

Manganese Health Research Program: Recent published literature

September 2009 - November 2009

December 2009

The Institute of Environment and Health (IEH) was established at Cranfield University in November 2005. The research and consultancy activities of the Institute are principally funded through specific grants, contracts and awards by UK Government Departments and Agencies.

This document is a report by the Institute of Environment and Health for the Manganese Health Research Program (MHRP)

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Introduction

This report presents the bibliographic details of papers identified as being first published during the period June 2009 to September 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 Proquest Health. 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

Chashchin, M.V., Ellingsen, D.G., Zibarev, E.V., *et al.* (2009) Peculiarities of Nervous System Functional State in Electric Welders Exposed to Manganese Compounds. *Meditsina Truda i Promyshlennaia Ekologiya*, (4), 10-13. [Russian]

Curran, C.P., Park, R.M., Ho, S.M., *et al.* (2009) Incorporating Genetics and Genomics in Risk Assessment for Inhaled Manganese: From Data to Policy. *Neurotoxicology*, 30(5), 754-760.

Dhatrak, S.V. & Nandi, S.S. (2009) Risk Assessment of Chronic Poisoning among Indian Metallic Miners. *Indian Journal of Occupational and Environmental Medicine*, 13(2), 60-64.

Flynn, M.R. & Susi, P. (2009) Neurological Risks Associated with Manganese Exposure from Welding Operations – A Literature Review. *International Journal of Hygiene and Environmental Health*, 212(5), 459-469.

Lech, T. & Dudek-Adamska, D. (2009) Concentrations of Zinc and Manganese in Post-Mortem Tissues and Body Fluids. *Problems of Forensic Sciences*, 78, 226-238.

Meeker, J.D., Rossano, M.G., Protas, B., *et al.* (2009) Multiple Metals Predict Prolactin and Thyrotropin (TSH) Levels in Men. *Environmental Research*, 109(7), 869-873.

Pejović-Milić, A., Aslam, Chettle, D.R., *et al.* (2009) Bone Manganese as a Biomarker of Manganese Exposure: A Feasibility Study. *American Journal of Industrial Medicine*, 52(10), 742-750.

Zacco, A., Resola, S., Lucchini, R., *et al.* (2009) Analysis of Settled Dust with X-Ray Fluorescence for Exposure Assessment of Metals in the Province of Brescia, Italy. *Journal of Environmental Monitoring*, 11(9), 1579-1585.

Zeng, G., Liang, J., Guo, S., *et al.* (2009) Spatial Analysis of Human Health Risk Associated with Ingesting Manganese in Huangxing Town, Middle China. *Chemosphere*, 77(3), 368-375.

2. HEALTH EFFECTS

Chashchin, M.V., Ellingsen, D.G., Zibarev, E.V., *et al.* (2009) Peculiarities of Nervous System Functional State in Electric Welders Exposed to Manganese Compounds. *Meditcina Truda i Promyshlennaia Ekologiya*, (4), 10-13. [Russian]

Flynn, M.R. & Susi, P. (2009) Neurological Risks Associated with Manganese Exposure from Welding Operations – A Literature Review. *International Journal of Hygiene and Environmental Health*, 212(5), 459-469.

Ramteke, S.G., Meshram, C.M. & Nanda, A. (2009) Neurological Complications in Manganese Mine Workers. *Journal of the Neurological Sciences*, 285(Supplement 1), S140-S141.

Solís-Vivanco, R., Rodríguez-Agudelo, Y., Riojas-Rodríguez, H., *et al.* (2009) Cognitive Impairment in an Adult Mexican Population Non-Occupationally Exposed to Manganese. *Environmental Toxicology and Pharmacology*, 28(2), 172-178.

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

3. MECHANISM

Ali, S.F., Boulton, M.C., Braydish-Stolle, L.K., *et al* (2009) Cytotoxic Effects of Manganese Nanoparticles using Different Solvent System in Astrocytes and Neuronal Cultured Cell. *The FASEB Journal*, 23(1_MeetingAbstracts), 759.3. Presented at the 2009 Conference on Experimental Biology, New Orleans, Louisiana, 18-22 Apr 2009.

Burton, N.C., Schneider, J.S., Syversen, T., *et al.* (2009) Effects of Chronic Manganese Exposure on Glutamatergic and GABAergic Neurotransmitter Markers in the Nonhuman Primate Brain. *Toxicological Sciences*, 111(1), 131-139.

Cicchetti, F., Drouin-Ouellet, J. & Gross, R.E. (2009) Environmental Toxins and Parkinson's Disease: What have we Learned from Pesticide-Induced Animal Models? *Trends in Pharmacological Sciences*, 30(9), 475-483.

Deng, Y., Xu, Z., Xu, B., *et al.* (2009) Excitotoxicity in Rat's Brain Induced by Exposure of Manganese and Neuroprotective Effects of Pinacidil and Nimodipine. *Biological Trace Element Research*, 131(2), 143-153.

Deng, Y., Xu, Z., Xu, B., *et al.* (2009) The Protective Effect of Riluzole on Manganese Caused Disruption of glutamate–glutamine Cycle in Rats. *Brain Research*, 1289, 106-117.

Giordano, G., Pizzurro, D., VanDeMark, K., *et al.* (2009) Manganese Inhibits the Ability of Astrocytes to Promote Neuronal Differentiation. *Toxicology and Applied Pharmacology*, 240(2), 226-235.

Himeno, S., Yanagiya, T. & Fujishiro, H. (2009) The Role of Zinc Transporters in Cadmium and Manganese Transport in Mammalian Cells. *Biochimie*, 91(10), 1218-1222.

Liu, M., Cai, T., Zhao, F., *et al.* (2009) Effect of Microglia Activation on Dopaminergic Neuronal Injury Induced by Manganese, and its Possible Mechanism. *Neurotoxicity Research*, 16(1), 42-49.

Milatovic, D., Zaja-Milatovic, S., Gupta, R.C., *et al.* (2009) Oxidative Damage and Neurodegeneration in Manganese-Induced Neurotoxicity. *Toxicology and Applied Pharmacology*, 240(2), 219-225.

Mishra, G., Shukla, R., Hasan, M., *et al.* (2009) Potentiation of Neurotoxicity of Lathyrus Sativus by Manganese: Alterations in Bloodbrain Barrier Permeability Effect of Manganese on Lathyrus Toxicity. *Toxicology Mechanisms and Methods*, 19(4), 318-326.

Sárkzi, L., Horváth, E., Kónya, Z., *et al.* (2009) Subacute Intratracheal Exposure of Rats to Manganese Nanoparticles: Behavioral, Electrophysiological, and General Toxicological Effects. *Inhalation Toxicology*, 21(SUPPL. 1), 83-91.

Shibata, S., Maeda, M., Furuta, K., *et al.* (2009) Neuroprotective Effects of (Arylthio)Cyclopentenone Derivatives on Manganese-Induced Apoptosis in PC12 Cells. *Brain Research*, 1294, 218-225.

4. HUMAN SUSCEPTIBILITY

No relevant papers identified.

5. TREATMENT AND IMAGING

No relevant papers identified.

6. MISCELLANEOUS

Hardy, G. (2009) Manganese in Parenteral Nutrition: Who, when, and Why should we Supplement? *Gastroenterology*, 137(5, Supplement 1), S29-S35.

Nduka, J.K. & Orisakwe, O.E. (2009) Heavy Metal Hazards of Pediatric Syrup Administration in Nigeria: A Look at Chromium, Nickel and Manganese. *International Journal of Environmental Research and Public Health*, 6(7), 1972-1979.

Park, B., Martin, P.A., Harris, C., *et al.* (2009) Preliminary in Vitro Investigation of the Potential Health Effects of Optisol, a Nanoparticulate Manganese Modified Titanium Dioxide UV-Filter used in Certain Sunscreen Products. *Nanotoxicology*, 3(2), 73-90.

Slicker, J. & Vermilyea, S. (2009) Invited Review: Pediatric Parenteral Nutrition: Putting the Microscope on Macronutrients and Micronutrients. *Nutrition in Clinical Practice*, 24(4), 481-486.

Stoll, K.E., Draper, W.E., Kliegman, J.I., *et al.* (2009) The Characterization and Structure of the Manganese-Responsive Transcriptional Regulator ScaR. *Biochemistry*, 48(43), 10308-10320.