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**A Bio-Medical Treatment Approach to Autism Spectrum Disorder,
Including Heavy Metal Detoxification**

(Note: This has been excerpted from the recently published book: *CHILDREN with STARVING BRAINS – A Medical Treatment Guide for Autism Spectrum Disorder* by Jaquelyn McCandless, M.D.) This article is being written for parents (and their doctors!) who want to have their children bio-medically evaluated for developmental or learning delays. It is an attempt to provide a brief summary of current information gleaned from my own practice, current research studies, and what I have learned from autism conferences and reports of other clinicians working with this population of children.

General: Developmental disabilities such as autism (ASD), attention deficit hyperactivity disorder (ADHD), dyslexia and uncontrollable aggression currently affect an estimated 12 million children under age 18 in the U.S. – almost one child in five. A recent report by a group of physicians states that millions of children in the U.S. exhibit learning disabilities, reduced IQ and destructive, aggressive behavior *because of exposures to toxic chemicals*. This report published by Greater Boston Physicians for Social Responsibility, **IN HARM'S WAY: TOXIC THREATS TO CHILD DEVELOPMENT (I)** links toxic exposures during early childhood, or even before birth, to lifelong disabilities. The report states that one million American children currently live with blood lead levels above the threshold recognized by U.S. Environmental Protection Agency as affecting behavior and cognition. Millions more would be added to this list if EPA thresholds were updated to take account of the most current research on the effects of lead, mercury and other heavy metals in children. The authors note that even at extremely low doses mercury exposure produces impairments in language ability, attention, and memory. In addition to the heavy metals, studies show that some 20 million U.S. children under age 5 eat an average of eight different pesticides on their food daily.

Autism Spectrum Disorder (ASD) is a very complex disease affecting multiple major physiological systems. Psychological and genetic etiologies have been researched for many years with applied behavioral analysis techniques the only officially recognized treatment for autism other than drugs for behavior control. There appears to be a genetic factor operating shown by high incidence of affected siblings, high frequency of autoimmune disorders in the mothers and other close relatives, and patterns (but not invariably) of genetic markers in research studies. However, the understanding of how genetics contribute to autism is still not known. Infectious (viral, bacterial, and fungal) etiologies have all been proposed, as many children show immune impairment from very early on. No one doubts the presence of immune dysregulation in our developmentally delayed children, but more and more clinicians who are working in this area are starting to feel that toxins of various kinds may be the etiological triggers that start the immune impairment in the first place, particularly toxic vaccinations injected into infants with immature immune systems.

Bio-Medical Evaluation: The first step in a bio-medical evaluation consists of a thorough family and child health history/interview. Then screening diagnostic lab tests are done to determine what bio-medical issues need to be addressed including whether heavy-metal toxicity is present. A basic blood count, metabolic chemistry, urinalysis and thyroid panel is obtained as a base-line for all children. Special tests are obtained according to symptoms and history of the child, and often include: tests for immune impairment; presence and levels of viruses and fungi involving both urine and stool studies; and IgG food sensitivity and amino acid panels as well as RBC essential mineral tests to direct proper nutrition. Some of these are blood tests. I am not currently accepting patients with autism whose parents are not willing to get them stabilized on a GF/CF (gluten and casein free) diet prior to their evaluation. In my opinion, these children have irritated intestines even if it has not reached the point of “leaky gut.” They need copious probiotics and elimination of sugar intake in order to help the near-ubiquitous gut infections heal. Anti-fungals may sometimes be needed per testing as an early step in treatment; we know now that chelation efforts fail if we try to administer chelating agents to inflamed guts – the yeasts flourish on those agents and they cannot do their job of chelating the mercury. Many children have sensitivities to other foods as well as casein and gluten, and those must be avoided or rotated according to degree of sensitivity.

Vaccinations and Mercury Poisoning: A relatively recent development in autism studies has arisen from the observation and sharing through internet and other support groups by parents that their children became autistic after vaccinations, notably the triples, DPT and MMR. There certainly have been isolated incidents of vaccine injuries for many years with little support from the medical profession or the vaccine makers, who have protection against injury suits. As a consequence of the increasing frequency of ASD and the worldwide sharing of information, parents as well as clinicians have been made aware that some vaccines our children have been receiving have neurotoxic levels of thimerosal, a mercury preservative. It appears that the cumulative level of mercury in required vaccines has reached toxic levels for a growing number of children. Mercury in its organic form is not toxic, but it is lipophilic and drawn to the brain, which is mostly fat, becoming oxidized into the very toxic inorganic form there. This inorganic form causes interference with the enzyme systems that allow proper nutrition and conduction to take place across the brain cell membranes. Since 1991 (which happens to be the year Hepatitis B began being mandated for all newborns), the increase in the incidence of autism has been phenomenal and reported in very clear statistics from the U.S. Dept. of Education (2). The number of children 6-11 served under IDEA, Part B for autism rose from 3,046 in 1991-92 to 27,323 in 1997-98, a 785% increase. Such increase cannot be due to genetics, though there seems to be a *genetic predisposition that makes a certain subset of children more sensitive to heavy metals and other toxins*. National statistics for the last two years show a continuing rise in the incidence of autism, estimated currently to be 1 per 150-250 children.

It is well known that the gastrointestinal tract is extremely susceptible to mercury injury. Since 60-70% of our immune function is located in the gut, toxic exposure predisposes the child to immune impairment very early in life, particularly when the toxic-laden vaccines are administered to newborns whose immune system is undeveloped. I consider any child who has four or more ear infections in their 1st year as immune-impaired with accompanying multiple courses of antibiotics contributing to gut pathogen overgrowth. Intestinal dysbiosis, usually candida, intractable diarrhea (or constipation), and subsequent inability to

tolerate the large peptides contained in wheat and milk is very common in these children. We have found that almost all of them benefit by a gluten and casein/free diet. Persistent brain viruses may be indicated by viral titers, brain studies, and positive response to anti-viral treatment. The earlier the toxic injury the more severe the effects on the brain and immuno-endocrine systems. In utero, the infant is subjected to mercury as well as other toxins by what the mother eats (especially contaminated fish), by the mercury vapor given off each time she chews if she has amalgams in her mouth, and ubiquitous environmental toxins she breathes. It is known now that it is detrimental for the expectant or nursing mother to have amalgam work done (placed or removed), as mercury crosses the placenta, with toxin accumulating in breast milk 8X the level in the mother.

Many parents have reported that their children became autistic soon after receiving their **MMR** immunization, usually between 14 and 18 months of age after what appeared as normal development, with many children already having age-appropriate language before their shot and losing all language afterwards. Though MMR does not contain mercury, if a child's immunity has been compromised by previous toxic insult, it appears that his or her immune system cannot then handle the triple-virus challenge in a sizable number of children. The majority of children have immune systems that can apparently deal with the amount of mercury they receive either from the mother or in vaccinations. However, the exponential rise in the incidence of autism, ADHD, and other developmental delay and learning problems in children in recent years seems to indicate that a sizable number of children have brain toxicity very likely through their vaccinations or mothers' amalgams.

When a congressman's (Dan Burton of Indiana) healthy five-week-old granddaughter almost died within hours of her **Hepatitis B** injection, a congressional investigation into vaccine injury was finally opened in July 2000. At least fifty-seven newborn babies had already officially been reported to have died shortly following the Hep B, which very probably is an underestimation, since many "crib deaths" may actually be post-vaccinal reactions. As a result of this investigation and parents' outcries, vaccination reform is in the works right now, with thimerosal being replaced by non-toxic preservatives in Hep B for newborns and other new vaccines. The AMA, CDC, IOM, or vaccine-makers are still not admitting any responsibility for the toxic levels of thimerosal in the vaccines, but they have recently admitted it may be *plausible*, and have agreed to fund several studies on the issue. Tragically, thimerosal was still present in doctors' supplies until late in 2001, which they were allowed to administer until used up and/or the new vaccines were more readily available. Amalgam dental reform is also being sought, but the ADA is as adamant about the safety of amalgams as the AMA is about mercury in vaccinations. Reigning paradigms are very difficult to give up, and most traditional doctors and dentists are resistant to even learning of many recent studies documenting the extreme neurotoxicity of mercury.

Testing for Brain Mercury: It is clear that if there is a genetic factor for immune dysfunction (e.g. mother with autoimmune disease, other affected family members, etc.) and/or the toxic load is too heavy and/or the immune system is too immature at the time of toxic input, cognitive impairment may result. It is also clear that there is a striking resemblance between autism and mercury poisoning. (3) In adults, poisoning seems to show its effects in generally impaired immunity, with chronic fatigue syndromes, multiple sclerosis, and autoimmune and other diagnostically puzzling illnesses now suspect as possible mercury poisoning. Mercury in even minute amounts is the most neurotoxic

element on the planet next to plutonium. Many doctors do not realize the extent of this toxic problem, and do not understand that **blood, urine, hair, or stool tests do NOT usually reveal the presence of mercury in the brain. If tests are positive, they probably indicate recent exposure (30-60 days) and are revealing body or organic mercury, which is non-toxic unless the exposure is great, and can often be handled by the immune system. If tests are negative that does not mean there is no brain mercury. The blood-brain barrier which is usually protective to the brain prevents the mercury coming out into the body excretions and hair without a chelating agent, so if poisoning is present it is a lifetime affair if not treated (25-30 years is the half-life for inorganic mercury).**

Mercury Detoxification: A physician-mother of an autistic child, Amy Holmes, M.D. of Baton Rouge, LA has been exploring the testing and treatment for mercury poisoning in autistic spectrum children for several years. She is a leading practitioner of oral chelation for children who show evidence of brain mercury and one of a group of physicians who is pioneering a new direction in medical detoxification of children based on careful attention to testing and nutrient/mineral supplementation. She and her group are working with around 800 patients (and a long waiting list) in treatment for heavy metal toxicity; her own autistic son who was non-verbal at four years of age is totally off the spectrum and normal in most ways after two years of chelation. Previous chelation protocols for children have not been adequately defined and effective to our knowledge, especially since what we're seeing in these epidemic proportions is a newly defined syndrome called "regressive" or "late onset" autism. Dr. Holmes participated in a group of 26 toxicity experts who convened for three days in February of 2001 to devise a Consensus Position Paper for Mercury Detoxification of Autistic Children (4). Though specifics of dosages, timing, and nutrients vary, this protocol offers safe and effective guidelines for practitioners who are ready to enter this pioneering new treatment mode. This approach has given new hope to thousands of parents for a disorder that has been considered a psychiatric illness and basically untreatable (except for applied behavioral analysis) rather than what it is: **a treatable medical illness.**

The improved hair analysis test is a good inexpensive preliminary screening for revealing abnormalities in essential minerals and other heavy metals, from which we can deduce the presence of mercury **because of its known effects on other elements not protected by the blood brain barrier.** Doctors' Data laboratory has the largest data base in the world on hair analyses, and this is the lab from which I order hair tests. By study of these findings and corroborating tests it can be inferred in a majority of cases whether mercury or other heavy metal poisoning exists and whether chelation might be useful. A challenge test with a chelating agent and urinary analysis of the metals pulled out is helpful to convince doctors and insurers unfamiliar with chronic mercury poisoning. If tests indicate heavy metal toxicity is present, we have to make sure the gastrointestinal tract and liver are functioning adequately before starting the chelation process. Since early immune injury sets the children up for low resistance to pathogens in general, some practitioners want to address the viral infections if titers are elevated, along with anti-fungal treatment. Others prefer to do the chelation first to see if the body's improved immune system can handle the viruses without anti-viral medications, since the available drugs strong enough to actually kill viruses are too toxic for our children, and the ones we do have are estimated to be about 30% effective at lowering the viral load to the point where the child's immune system can keep the infection controlled. However, we have discovered we cannot wait to treat the gut

pathogen overgrowth; we learned the hard way that chelation appears to be less effective or even ineffective in children with heavy fungal infestation. Since anti-fungals and anti-virals as well as the chelating agents can be sometimes stressful to the liver, the sequence of treatment depends on the doctor's experience and preferences and on the general health and lab tests of the individual child.

Importance of Nutrient Program: A good nutrient program specific to each child is always implemented from 2-4 weeks prior to chelation to make sure there will be no depletion during the detox program, as some of the good minerals may be excreted along with the heavy metals. Once the nutrient program is in place, the gut is in good health, and lab values show adequate kidney and liver function, we begin the oral chelation process with properly spaced doses (per child's weight) of dimercaptosuccinic acid (DMSA), present recommendation being two week cycles of 3 days on and 11 days off. If amalgams are in place they must be removed prior to chelation, and should be removed from ALL children nevertheless in my opinion. Our testing reveals that other toxic heavy metals are often removed in the chelation process also. Then, with regular testing finally showing little or no body mercury being excreted, and not until then, alpha-lipoic acid (ALA) is added (oral or transdermal), this being the only known chelating agent other than cilantro (which is difficult to quantify and administer reliably), which crosses the blood-brain barrier to remove brain mercury. Treatment can take 6 months to 2 or more years depending on how much and how long mercury has been in the brain and/or on other factors as yet unknown.

The nutrient/mineral reinforcement as preparation and careful replacement during chelation must be accompanied by avoidance of any further known contamination from the environment or from foods or medicines (and especially vaccines with thimerosal!) Mono-vaccines are preferable to the triples, and parents must start insisting on these in order to get the physicians and vaccine makers to comply. Finally, no child should ever be vaccinated while ill in any way, and if other children in the family have developmental delay, the question of vaccines has to be very carefully considered and all the latest vaccine information obtained before proceeding. Titers may need to be checked to make sure there is a need for boosters. Needless to say, this bio-medical treatment does not obviate the need for ongoing educational and rehabilitation training to compensate for any delay present to fill in the missing elements of each child's development.

Role of Doctors and Parents In This Treatment Approach: This kind of extensive evaluation, diagnostic tests with proper interpretation, and dedicated follow-up with chelation dosages and nutrient management make detoxification challenging for both physician and parents, not to mention the child. Responsible lab testing, assessment of pre-chelation blood and chemistry status, ever-changing medication needs, requirement for periodic testing to check amount of mercury being removed and an ongoing relationship between parent(s) and physician are all important to this process. The professional effort and time required make this process unattractive to many busy pediatricians and HMO groups; many professionals take it on only after encountering these developmental disorders in their own loved ones. Health insurance payment is variable and many tests will not be covered (insurance reform is important as well as vaccine reform to help parents pay for the treatment of this very complex disease). Parents must fight to get coverage, and sometimes threatening litigation with a willingness to follow through is the only way proper coverage may be obtained.

It is very important for parents to be informed so they can intelligently participate in these medical decisions especially since they are doing the long-term administering of these treatments and know their children and their children's health history and response pattern better than any physician could. They should also be advised to keep copies of all their lab reports and understand as much as possible every medical intervention given their child. So many parents who totally trusted their doctors and our health system have now become disenchanted with the system, and realize they are their child's best advocate and often have to educate their doctors about this new kind of disorder and new treatments.

Chelation is associated in many people's minds with elderly people getting hours-long daily IV treatment for arteriosclerosis, and many doctors are not yet aware of safe oral chelation treatment for children except for lead poisoning, a very prevalent and serious toxicity problem but with a much different protocol. When parents first present the idea of mercury toxicity and chelation to their doctors, many of my colleagues are reluctant to look into it, considering it "alternative" or "fringe" medicine. I strongly believe it is one of the most important pieces of the autism-ADHD spectrum puzzle yet discovered, tying together many of the disparate gastrointestinal, neurological, endocrinological, and immune-deficiency symptoms in these children. It is especially important since we can safely and effectively provide treatment if the proper evaluation indicates there is toxicity present. Often younger children improve with the pre-chelation nutrient program, diet, and probiotics remarkably and quickly so, lending credence to what is known about heavy metals' effect of diminishing the ability of body and particularly brain cells to take in proper nutrients for optimal functioning. Obviously younger patients have a better chance of being cured of permanent brain damage, but older children are often showing much benefit from this process also, particularly if treated prior to puberty.

One of the side effects of oral chelation for some children is a heightened susceptibility to yeast overgrowth activated by the sulfur compounds that are part of the chelating agents. For those children who prove to have such immature or impaired gastrointestinal tracts that these infections and treatments interfere or delay our chelation efforts, I have begun exploring and putting into effect an alternative to DMSA chelation for some children who on testing show disturbed metal metabolism. I may start out with this protocol for those children who are having severe yeast infections prior to even starting DMSA chelation. This is a perhaps slower but more "natural" detoxification program in the form of a nutrient protocol designed by Dr. William Walsh at Pfeiffer Clinic in Illinois called the metallothionein promotion protocol. (5)

Detoxification treatment knowledge is still in the early stages, with protocols changing as our clinical experience dictates. Still, the critical time factor for our children being helped makes it imperative to proceed as quickly as possible with what we already know as long as we do not harm them. At this early stage, we may be testing much more than we may need to later on as we know more, but we are still fine-tuning this protocol so precautions are taken very seriously.

Summary: In summary, I feel that all children who have serious attention, behavior, and learning problems should be given a bio-medical evaluation including a heavy metal toxicity work-up. **These children are medically ill and their brains are starving.** I urge parents

to become informed and doctors to become interested enough to educate themselves on bio-medical approaches to this disorder now reaching epidemic proportions. A well-functioning immune system is the primary key to good health. Ever-increasing toxins all over the world now require all of us to become aware of this exposure and avoid environments, foods, and medical treatments especially vaccinations and excessive antibiotics that will impair our immunity. Increased awareness at the personal and parental level is essential and will hopefully eventually influence governments to expand their awareness of the connection between increased toxins and impaired immunity. It is clear that immune system health through enlightened nutrition and education about elimination/avoidance of toxins is the medicine of the present and the future.

- (1) IN HARM'S WAY: TOXIC THREATS TO CHILD DEVELOPMENT
(Cambridge, MA; Greater Boston Physicians for Social Responsibility, May 2000)
www.igc.org/psr/ or paper copy, 617-497-7440
- (2) Autism numbers from US Dept. of Education, 21st Annual Report to Congress on the Implementation of Individuals with Disabilities Education Act,
www.ed.gov/offices/OSERS/osep/oswp99AnlRpt/
- (3) AUTISM: A NOVEL FORM OF MERCURY POISONING, by Bernard, Enayati, Redwood, Roger, Binstock comparing mercury poisoning and autism, Autism Research Institute's website: www.autism.com/ari
- (4) Autism Research Institute, MERCURY DETOXIFICATION OF AUTISTIC CHILDREN, CONSENSUS POSITION PAPER/2001: www.autism.com/ari
- (5) Metallothionein and Autism; Booklet published by Pfeiffer Treatment Center, Naperville IL, October 2001

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