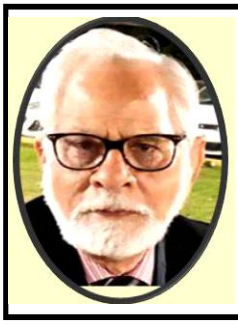

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MYELIN SHEATH REGENERATION DAMAGED BY METHYLMERCURY

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The survival of human race depends upon, better environmental management. Therefore, continuous and sincere efforts will have to be carried out by everyone involved in environmental management. Heavy metals released in the environment naturally or due to various activities is a major health problem. They are entering in animal's body through food chain, water and air. Some of the metals are necessary in small quantity, while several others are none essential. Among later the metallic mercury released in the environment is quite dangerous. It occurs in 3 forms viz., metallic, inorganic and organic forms. Metallic mercury is converted into organic form by bacterial species. Methylmercury is the most common form enters in all the animal tissues.

Methylmercury (MMC) is widely used in various industries and agriculture. It is a strong neuropoison as it can cross blood brain barrier easily, leading to cellular and myelin degeneration. It causes irreversible damage to the nervous system. The high thiol reactivity of MMC has been suggested to be the basis of their harmful biological effects. The main mechanisms involved, are inhibition of protein synthesis, microtubule disruption, increase of intracellular Ca(2+) and disturbance of neurotransmitter function, oxidative stress and triggering of excitotoxicity mechanisms**.**

Mercury cause loss of sensation, ataxia, tremors , deformities of limbs, hyper-salivation, loss of memory, muscular incoordination, kidney damage, paralysis, constriction of visual field impairment of hearing, mental disturbance, epileptic seizures, parkinsonism, hypertension, vomiting, diarrhea and nausea. It also causes breakage of DNA strands, blockage of DNA replication and oxidative DNA based modification. The reduced states also bind with protein and DNA forming DNA protein crosslink and deactivating DNA. MMC damage in all cell organelles, nucleus, nucleolus , chromosomes and DNA has been reported almost in all organs. MMC is a strong oxidant, interferes in protein, fat and lipid metabolism, increase lipid peroxidation and free radical formation, disturbers the body hormones, vitamins, immune system and enzymes of various metabolic pathways.

Chelation therapy is presently the treatment of choice for reducing the body burden of MMC both from adult and children. There are currently a number of chelators (synthetic and plant origin) that are either in practical use or under investigation both *in vivo* and *in vitro* studies, but fool proof therapy is not available.

We have been able to eliminate mercury and methylmercury from different body organs using vitamins and monothiols.[1] We also reported antioxidants (GSH) and B vitamins (B1,B6,B12), alone or in combination, repair myelin sheath damaged by MMC.[2] B-vitamins and GSH quickly eliminate the metal from the CNS. They also recovered the enzymes related to myelin synthesis.[3,4.] Both these factors appear to be responsible for myelin re-synthesis leading to regeneration of myelin sheath. Since the vitamins and GSH are the natural physiological components of animal body, their exogenous application in proper doses is unlikely to be injurious and can safely be used even for intoxicated human subject.

References: [1]Sood, P.P. and Tyagi, S.: J. Cell Tissue Res. 23(2): 7295-7301 (2023). [2]Sood, P.P., Vijayalakshmi, K. and Bapu, C.: Cell. Mol. Biol., 39: 213-220 (1993). [3]Cherian, B., Sood, P.P., Vijayalakshmi, K. Chundawat, R.S. and Tyagi, S.: J. Cell Tissue Res. 19(1): 6645-6652 (2019). [4]Vijayalakshmi, K. and Sood, P.P.: Cell. Mol. Biol., 40: 211-224 (1994).