safeMinds
Sensible Action For Ending Mercury-Induced Neurological Disorders

Summary of Comparison of Biological Abnormalities in Autism and Mercury Exposure

Mercury Exposure	Autism
Biochemistry	
Binds – SH groups; blocks sulfate transporter in intestines and kidneys.	Low sulfate levels
Reduces glutathione availability; inhibits enzymes of glutathione metabolism; glutathione needed in neurons, cells, and liver to detoxify heavy metals; reduces glutathione peroxidase and reductase.	Low levels of glutathione; decreased ability of liver to detoxify xenobiotics; abnormal glutathione peroxidase activity in erythrocytes.
Disrupts purine and pyrimidine metabolism	Purine and pyromidine metabolism errors lead to autistic features.
Disrupts mitochondrial activities especially in the brain.	Mitochondrial dysfunction, especially in brain.
Immune System	
Sensitive individuals more likely to have allergies, asthma, autoimmune-like symptoms, especially rheumatoid-like ones.	More likely to have allergies and asthma; familial presence of autoimmune diseases, especially rheumatoid arthritis; IgA deficiencies
Can produce an immune response in CNS; causes brain/ MBP autoantibodies	On-going immune response in CNS; brain/MBP autoantibodies present
Causes overproduction of TH2 subset; kills/inhibits lymphocytes, T-cells, and monocytes; decreases NK T-cell activity; induces or suppresses IFNg & IL-2	Skewed immune-cell subset in the Th2 direction; decreased responses to T-cell mitogens; reduced NK T-cell function; increased IFNg & IL-12
CNS Structure	
Selectively targets brain areas unable to detoxify or reduce mercury-induced oxidative stress	Specific areas of brain pathology; many functions spared
Accumulates in amygdale, hippocampus, basal ganglia, cerebral cortex; damages Purkinje and granule cells in cerebellum; brain stem defects in some cases.	Pathology of amygdale, hippocampus, basal ganglia, cerebral cortex; damage to Purkinje and granule cells in cerebellum; brain stem defects in some cases
Causes abnormal neuronal cytoarchitecture; disrupts neuronal migration, microtubules, and cell division; reduces NCAMs	Neuronal disorganization; increased neuronal cell replication, increased glial cells; depressed expression of NCAMs
Progressive microencephaly.	Progressive microencephaly and macrocephaly

Neurochemistry	
Prevents presynaptic serotonin release and inhibits serotonin transport; causes calcium disruptions	Decreased serotonin sythesis in children; abnormal calcium metabolism
Alters dopamine systems; peroxidine deficiency in rats resembles mercurialism in humans	Either high or low dopamine levels; positive response to peroxidine, which lowers dopamine levels
Neurochemistry (continued)	
Elevates epinephrine and norepinephrine levels by blocking enzyme that degrades epinephrine	Elevated norepinephrine and epinephrine
Elevates glutamate	Elevated glutamate and aspirate
Leads to cortical acetylcholine deficiency; increases muscarinic receptor density in hippocampus and cerebellum	Cortical acetylcholine deficiency; reduced muscarinic receptor binding in hippocampus
Causes demyelinating neuropathy	Demylination in brain
Neurophysiology	
Causes abnormal EEGs, epileptiform activity, variable patterns, e.g., subtle, low amplitude seizure activities.	Abnormal EEGs epileptiform activity, variable patterns, including subtle, low amplitude seizure activities
Causes abnormal vestibular nystagmus responses; loss of sense of position in space	Abnormal vestigular nystagmus responses; loss of sense of position in space
Results in autonomic disturbance; excessive sweating poor circulation, elevated heart rate	Autonomic disturbance; unusual sweating, poor circulation, elevated heart rate