *Brain Research*, 1258, 86-95.

Tong, M., Dong, M. & de la Monte, S.M. (2009) Brain Insulin-Like Growth Factor and Neurotrophin Resistance in Parkinson's Disease and Dementia with Lewy Bodies: Potential Role of Manganese Neurotoxicity. *Journal of Alzheimer's Disease*, 16(3), 585-599.

Zhang, P., Wong, T.A., Lokuta, K.M., *et al.* (2009) Microglia Enhance Manganese Chloride-Induced Dopaminergic Neurodegeneration: Role of Free Radical Generation. *Experimental Neurology*, 217(1), 219-230.

## 4. HUMAN SUSCEPTIBILITY

Ljung, K.S., Kippler, M.J., Goessler, W., *et al.* (2009) Maternal and Early Life Exposure to Manganese in Rural Bangladesh. *Environmental Science & Technology*, 43(7), 2595-2601.

Varlibas, F., Delipoyraz, I., Yuksel, G., *et al.* (2009) Neurotoxicity Following Chronic Intravenous use of "Russian Cocktail". *Clinical Toxicology*, 47(2), 157-160.

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## 5. TREATMENT AND IMAGING

Varlibas, F., Delipoyraz, I., Yuksel, G., *et al.* (2009) Neurotoxicity Following Chronic Intravenous use of "Russian Cocktail". *Clinical Toxicology*, 47(2), 157-160.



## 6. MISCELLANEOUS

Michalke, B., Halbach, S. & Nischwitz, V. (2009) JEM Spotlight: Metal Speciation Related to Neurotoxicity in Humans. *Journal of Environmental Monitoring*, 11(5), 939-954.