

Neurotoxicity of Inhaled Manganese

J. Zayed

Department of occupational and environmental health
University of Montreal, Montreal, Quebec, Canada

ABSTRACT

The central nervous system represents an important target for manganese (Mn) intoxication which may cause neurological symptoms similar to Parkinson's Disease in humans. With the addition of methylcyclopentadienyl manganese tricarbonyl (MMT) in unleaded gasoline which leads to fine particle Mn emissions, Mn has once again attracted attention. Microenvironments with high traffic density show higher Mn concentrations. One of the crucial questions is whether a low increase of Mn contamination resulting from the widespread use of MMT could lead to neurotoxic effects. Most experimental animal studies of Mn neurotoxicity have been conducted in non-human primates and rodents. The majority of these studies were performed in rodents following oral administration and did not assess bioaccumulation or central system nervous changes. The major effects observed were transient modifications of spontaneous motor activity; very few inhalation toxicological studies were conducted. Since most Mn intoxication in humans occurs via inhalation, more studies are required using the respiratory route of administration. Mainly based on our research program, this paper will focus on the neurotoxicity of inhaled Mn on animals. Effects of Mn exposure on the deposition and bioaccumulation of Mn in different tissues, on histological damage to the brain and on the locomotor activity of rats will be addressed.