AUTISM: A UNIQUE TYPE OF MERCURY POISONING

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ABSTRACT

Autism is a syndrome characterized by impairments in social relatedness, language and communication, a need for routine and sameness, abnormal movements, and sensory dysfunction. Mercury (Hg) is a toxic metal that can exist as a pure element or in a variety of inorganic and organic forms and can cause immune, sensory, neurological, motor, and behavioral dysfunctions similar to traits defining or associated with autism. Thimerosal, a preservative frequently added to childhood vaccines, has become a major source of Hg in human infants and toddlers. According to the FDA and the American Academy of Pediatricians, fully vaccinated children now receive, within their first two years, Hg levels that exceed safety limits established by the FDA and other supervisory agencies. A thorough review of medical literature and U.S. government data indicates (i) that many and perhaps most cases of idiopathic autism, in which a period of developmental normalcy is followed by an emergence of symptoms, are induced by early exposure to Hg; (ii) that this type of autism represents a unique form of Hg poisoning (HgP); (iii) that excessive Hg exposure from thimerosal in vaccine injections is an etiological mechanism for causing the traits of autism; (iv) that certain genetic and non-genetic factors establish a predisposition whereby thimerosal's adverse effects occur only in some children; and (v) that vaccinal Hg in thimerosal is causing a heretofore unrecognized mercurial syndrome.

SYNOPSIS

A review of medical literature indicates that the characteristics of autism and of mercury poisoning (HgP) are strikingly similar. Traits defining or associated with both disorders are summarized in *Table A* immediately following and are discussed and cited in the body of this document. The parallels between the two diseases are so thorough as to suggest, based on total Hg injected into U.S. children, that many cases of autism are a form of mercury poisoning.

For these children, the exposure route is childhood vaccines, most of which contain thimerosal, a preservative which is 49.6% ethylmercury by weight. Over the last decade, the amount of mercury a typical child under two years received from vaccinations equated to 237.5 micrograms injected in several bolus (or large) doses.

The total amount injected into infants and toddlers (i) is known to exceed Federal safety standards, (ii) is officially considered to be a “low” level; whereby (iii) only a small percentage of exposed individuals exhibit symptoms of toxicity. In fact, children who develop Hg-related autism are likely to have had a predisposition derived from genetic and non-genetic factors.

Importantly, the timings of vaccinal Hg-exposure and its latency period coincide with the emergence of autistic-symptoms in specific children. Moreover, excessive mercury has been detected in urine, hair, and blood samples from autistic children; and parental reports, though limited at this date, indicate significant improvement in symptoms subsequent to heavy-metal chelation therapy.

The HgP phenotype is diverse and depends upon a number of factors – including type of Hg, route of entry into the body, rate and level of dose, individual genotype, and the age and immune status of the patient. Historically, variation among these factors has caused slightly different manifestations of mercurialism; Mad Hatter's disease, Minamata disease, acrodynia, and industrial exposures provide examples.

The pathology arising from the mercury-related variables involved in autism – intermittent bolus doses of ethylmercury injected into susceptible infants and toddlers – is heretofore undescribed in medical literature. Therefore, in accord with existing HgP data and HgP's ability to induce virtually all the traits defining or associated with autism spectrum disorders, we hypothesize that many and perhaps most cases of autism represent a unique form of mercury poisoning.

This conclusion and its supporting data have important implications for the affected population of autistic individuals and their families, for other unexplained disorders with symptoms similar to those of heavy metal intoxication, for vaccine content, and for childhood vaccination programs. Due to its high potential for neurotoxicity, thimerosal should be removed immediately from all vaccine products designated for infants and toddlers.

Table A: Summary Comparison of Characteristics of Autism & Mercury Poisoning

	Mercury Poisoning	Autism
Impariments in Sociability	Social deficits, shyness, social withdrawal	Social deficits, social withdrawal, shyness
	Depression, mood swings; mask face	Depressive traits, mood swings; flat affect
	Anxiety	Anxiety
	Lacks eye contact, hesitant to engage others	Lack of eye contact, avoids conversation
	Irrational fears	Irrational fears
	Irritability, aggression, temper tantrums	Irritability, aggression, temper tantrums
	Impaired face recognition	Impaired face recognition
	Schizoid tendencies, OCD traits	Schizophrenic & OCD traits
	Repetitive, penseverative, stereotypic behaviors	Repetitive, penseverative, stereotypic behaviors
Speech & Language Deficits	Loss of speech, failure to develop speech	Delayed language, failure to develop speech
	Dysarthria; articulation problems	Dysarthria; articulation problems
	Speech comprehension deficits	Speech comprehension deficits
	Verbalizing & word retrieval problems	Echolalia; word use & pragmatic errors
	Hearing loss; deafness in very high doses	Mild to profound hearing loss
	Poor performance on language IQ tests	Poor performance on verbal IQ tests
Sensory Abnormalities	Abnormal sensation in mouth & extremities	Abnormal sensation in mouth & extremities
	Sound sensitivity	Sound sensitivity
	Abnormal touch sensations; touch aversion	Abnormal touch sensations; touch aversion
	Vestibular abnormalities	Vestibular abnormalities
	Impaired visual fixation	Problems with joint attention
Motor Disorders	Involuntary jerking movements – arm flapping, ankle jerks, myoclonal jerks, choreiform movements, circling, rocking	Stereotyped movements - arm flapping, jumping, circling, spinning, rocking; myoclonal jerks; choreiform movements
	Deficits in eye-hand coordination; limb apraxia; intention tremors	Poor eye-hand coordination; limb apraxia; problems with intentional movements
	Gait impairment; ataxia – from incoordination & clumsiness to inability to walk, stand, or sit; loss of motor control	Abnormal gait and posture, clumsiness and incoordination; difficulties sitting, lying, crawling, and walking
	Difficulty in chewing or swallowing	Difficulty chewing or swallowing
	Unusual postures; toe walking	Unusual postures; toe walking
Cognitive Impairments	Borderline intelligence, mental retardation - some cases reversible	Borderline intelligence, mental retardation - sometimes "recovered"
	Poor concentration, attention, response inhibition	Poor concentration, attention, shifting attention
	Uneven performance on IQ subtests	Uneven performance on IQ subtests
	Verbal IQ higher than performance IQ	Verbal IQ higher than performance IQ
	Poor short term, verbal, & auditory memory	Poor short term, auditory & verbal memory
	Poor visual and perceptual motor skills, impairment in simple reaction time	Poor visual and perceptual motor skills, lower performance on timed tests
	Difficulty carrying out complex commands	Difficulty carrying out multiple commands
	Word-comprehension difficulties	Word-comprehension difficulties
	Deficits in understanding abstract ideas & symbolism; degeneration of higher mental powers	Deficits in abstract thinking & symbolism, understanding other's mental states, sequencing, planning & organizing

Unusual Behaviors	Stereotyped sniffing (rats)	Stereotyped, repetitive behaviors
	ADHD traits	ADHD traits
	Agitation, unprovoked crying, grimacing, staring spells	Agitation, unprovoked crying, grimacing, staring spells
	Sleep difficulties	Sleep difficulties
	Eating disorders, feeding problems	Eating disorders, feeding problems
	Self injurious behavior, e.g. head banging	Self injurious behavior, e.g. head banging
Visual Impairments	Poor eye contact, impaired visual fixation	Poor eye contact, problems in joint attention
	"Visual impairments," blindness, near-sightedness, decreased visual acuity	"Visual impairments"; inaccurate/slow saccades; decreased rod functioning
	Light sensitivity, photophobia	Over-sensitivity to light
	Blurred or hazy vision	Blurred vision
	Constricted visual fields	Not described
Physical Disturbances	Increase in cerebral palsy; hyper- or hypo-tonia; abnormal reflexes; decreased muscle strength, especially upper body; incontinence; problems chewing, swallowing, salivating	Increase in cerebral palsy; hyper- or hypotonia; decreased muscle strength, especially upper body; incontinence; problems chewing and swallowing
	Rashes, dermatitis/dry skin, itching; burning	Rashes, dermatitis, eczema, itching
	Autonomic disturbance: excessive sweating, poor circulation, elevated heart rate	Autonomic disturbance: unusual sweating, poor circulation, elevated heart rate
Gastro-intestinal Disturbances	Gastroenteritis, diarrhea; abdominal pain, constipation, "colitis"	Diarrhea, constipation, gaseousness, abdominal discomfort, colitis
	Anorexia, weight loss, nausea, poor appetite	Anorexia; feeding problems/vomiting
	Lesions of ileum & colon; increased gut permeability	Leaky gut syndrome
	Inhibits dipeptidyl peptidase IV, which cleaves casomorphin	Inadequate endopeptidase enzymes needed for breakdown of casein & gluten
Abnormal Biochemistry	Binds -SH groups; blocks sulfate transporter in intestines, kidneys	Low sulfate levels
	Has special affinity for purines & pyrimidines	Purine & pyrimidine metabolism errors lead to autistic features
	Reduces availability of glutathione, needed in neurons, cells & liver to detoxify heavy metals	Low levels of glutathione; decreased ability of liver to detoxify heavy metals
	Causes significant reduction in glutathione peroxidase and glutathione reductase	Abnormal glutathione peroxidase activities in erythrocytes
	Disrupts mitochondrial activities, especially in brain	Mitochondrial dysfunction, especially in brain
Immune Dysfunction	Sensitivity due to allergic or autoimmune reactions; 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	On-going immune response in CNS
	Causes brain/MBP autoantibodies	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 Structural Pathology	Selectively targets brain areas unable to detoxify or reduce Hg-induced oxidative stress	Specific areas of brain pathology; many functions spared
	Damage to Purkinje and granular cells, brainstem, corpus callosum, basal glangia, cerebral cortex	Damage to Purkinje and granular cells, brainstem, corpus callosum, basal glangia, cerebral cortex
	Accummulates in amygdala and hippocampus	Pathology in amygdala and hippocampus
	Causes abnormal neuronal cytoarchitecture; disrupts neuronal migration & cell division; reduces NCAMs	Neuronal disorganization; increased neuronal cell replication, increased glial cells; depressed expression of NCAMs
	Progressive microcephaly	Progressive microcephaly and macrocephaly
Abnormalities in Neuro-chemistry	Prevents presynaptic serotonin release & inhibits serotonin transport; causes calcium disruptions	Decreased serotonin synthesis in children; abnormal calcium metabolism
	Alters dopamine systems; peroxidine deficiency in rats resembles mercurialism in humans	Possibly high or low dopamine levels; positive response to peroxidine (lowers dopamine levels)
	Elevates epinephrine & norepinephrine levels by blocking enzyme that degrades epinephrine	Elevated norepinephrine and epinephrine
	Elevates glutamate	Elevated glutamate and aspartate
	Leads to cortical acetylcholine deficiency; increases muscarinic receptor density in hippocampus & cerebellum	Cortical acetylcholine deficiency; reduced muscarinic receptor binding in hippocampus
	Causes demyelinating neuropathy	Demyelination in brain
Neuro-physiology	Causes abnormal EEGs, epileptiform activity	Abnormal EEGs, epileptiform activity
	Causes seizures, convulsions	Seizures; epilepsy
	Causes variable patterns, eg, subtle, low amplitude seizure activity	Variable patterns, eg, subtle, low amplitude seizure activities
Population Charact-eristics	Effects more males than females	Male:female ratio estimated at 4:1
	At low doses, only affects those geneticially susceptible	High heritability - concordance for MZ twins is 90%
	First added to childhood vaccines in 1930s	First "discovered" among children born in 1930s
	Exposure levels steadily increased since 1930s with rate of vaccination, number of vaccines	Prevalence of autism has steadily increased from 1 in 2000 (pre1970) to 1 in 500 (early 1990s), higher in 2000.
	Exposure occurs at 0 - 15 months; clinical silent stage means symptom emergence delayed; symptoms emerge gradually, starting with movement & sensation	Symptoms emerge from 4 months to 2 years old; symptoms emerge gradually, starting with movement & sensation

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