

Manganese Health Research Program: Recent published literature

July 2011 – September 2011

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Introduction

This report presents the bibliographic details of papers identified as being first published during the period July 2011 to September 2011.

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

Afridi, H.I., Kazi, T.G., Kazi, N., *et al.* (2011) Chromium and Manganese Levels in Biological Samples of Pakistani Myocardial Infarction Patients at Different Stages as Related to Controls. *Biological Trace Element Research*, 142(3), 259-273.

Afridi, H., Kazi, T., Kazi, N., *et al.* (2011) Erratum: Chromium and Manganese Levels in Biological Samples of Pakistani Myocardial Infarction Patients at Different Stages as Related to Controls. *Biological Trace Element Research*, (3), 896-896.

Andersen, M.E. (2011) Application of PBPK Modeling to Evaluate Safe Exposures to a Toxic but Essential Metal. *Toxicological Sciences*, 120(Suppl. 2), 527. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Antonini, J.M., Roberts, J.R. & Sriram, K. (2011) Nail Manganese as a Biomarker of Welding Fume Exposure. *Toxicological Sciences*, 120(Suppl. 2), 497-498. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Arora, M., Bradman, A., Harley, K., *et al.* (2011) Early Life Manganese Exposure Estimated using Deciduous Tooth Dentine as A Biomarker. *Toxicological Sciences*, 120(Suppl. 2), 265. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Brna, P., Gordon, K., Dooley, J.M., *et al.* (2011) Manganese Toxicity in a Child with Iron Deficiency and Polycythemia. *Journal of Child Neurology*, 26(7), 891-894.

Cantone, L., Nordio, F., Hou, L., *et al.* (2011) Inhalable Metal-Rich Air Particles and Histone H3K4 Dimethylation and H3K9 Acetylation in a Cross-Sectional Study of Steel Workers. *Environmental Health Perspectives*, 119(7), 964-969. Available at: <http://ehp03.niehs.nih.gov/article/attachObjectAttachment.action?uri=info%3Adoi%2F10.1289%2Fehp.1002955&representation=PDF>.

Elenge, M.M., Aubry, J.C., Jacob, L., *et al.* (2011) Heavy Metal in Hair Samples of 109 Non-Industrial (Miners) Population in Katanga [Teneurs des Métaux Lourds dans 109 Échantillons de Cheveux d'Une Population Non Industrielle au Katanga]. *Sante (Montrouge, France)*, 21(1), 41-46.

Fordahl, S.C., Cooney, P., Qiu, Y., *et al.* (2011) Waterborne Manganese Exposure Alters Stereotypic Behaviors and Plasma Metabolites in Developing Rats. *Toxicological Sciences*, 120(Suppl. 2), 461. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Gunier, R., Smith, D.R., Bradman, A., *et al.* (2011) Manganese Levels in Carpet Dust are Associated with Proximity to Agricultural Use of Maneb and Mancozeb. *Toxicological Sciences*, 120(Suppl. 2), 134. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

- Lee, B.K. & Kim, Y. (2011) Relationship between Blood Manganese and Blood Pressure in the Korean General Population According to KNHANES 2008. *Environmental Research*, 111(6), 797-803.
- Leggett, R.W. (2011) A Biokinetic Model for Manganese. *Science of the Total Environment*, 409(20), 4179-4186.
- Long, Z., Jiang, Y., Li, X., *et al* (2011) Neuroimaging of Manganese Toxicity: Gaba and Metabolic Changes in The Human Brain. *Toxicological Sciences*, 120(Suppl. 2), 459. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Lucchini, R., Donna, F., Zoni, S., *et al* (2011) Neuromotor and Sensory Changes in Italian Children Resident in the Vicinity of Ferroalloy Industry. *Toxicological Sciences*, 120(Suppl. 2), 135. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Madejczyk, M.S. & Ballatori, N. (2011) The Iron Transporter Ferroportin can also Function as a Manganese Exporter. *Toxicological Sciences*, 120(Suppl. 2), 66-67. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Miyake, Y., Tanaka, K., Fukushima, W., *et al.* (2011) Dietary Intake of Metals and Risk of Parkinson's Disease: A Case-Control Study in Japan. *Journal of the Neurological Sciences*, 306(1-2), 98-102.
- Moberly, A.H., Pottackal, J., Czarnecki, L., *et al* (2011) Neurotoxic Effects of Intranasal Manganese Exposure and Interaction with Cadmium Exposure in a Mouse Model. *Toxicological Sciences*, 120(Suppl. 2), 457. [Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Roels, H.A. (2011) Biomarkers of Exposure to Manganese and Prospective Studies of its Neurotoxic Effects in Occupational Cohorts. *Toxicological Sciences*, 120(Suppl. 2), 527. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Smith, D.R., Jursa, T., Donna, F., *et al* (2011) Validation of Hair Manganese as an Exposure Biomarker: Analytical Considerations and Associations with Other Exposure Markers. *Toxicological Sciences*, 120(Suppl. 2), 265. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Summers, M.J., Summers, J.J., White, T.F., *et al.* (2011) The Effect of Occupational Exposure to Manganese Dust and Fume on Neuropsychological Functioning in Australian Smelter Workers. *Journal of Clinical and Experimental Neuropsychology*, 33(6), 1-12.
- Tait, V., Salehi, F., Croteau, M., *et al* (2011) Hazard Assessment for the Essential Element Manganese Based on Toxicological, Epidemiological, and Mechanistic Data: Susceptible Sub-Populations and Inter-Individual Variability. *Toxicological Sciences*,

120(Suppl. 2), 527-528. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Taylor, M.D., Schroeter, J.D., Nong, A., *et al* (2011) The Development of a Human Multi-Route Physiologically-Based Pharmacokinetic Model for Manganese. *Toxicological Sciences*, 120(Suppl. 2), 459. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Wasserman, G.A., Liu, X., Parvez, F., *et al.* (2011) Arsenic and Manganese Exposure and Children's Intellectual Function. *Neurotoxicology*, 32(4), 450-457.

Xu, J., Li, X., Streitmatter, S., *et al* (2011) Neuroimaging of Manganese Toxicity: Effect of Exposure Time on accumulation in Human Brain. *Toxicological Sciences*, 120(Suppl. 2), 459. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Yoon, M., Schroeter, J.D., Nong, A., *et al* (2011) Physiologically Based Pharmacokinetic Modeling of Manganese Exposure in Humans During Fetal and Neonatal Development. *Toxicological Sciences*, 120(Suppl. 2), 151. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Yoon, M., Schroeter, J.D., Nong, A., *et al.* (2011) Physiologically Based Pharmacokinetic Modeling of Fetal and Neonatal Manganese Exposure in Humans: Describing Manganese Homeostasis during Development. *Toxicological Sciences*, 122(2), 297-316.

2. HEALTH EFFECTS

Afeseh Ngwa, H., Kanthasamy, A., Anantharam, V., *et al* (2011) Manganese and Vanadium Exposure Induces Severe Neurotoxic Response in Olfactory System of an Animal Model: Potential Relevance to Olfactory Dysfunction And Parkinson's Disease (PD). *Toxicological Sciences*, 120(Suppl. 2), 458. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Afridi, H.I., Kazi, T.G., Kazi, N., *et al.* (2011) Chromium and Manganese Levels in Biological Samples of Pakistani Myocardial Infarction Patients at Different Stages as Related to Controls. *Biological Trace Element Research*, 142(3), 259-273.

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Apostoli, P. & Catalani, S. (2011) Metal Ions Affecting Reproduction and Development. *Metal Ions in Life Sciences*, 8, 263-303.

Arslan, M., Demir, H., Arslan, H., *et al.* (2011) Trace Elements, Heavy Metals and Other Biochemical Parameters in Malignant Glioma Patients. *Asian Pacific Journal of Cancer Prevention*, 12(2), 447-451. Available at: http://www.brainlife.org/reprint/2011/Arslan_H110000.pdf.

Cantone, L., Nordio, F., Hou, L., *et al.* (2011) Inhalable Metal-Rich Air Particles and Histone H3K4 Dimethylation and H3K9 Acetylation in a Cross-Sectional Study of Steel Workers. *Environmental Health Perspectives*, 119(7), 964-969. Available at: <http://ehp03.niehs.nih.gov/article/fetchObjectAttachment.action?uri=info%3Adoi%2F10.1289%2Fehp.1002955&representation=PDF>.

Cho, Y., Takami, S., Toyoda, T., *et al.* (2011) Lack of Modification of Tumorigenesis in the Central Nervous System by Early-Life Exposure to Manganese. *Toxicology Letters*, 205(Supplement 1), S258-S259.

Chtourou, Y., Trabelsi, K., Fetoui, H., *et al.* (2011) Manganese Induces Oxidative Stress, Redox State Unbalance and Disrupts Membrane Bound ATPases on Murine Neuroblastoma Cells in Vitro: Protective Role of Silymarin. *Neurochemical Research*, 36(8), 1546-1557. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3139064/pdf/11064_2011_Article_483.pdf.

Clewell, H.J., Andersen, M., Tait, V., *et al* (2011) The Use of Epidemiological Data and PBPK Modeling in a Risk Assessment: Manganese as a Case Study. *Toxicological Sciences*, 120(Suppl. 2), 526-527. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Clewell, H.J., Schroeter, J.D., Yoon, M., *et al* (2011) The Use of PBPK Models for Monkey and Human to Investigate the Dose-Response for the Neurological Effects of Mn. *Toxicological Sciences*, 120(Suppl. 2), 527. [Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Jain, S. & Ferrando, S.J. (2011) Manganese Neurotoxicity Presenting with Depression, Psychosis and Catatonia. *Psychosomatics*, 52(1), 74-77.

Kern, C. & Smith, D.R. (2011) Pre-Weaning Mn Exposure Leads to Prolonged Astrocyte Activation and Lasting Effects on the Dopaminergic System in Adult Rats. *Toxicological*

Sciences, 120(Suppl. 2), 461. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Lee, B.K. & Kim, Y. (2011) Relationship between Blood Manganese and Blood Pressure in the Korean General Population According to KNHANES 2008. *Environmental Research*, 111(6), 797-803.

Long, Z., Jiang, Y., Li, X., *et al* (2011) Neuroimaging of Manganese Toxicity: GABA and Metabolic Changes in the Human Brain. *Toxicological Sciences*, 120(Suppl. 2), 459. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Lucchini, R., Donna, F., Zoni, S., *et al* (2011) Neuromotor and Sensory Changes in Italian Children Resident in the Vicinity of Ferroalloy Industry. *Toxicological Sciences*, 120(Suppl. 2), 135. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Martin, D.P., Anantharam, V., Kanthasamy, A., *et al* (2011) The Interaction of Manganese with Prion Protein and Its Role in The Propagation of Prion Disease. *Toxicological Sciences*, 120(Suppl. 2), 36-37. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Miyake, Y., Tanaka, K., Fukushima, W., *et al*. (2011) Dietary Intake of Metals and Risk of Parkinson's Disease: A Case-Control Study in Japan. *Journal of the Neurological Sciences*, 306(1-2), 98-102.

Moberly, A.H., Pottackal, J., Czarnecki, L., *et al* (2011) Neurotoxic Effects of Intranasal Manganese Exposure and Interaction with Cadmium Exposure in A Mouse Model. *Toxicological Sciences*, 120(Suppl. 2), 457. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Molina, R.M., Phattanarudee, S., Kim, J., *et al*. (2011) Ingestion of Mn and Pb by Rats during and After Pregnancy Alters Iron Metabolism and Behavior in Offspring. *Neurotoxicology*, 32(4), 413-422.

Soldin, O. & Aschner, M. (2011) Chronic Manganese Alters Thyroid and Estrogen Levels in Rats Blood. *Toxicological Sciences*, 120(Suppl. 2), 458. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Sun, Z.-., Song, G.-., Zhang, M., *et al*. (2011) Clinical Study on Zinc, Copper and Manganese Levels in Patients with Esophageal Squamous Cell Cancer. *Trace Elements and Electrolytes*, 28(2), 116-120.

Tait, V., Salehi, F., Croteau, M., *et al* (2011) Hazard Assessment for the Essential Element Manganese Based on Toxicological, Epidemiological, and Mechanistic Data: Susceptible Sub-Populations and Inter-Individual Variability. *Toxicological Sciences*, 120(Suppl. 2), 527-528. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

3. MECHANISM

Akhtar, M. & Trombetta, L.D. (2011) Maneb (Manganous Ethylenebis[Dithiocarbamate]) Exposure in Rat Hippocampal Astrocytes Leads to Activation of Intrinsic Apoptotic Pathway. *Toxicological Sciences*, 120(Suppl. 2), 289. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Alaimo, A., Gorjod, R.M. & Kotler, M.L. (2011) The Extrinsic and Intrinsic Apoptotic Pathways are Involved in Manganese Toxicity in Rat Astrocytoma C6 Cells. *Neurochemistry International*, 59(2), 297-308.

Avila, D. & Aschner, M. (2011) HSPs Are Important Mediators of Mn-Induced Toxicity in *C. Elegans*. *Toxicological Sciences*, 120(Suppl. 2), 455-456. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Chtourou, Y., Trabelsi, K., Fetoui, H., *et al.* (2011) Manganese Induces Oxidative Stress, Redox State Unbalance and Disrupts Membrane Bound ATPases on Murine Neuroblastoma Cells in Vitro: Protective Role of Silymarin. *Neurochemical Research*, 36(8), 1546-1557. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3139064/pdf/11064_2011_Article_483.pdf.

Dodd, C.A., Georgieva, I.I. & Filipov, N.M. (2011) Mechanism of Enhanced Heme Oxygenase-1 (HO-1) Activity and the Role of HO-1 in Controlling Inflammatory Cytokine Output in LPS-Stimulated Microglia. *Toxicological Sciences*, 120(Suppl. 2), 456. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Epur, A., Xu, J., Zheng, W., *et al* (2011) Neuroimaging Of Manganese Toxicity: Therapeutic Effect of Para-Amino Salicylic Acid in A Rat Model. *Toxicological Sciences*, 120(Suppl. 2), 555. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Frick, R., Müller-Edenborn, B., Schlicker, A., *et al.* (2011) Comparison of Manganese Oxide Nanoparticles and Manganese Sulfate with Regard to Oxidative Stress, Uptake and Apoptosis in Alveolar Epithelial Cells. *Toxicology Letters*, 205(2), 163-172.

Fu, X., Zhang, Y., Jiang, W., *et al* (2011) Reduced Copper Clearance by the Blood-CSF Barrier Following *in vivo* Manganese and the Role of CU Transporter ATP7A. *Toxicological Sciences*, 120(Suppl. 2), 458. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Gunter, T.E., Gerstner, B., Gavin, C., *et al* (2011) Mn²⁺ Inhibition of Oxidative Phosphorylation in Liver, Brain, and Heart Mitochondria. *Toxicological Sciences*, 120(Suppl. 2), 456. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Huang, P., Li, G. & Sun, Z. (2011) Enzymes and Oxidative Damage Indicators in Rats Following Subacute or Subchronic Manganese Chloride Exposure. *Toxicological Sciences*, 120(Suppl. 2), 235. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Kurzatkowski, D.M. & Trombetta, L.D. (2011) The Neurotoxic Effects of Maneb on the Hippocampus of NRF2 (-/-) Mice. *Toxicological Sciences*, 120(Suppl. 2), 289. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Li, G.J., Wei, K.H., Jing, H.M., *et al* (2011) Peptidome and Proteome in Murine Choroid Plexus-Cerebrospinal Fluid System: Effect of Chronic Manganese (Mn) Exposure. *Toxicological Sciences*, 120(Suppl. 2), 458. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

- Long, Z., Jiang, Y., Li, X., *et al* (2011) Neuroimaging of Manganese Toxicity: GABA And Metabolic Changes in the Human Brain. *Toxicological Sciences*, 120(Suppl. 2), 459. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Lu, C., Yang, X. & Huang, S. (2011) Effects of Taurine on Mitochondrial Damage Induced by Manganese Chloride. *Chinese Journal of Public Health*, 27(7), 0889-0892.
- Martin, D.P., Anantharam, V., Kanthasamy, A., *et al* (2011) The Interaction of Manganese with Prion Protein and Its Role in the Propagation of Prion Disease. *Toxicological Sciences*, 120(Suppl. 2), 36-37. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Mcdougall, S.A., Der-Ghazarian, T., Britt, C.E., *et al.* (2011) Postnatal Manganese Exposure Alters the Expression of D2L and D2S Receptor Isoforms: Relationship to PKA Activity and Akt Levels. *Synapse*, 65(7), 583-591.
- Milatovic, D., Yu, Y., Zaja-Milatovic, S., *et al* (2011) Oxidative Injury and EP2 SIGNALING in Manganese Neurotoxicity. *Toxicological Sciences*, 120(Suppl. 2), 456. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Molina, R.M., Phattananarudee, S., Kim, J., *et al.* (2011) Ingestion of Mn and Pb by Rats during and After Pregnancy Alters Iron Metabolism and Behavior in Offspring. *Neurotoxicology*, 32(4), 413-422.
- Moreno, J.A., Streifel, K.M., Sullivan, K.A., *et al.* (2011) Manganese-Induced NF- κ B Activation and Nitrosative Stress is Decreased by Estrogen in Juvenile Mice. *Toxicological Sciences*, 122(1), 121-133.
- Nelson, M., Adams, T., Beaubrun, D., *et al* (2011) Are the Neurotoxic Effects of Manganese due to Blockage of Post-Synaptic Dopamine Receptors. *Toxicological Sciences*, 120(Suppl. 2), 552. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Pinsino, A., Roccheri, M.C., Costa, C., *et al.* (2011) Manganese Interferes with Calcium, Perturbs ERK Signaling, and Produces Embryos with no Skeleton. *Toxicological Sciences : An Official Journal of the Society of Toxicology*, 123(1), 217-230.
- Prabhakaran, K., Chapman, G.D. & Gunasekar, P.G. (2011) A-Synuclein Overexpression Enhances Manganese-Induced Neurotoxicity through the NF- κ B-Mediated Pathway. *Toxicology Mechanisms and Methods*, 21(6), 435-443.
- Settivari, R., LeVora, J., VanDuyn, N., *et al* (2011) GST-PI Inhibits Dopamine Neuron Degeneration in C. Elegans Models Of Parkinson's Disease And Manganism. *Toxicological Sciences*, 120(Suppl. 2), 38. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Streifel, K., Moreno, J. & Tjalkens, R. (2011) Role of Neuroinflammation in Developmental Vulnerability to Manganese. *Toxicological Sciences*, 120(Suppl. 2), 571. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Sullivan, K. & Tjalkens, R. (2011) Glial Interactions and Neuroinflammation in Manganese Neurotoxicity. *Toxicological Sciences*, 120(Suppl. 2), 456-457. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.
- Tait, V., Salehi, F., Croteau, M., *et al* (2011) Hazard Assessment for the Essential Element Manganese Based on Toxicological, Epidemiological, and Mechanistic Data: Susceptible Sub-Populations and Inter-Individual Variability. *Toxicological Sciences*, 120(Suppl. 2), 527-528. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Zhang, D., Kanthasamy, A., Anantharam, V., *et al.* (2011) Effects of Manganese on Tyrosine Hydroxylase (TH) Activity and TH-Phosphorylation in a Dopaminergic Neural Cell Line. *Toxicology and Applied Pharmacology*, 254(2), 65-71.

4. HUMAN SUSCEPTIBILITY

Cai, S-L., Sun, M-X. & He, Y-L. (2011) Case-Control Study on Relationship between CYP2E1 Polymorphisms and Occupational Susceptibility to Chronic Manganese Exposure in Chinese Han Population. *Chinese Journal of Industrial Medicine*, 24(PART 3), 200-201. [Chinese].

Chakraborty, S. & Aschner, M. (2011) Examining a Potential Gene-Environment Interaction between The PD-Associated Gene Parkin And Manganese in a C. Elegans Model. *Toxicological Sciences*, 120(Suppl. 2), 455. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

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5. TREATMENT AND IMAGING

Lu, C. (2011) Effects of Taurine on Spatial Memory of Rats Exposed to Manganese Chloride. *Zhongguo Yaolixue Yu Dulixue Zazhi- Chinese Journal of Pharmacology and Toxicology*, 25(3), 254-257. [Chinese].

LU, C., YANG, X. & HUANG, S. (2011) Effects of Taurine on Mitochondrial Damage Induced by Manganese Chloride. *Chinese Journal of Public Health*, 27(7), 0889-0892.

Petion, V., Rios, J., Mayne, J., *et al* (2011) Is Chelation the Mechanism of Action Of P-Aminosalicylic Acid (PAS) in the Treatment of Manganism? *Toxicological Sciences*, 120(Suppl. 2), 555. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Tait, V., Salehi, F., Croteau, M., *et al* (2011) Hazard Assessment for the Essential Element Manganese Based on Toxicological, Epidemiological, and Mechanistic Data: Susceptible Sub-Populations and Inter-Individual Variability. *Toxicological Sciences*, 120(Suppl. 2), 527-528. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Xu, J., Li, X., Streitmatter, S., *et al* (2011) Neuroimaging of Manganese Toxicity: Effect of Exposure Time on Accumulation in Human Brain. *Toxicological Sciences*, 120(Suppl. 2), 459. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Zhiqiang, F., Peng, Z., Weiwei, W., *et al.* (2011) Functional Mapping of Rat Brain Activation Following rTMS using Activity-Induced Manganese-Dependent Contrast. *Neurological Research*, 33(6), 563-571.

6. MISCELLANEOUS

Bowman, A.B. (2011) Patient-Derived Stem Cells as a Translational Model for Neurotoxicological Risk. *Toxicological Sciences*, 120(Suppl. 2), 526. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Fujishiro, H., Doi, M., Enomoto, S., *et al.* (2011) High Sensitivity of RBL-2H3 Cells to Cadmium and Manganese: An Implication of the Role of ZIP8. *Metallomics : Integrated Biometal Science*, 3(7), 710-718.

Hogan, C., Gordon, R., Kanthasamy, A., *et al.* (2011) Novel NADPH Oxidase Modulator Protects against Neuroinflammation Associated with Manganese Neurotoxicity. *Toxicological Sciences*, 120(Suppl. 2), 457. Abstract presented at the 50th Annual Meeting of the Society of Toxicology, March 6–10, 2011, Washington, DC.

Murnyak, G., Vandenberg, J., Yaroschak, P.J., *et al.* (2011) Emerging Contaminants: Presentations at the 2009 Toxicology and Risk Assessment Conference. *Toxicology and Applied Pharmacology*, 254(2), 167-169.

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