

Autism: A Twisted Tale of Virus and Thimerosal

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Introduction

I am often asked why I work in the field of autism, as my own children are not autistic. It seems that many doctors feel compelled to work in this field because they have children of their own that are autistic. It is precisely because of the fact that I am blessed to have three healthy children that I want to help others to have that same gift in their lives. In addition, I am blessed to have the luxury of taking on a limited number of patients with whom I am able to spend a great deal of time to customize and individualize their recovery programs. This affords me the opportunity to gain an intimate understanding of some of the issues in autism. Finally, I am blessed to have a diverse practice that specializes in neurological and chronic inflammation. This enables me to learn from individuals with single imbalances in the body, and then apply these principles to the more complex issues that are encountered in autism.

I have been researching and working with inflammatory pathways in the body since my doctoral work at Albany Medical College. I have always felt that it is critical to understand why something is happening in order to make informed choices directed at correcting the imbalance, and to share that knowledge in an effort to help the affected individuals on their path to healing. It is my belief that the more one understands the pathogenesis that leads to a particular condition, the easier it is to ascertain effective strategies to truly resolve the problem rather than simply eliminating symptoms. This is especially true for autism where every child is so unique. "Autism" is a broad category which, for the most part, is based on developmental and behavioral characteristics. Within this broad category are children with a great diversity of biochemical imbalances. In most cases it is incumbent upon the parent to make individualized decisions about their own child's welfare. The better these parents understand the causes and the processes that underlie the condition we call autism, the easier it is for them to make informed choices for their child's individual needs.

I have written at length about the role of excitotoxins in the pathogenesis of autism.¹ A subsequent paper by the world expert on excitotoxins, Dr. Russell Blaylock, has substantiated this work.² These papers illustrate that glutamate and excitotoxins are key factors in the observed behaviors and pathology of autism. However, excitotoxins are not the cause of autism, even if they are a crucial part of the pathway by which the condition progresses. In my continuing effort to understand the pathway that leads to autism, I have reason to believe that a condition of chronic viral infection exists involving all three of the viruses in the MMR vaccine. The chronic measles, mumps and rubella in these children can account for many of their symptoms. I have observed the impact of each of these viruses in these children and have found them to result in imbalances in one or more organ systems. Furthermore, it is my belief that the preservative thimerosal helps to create this problem of chronic viral infection. Thimerosal may play an even more insidious role in the development of autism beyond its role in potential mercury toxicity.

The Role of Thimerosal

The toxic effects of mercury have been well characterized and documented. Many of the symptoms seen in autism resemble aspects of mercury toxicity. It has been assumed that thimerosal breaks down into ethylmercury in the body, and the released ethyl mercury causes the toxicity problems in the body. In experimental studies, thimerosal has been used as a thiol titration reagent. This would suggest, that at least experimentally, thimerosal can break down in such a way as to expose the thiol group.³ A further argument posed for the breakdown of thimerosal is that ethylmercury is known to have a high affinity for sulfhydryl groups and will exchange readily to bind to available sulfhydryl groups.⁵ Yet the chemical structure of thimerosal is such that the ethylmercury group is covalently bound to sulfhydryl groups; at least partially satisfying this affinity for sulfhydryl groups.

Neither of these points address the actual issue of the degradation of thimerosal in the body. A report from the National Toxicology Program clearly states that the rate of physiological degradation of thimerosal has not been addressed. The report goes on to say that "there is no information which proves the extent to which thimerosal is metabolized following administration to animals or humans."⁴

I do believe that thimerosal can break down in the body to yield ethylmercury and cause the toxic consequences that occur as a result of this release. However, I think that it is possible that some portion of the thimerosal may not breakdown completely to ethyl mercury. The thimerosal can assume at least two other, potentially more dangerous structural conformations. Based on my extensive work in molecular biology and DNA and RNA synthesis, I can see where it is possible for thimerosal to mimic the actual building blocks for DNA or RNA synthesis in the body. These "thimerosal building blocks" would contain the mercury molecule. This has the potential to create a condition where the mercury is stably integrated into the nucleic acids, DNA or RNA.

The use of modified DNA or RNA bases (building blocks) for incorporation into full-length nucleic acids is a well-known and very routine technique in molecular biology. A wide variety of modified DNA or RNA bases are used for analytical, diagnostic, and therapeutic purposes. Many of the compounds that are used as antiviral agents or anticancer compounds are modified nucleic acid bases.^{6,7} The reason for using these modified bases as therapeutic agents is that they incorporate into the natural growing RNA or DNA in the body, but then they inhibit the continuation of this growth process. In other words, the incorporation of modified bases can create a scenario where the RNA or DNA becomes "stuck" at a given point, with the modified base stably incorporated into the structure.

As early as the 1970's it was shown that mercurated nucleotides (DNA or RNA bases) were incorporated normally into growing DNA strands. Furthermore, these mercurated derivatives were able to interact with enzymes in the body in an analogous fashion to unmodified bases.⁸ The use of mercurated derivatives of DNA and RNA is still in use today.⁹

There are two types of DNA and RNA bases, purines and pyrimidines. Thimerosal is able to form structures that can mimic both purines and pyrimidines:

Compounds that mimic pyrimidines are known as pyrimidine antagonists. These modified bases are capable of binding to enzymes in the body, in addition to their ability to be incorporated into nucleic acids in the body. One of the key enzymes that is a target for current drug therapy is the thymidylate synthetase (TS) enzyme.¹⁰ Strategies to inhibit this enzyme use modified pyrimidine bases to bind and inactivate the enzyme. The modified base binds to the enzyme and the enzyme gets "stuck", and therefore its activity is inhibited. This key enzyme, which is already a target in current modified nucleotide drug therapy, is part of the methylation pathway. Inhibition of this enzyme would result in abnormalities in methylation.

Compounds that mimic purines are known as purine antagonists. These compounds can inhibit the enzyme HGPRT (hypoxanthine guanine phosphoribosyl transferase).¹¹ Inhibition of this enzyme can result in elevated levels of hypoxanthine, uric acid, and an increase in purine nucleotide synthesis. Severe deficiency of HGPRT is associated with a large number of neurological abnormalities including aggressive and destructive behavior, self-mutilation, and spasticity. Over production of purine nucleotides has been associated with autism.¹² Abnormalities in uric acid and hypoxanthine levels are also often seen in autistic children.

To summarize at this point, I believe that it is possible that thimerosal does not break down completely to ethyl mercury. There is not sufficient evidence at this time to prove that this degradation process goes to completion in the body. This is true for any thimerosal that is used in conjunction with the MMR vaccine, as well as any thimerosal from other vaccines that has remained intact and has not been eliminated from the body. As a result, it is possible that

thimerosal can mimic natural nucleic acid bases in the body. These mercurated nucleic acid bases can then be incorporated into DNA or RNA, or can interact with the TS enzyme, or with the HGPRT enzyme. If the former occurs, one would expect a situation where mercury is stably bound within the body and difficult to remove. If the later occurs one would expect that there would be imbalances in methylation and purine metabolism. Most likely both of these situations exist, and we see evidence of both of these mechanisms at work in autism.

The Viral/Thimerosal Connection

The particular combination of viruses that are used in the MMR vaccine are unique in that all three are single stranded RNA viruses. Measles and mumps are negative stranded RNA retroviruses and rubella is a positive stranded RNA virus. Human cells do not contain enzymes for copying their own RNA. As a result, the viruses bring in their own enzymes with them in order to initiate replication once they have infected a cell. The virus diverts the host's (the human cells) resources for replication of more virus. One of the key components used by the virus for replication are the nucleic acid bases that are needed to produce more viral RNA. Once viral replication begins using the enzyme that the virus has brought in with it, along with host resources, many copies of the viral RNA are made. Required viral proteins are then made; the virus is assembled and packaged.

During this process the virus inhibits host cell functions. This serves the dual purpose of allowing the virus to commandeer the host machinery for its own purposes as well as to ensure that the host cell will die and release all the newly formed viral particles. The newly released viral particles are then free to infect additional cells. However, what happens if the viral particles are not released? The virus remains intracellular and the result is chronic viral infection. In the case of the MMR vaccine and thimerosal, we have a potential situation where some of the nucleic acid bases that are used by the virus to make more viral RNA would contain thimerosal acting as a mimic for a nucleic acid base. In addition any thimerosal from other vaccines that has remained intact and has not been eliminated from the body could be used in a similar fashion.

These growing viral RNAs could then get stuck at various points of their replication. Rather than completing the normal viral life cycle, the result would be a chronic viral infection with thimerosal stably bound within viral RNA that is inside host cells.

Retroviruses like measles or mumps also have the ability to copy their viral RNA into DNA. This DNA copy of the viral RNA is then stably inserted into the host DNA. As already mentioned, rubella differs from the other two vaccine viruses in that it is a positive stranded RNA virus. However, in the presence of retroviruses, variants of the rubella virus have occurred such that the RNA genome of the virus can also be converted into DNA. This DNA is then stably integrated into the DNA of the host cell, analogous to the situation for mumps and measles. If thimerosal is acting to mimic a nucleic acid base it would create a situation of viral persistence as well as the stable incorporation of the mercury into the host DNA.

Purine and pyrimidine mimics are widely used and have a history of demonstrated efficacy as antiviral agents against active, established viral infections.^{6,7} Thimerosal has also been shown to have antiviral activity.¹³ The reason that thimerosal is used in vaccines is for the precise purpose of acting as an antimicrobial preservative (growth inhibitor for microbes-bacteria, viruses, fungi). This indicates that the molecule can inhibit viral growth by some mechanism. I suggest that the mode of action of thimerosal is nucleotide mimicry or enzymatic inhibition, substantiating the hypothesis presented here.

The use of purine and pyrimidine mimics against active, established viral infection is very different than the circumstance that occurs during vaccination with MMR/thimerosal.¹⁴ Vaccination with live virus is designed to trigger viral replication. However, the simultaneous presence of an inhibitor of viral replication is a dangerous proposition. In a circumstance where you are concurrently triggering and inhibiting viral replication, it will be up to the

immune status of the individual host, as to which will actually occur.³⁸ This can create a unique problem for children who are compromised in their ability to rapidly eliminate heavy metals, such as the preservative thimerosal. If the thimerosal is not quickly excreted, it will remain in the system long enough to serve as a nucleotide mimic, making the child susceptible to chronic viral infection. This is true for any thimerosal that is used in conjunction with the MMR vaccine, as well as any thimerosal from other vaccines that has remained intact, or any other mercury that has accumulated and has not been eliminated from the body.

Removal of Mercury

If the scenario described above is operating with respect to thimerosal, it would help to explain the difficulty in removing mercury from autistic children. It would be necessary to trigger the elimination of chronic virus in order to fully eradicate thimerosal from the body. There are a number of agents that are currently utilized for chelation of heavy metals. These include DMSA, EDTA, glutathione, alpha lipoic acid³⁷, and garlic. Each of these agents also has antiviral capabilities. Garlic is well known as an antiviral, antifungal, antibacterial nutritional supplement. Glutathione is one of the body's most important defense mechanisms against viruses. In fact, in the case of HIV infection, a major determinant in preventing active AIDS infection is the individuals' glutathione level. There are examples in the literature of EDTA eliciting virus from cells, and I have personally documented this in my own practice.¹⁵ DMSA, which is widely held as solely a mercury chelator, has been described to have antiviral activity; more specifically anti-retroviral activity.^{16,17} It is possible, and based on my own observations, I consider it probable that these chelating agents act to both chelate mercury as well as to trigger chronic virus containing thimerosal from the body. I believe that the "detox rash" that most parents of autistic children are familiar with, may actually be in part a viral rash, as chronic virus is eliminated from the body.

The Viruses Themselves

I believe that each of the viruses of the MMR vaccine sets up "housekeeping" in a chronic fashion in different organs in the body. As one triggers viral elimination, it is possible to see differential effects on the various organs.

I agree with Dr. Wakefield that the measles portion of the vaccine tends to create a chronic viral infection that "sets up housekeeping" in the intestinal tract. I feel that it is the measles portion of the vaccine that also creates many of the visual problems or stims that are seen in autistic behavior. As measles virus is presumably eliminated from autistic children, one sees an improvement in the gut, bowel movements and a lessening of eye stims. In my practice, I also work with a number of individuals with Crohn's disease and ulcerative colitis. I have found that one can eliminate the symptoms of the disease without active elimination of virus. The key to eliminating symptoms in these individuals appears to be the use of supplements that reduce the inflammatory mediators TNF alpha, and also help to restore a normal TH1/TH2 balance in the immune system. While this strategy is useful in helping the isolated gut symptoms in autism, it is preferable to eliminate virus due to the more severe effects of chronic measles infection in these children.

The nature and magnitude of the effects of chronic measles infection can be exemplified by the disease known as subacute sclerosing panencephalitis (SSPE). SSPE is a chronic measles infection that occurs more frequently in boys than in girls. While the manifestations of SSPE occur 6-8 years after measles infection, the early stages of SSPE have a striking similarity to the onset of autism. The onset includes "progressive behavioral and intellectual deterioration that can include psychological difficulties, personality changes, declining school performance, impaired memory, altered judgement and motor coordination." Later manifestations of this chronic disease include seizure activity, ocular abnormalities, ataxia, dyskinesia, neurological deficits, visual and speech impairment, and mutism.¹⁸ Fortunately, the similarities between autism and SSPE end there, as SSPE is ultimately a fatal disease.

In addition to the measles infection that has been well characterized by Wakefield, it is my belief that these children have problems with chronic viral infections from each of the other viruses in the MMR- mumps and rubella.

I believe that rubella tends to specifically affect the pancreas, or "set up housekeeping" in the pancreas. The results of this chronic viral infection of the pancreas potentially include sugar regulation imbalances, decreased levels of vitamin K and decreased secretion of a variety of pancreatic enzymes. Decreased release of gastric inhibitory peptide from the pancreas can lead to acid excess in the gut and the consequent yeast/bacterial issues. The enzyme GAD (glutamic acid decarboxylase) is also synthesized in the pancreas and is crucial for the regulation of glutamate and GABA. The critical importance of the balance between glutamate and GABA has been written about at length, both by Dr. Blaylock and myself.^{1,2} These papers also discuss the central role of excess glutamate and lack of GABA in the development of autistic spectrum disorders. The recent finding that copper suppresses GABA ties together pancreatic damage to disruptions in copper/zinc ratios in the body.³⁶

CCK is yet another product of the pancreas. Decreased levels of CCK in the brain are related to "idiopathic environmental intolerance".¹⁹ This is a psychological disorder that is characterized by impairment of normal social and vocational functioning and is also correlated with anxiety and panic. This condition is reminiscent of some of the socialization issues seen in children with autistic type behavior. Decreased release of secretin from the pancreas has been postulated to be involved with speech difficulties. Secretin that is released by Purkinje cells in the brain may regulate cells nearby to produce GABA. In addition, secretin appears to activate neurons in the amygdala, an area of the brain that integrates social and emotional stimuli.²⁰

The effects of singular rubella vaccination are exemplified by some of the cases I have seen in my practice. I work with an individual in her early forties who received rubella as a separate vaccine when it was available in 1969. She developed type I diabetes following the rubella vaccine at the age of 8; she was not born with type I diabetes. It is known that type I diabetes causes damage in the pancreas, abnormal sugar regulation and destruction of the GAD enzyme in the pancreas that converts glutamate to GABA. This clinical picture is reminiscent of some of the imbalances one sees in autism. There is yet another case of a 41-year-old individual who was vaccinated with the rubella portion of the vaccine in the early seventies. She developed mild anxiety/panic disorder following vaccination. Excessive anxiety and panic disorder can be related to GABA imbalances and sugar imbalances.²¹ This same individual was re-vaccinated for rubella after the birth of each of her four children. Shortly after the last vaccination, this woman has displayed severe hypoglycemia, tendency to seizures, acute panic and anxiety disorder to the point of agoraphobia. This condition has persisted for the past 7 years. One can see the potential influence of singular chronic viral infections when looking at cases of individual vaccination.

I believe that the mumps virus "sets up housekeeping" in the regions of the body that affect hormonal balance- the testes or the ovaries. Severe mumps infection is known to result in orchitis and oophritis. For the past year I have been looking at the relationship between hormone levels and autistic type behavior in both males and females. As a result of this work I have found significant hormonal imbalances. These imbalances are not always of the same pattern or nature. This would be expected, as all children deemed "autistic" do not necessarily exhibit the same biochemical imbalances.

Some of the male children I work with appear to be completely devoid of testosterone. Others are completely devoid of DHEA. On the other hand, some have testosterone levels that are in the normal and even high range, yet their lutenizing hormone levels are still exceedingly high. Some of these hormonal irregularities can be balanced with the use of supplements that support hormone levels. Following a program to support viral elimination from the body, the need for these supplements is decreased or eliminated.

These major imbalances in hormone levels may be the crux of the problem in terms of the "age related myth" concerning autism. The myth I am referring to is the common notion that you have to catch and reverse autism by the age of 5, otherwise it is impossible to reverse. This age constraint puts additional pressure on parents of autistic children, who are already feeling crushed under the weight of emotional, time and financial pressure. In my practice, I have not found that age is a factor in working with autism. The discrepancy between actual hormone levels and required hormone levels becomes greater as the child ages. As a result, the problems associated with lack of appropriate hormones are exacerbated with increasing age. If one addresses the hormone imbalances then the age of the child is no longer a factor in working with autism. One of the adolescents that I have been working with for the past year and a half is now 17. Recently his math teacher wrote a problem on the blackboard and offered \$5.00 to whomever finished it first. Within 15 minutes this individual finished the problem correctly. Later, the teacher confided to the mother that he had made the monetary offer, but had not expected anyone to solve the problem. The teacher needed half an hour to figure out the answer for himself, while this adolescent had the answer in half the time!

Symptoms of severe mumps infection also include the inability to feel pain. Based on the lack of hormones and hormonal imbalances, it is possible that chronic mumps infection also suppresses emotions as well as suppressing pain. Consistent with this hypothesis is the finding that during the course of viral elimination one sees mood swings that would represent an ability to recognize and respond emotionally.

I believe that in some cases the mumps infection is severe enough to cause damage or chronic infection of the parotids. It is expected that triggering viral elimination in these cases will result in language improvement in children with limited language abilities.

In addition to the difficulties encountered with specific viruses, there are also the general consequences of chronic viral infection on the body. Many viruses have been documented to trigger the synthesis of host metallothionein proteins.^{22,23,24} While the short-term effect of this would be expected to be beneficial, the long-term effect could be the depletion of MT proteins in the body. It would be difficult to replenish these proteins once they are depleted due to the overall lack of sulfur seen in many of these children. In addition, it is possible that these MT proteins that are triggered in response to viral infection are able to bind the heavy metals in the body. However, unlike MT proteins that are made in response to cellular signals, these viral triggered MT act to sequester the metals inside the cell. It is important to remember that viruses are parasites, they are not free living organisms. It is in the best interest of the virus to keep "the host", in this case the child, immunocompromised so that the virus continues to have a home. If the virus is able to aid in trapping heavy metals inside the cells, it would certainly help to keep the host immunocompromised. Chronic viral infection would also have the consequence of continually activating the immune system. This could result in a depletion of key regulatory mediators of the immune system as well as a chronic inflammatory condition. This chronic inflammatory condition would lead directly into the excitotoxin situation that I have previously written about at length.¹

Why Not Everyone?

I feel that any explanation for autism should address the issue of why everyone who is vaccinated does not become autistic. This has been one of the arguments regarding the involvement of the MMR vaccine and thimerosal in autism. I believe that there are certain predisposing factors that cause a particular child to be susceptible to autism following vaccination with the MMR vaccine. These predisposing factors include high glutamate levels, liver dysfunction, certain blood types, a family history of alcoholism, liver problems or neurological inflammation, heavy metal levels of the mother, and underlying chronic viral or bacterial infections of the mother, among others.¹ I believe a key factor is an underlying streptococcal infection. Virtually all of the children that I work with have had incidents of ear infections or streptococcal infections early in childhood. There is evidence that individuals with

certain blood types or with a particular genetic makeup are more susceptible to streptococcal infection.^{1,25} This may explain some of the "selectivity" seen with respect to autism.

I believe that it is likely that the streptococcus permanently resides as part of the bacteria or flora in the nasopharyngeal cavity of these children who are highly susceptible to streptococci. The mucous system in our nasal passages flushes bacteria and viruses into our stomach. It is easy to see how under "compromised conditions", streptococci could survive the stomach and make its way to the intestinal tract. Gastric reflux has been implicated as a factor in ear infections.²⁶ It is not surprising then, to note that in addition to its role in ear infections and strep throat, streptococcus has been implicated in leaky gut.²⁷

Gut flora changes play a major role in causing the increased intestinal membrane permeability that is seen with leaky gut. Depletion of glutathione is a common occurrence in leaky gut. Streptococcal infection, or the presence of chronic or recent infection, depletes glutathione levels.²⁸ High glutamate levels also result in the depletion of glutathione.²⁹ Streptococcal infection is also more likely to be an issue in individuals with high glutamate levels, as glutamate is related to virulence in streptococci. Streptococcus flourishes in a high glutamate, low glutathione environment.^{30,31} Thus, the combined effects of changes in gut flora and depleted glutathione lay the groundwork for leaky gut.

Streptococci have the ability to behave as opportunistic organisms and reside in the body as a part of the normal flora, waiting for an opportune moment to cause active infection. I work with several women in my practice who get strep throat every month coinciding with their menstrual cycle. This is not surprising considering that both glutathione levels and glutamate levels are affected by estrogen. While glutathione levels hit their monthly low just before menstruation, glutamate levels are increased in response to estrogen.^{32,33}

Streptococcus synthesizes a number of proteins to aid in its virulence. These proteins encompass several toxins that increase its virulence, including a toxin that resembles the zinc metalloprotease. This toxin binds zinc and can lead to zinc imbalances.³⁴ As previously mentioned, streptococcus helps to deplete glutathione levels. It has been found that mercury elimination is partially dependent on glutathione. Furthermore, it has been suggested that glutathione may play a role in metallothionein synthesis.³⁵ Metallothioneins are the proteins involved in binding heavy metals in the body. Consequently, streptococcal infection creates a situation that depletes the body of proteins involved in viral defense and heavy metal elimination and predisposes an individual to leaky gut. Combined, this would create an environment where it would be difficult for the child to quickly eliminate thimerosal. Given this environment, the MMR vaccine potentially causes the most damage. If the hypothesis presented here is correct, it is essential for a child to be able to rapidly eliminate thimerosal before it has a chance to become stably incorporated in viral nucleic acids, to interact with crucial enzymes, or to become trapped within the cells. Inoculation with viruses that have the ability to create chronic infection can create havoc in an infant who is particularly susceptible due to underlying streptococcal infection, or any number of other predisposing factors.

One child that I work with had an especially severe streptococcal infection from birth. The infection was so deeply rooted that surgery was necessary to remove a streptococcal abscess from the shoulder bone. This child has severe issues with aggressive behavior and anxiety. He is extremely bright yet is severely delayed in reading ability. His body is unable to handle heavy metals as evidenced by urine, stool and hair metal analysis. Many of his biochemical parameters are abnormal. This child is not autistic and has no delayed language or issues with eye contact or social interactions. This child was never vaccinated.

An Approach to Healing

As already discussed, one of my goals is to share my knowledge, observations and experience so that others might have the tools they need to help heal their own children. I believe that knowledge is power, and the more you know the more power you have over your condition. I

have found that "autism" is a general catchall phase, and children with very different biochemical imbalances are thrust together in this category. Therefore, while there are some universal generalities, the specific plan of treatment depends on the specific needs of each individual child. It is for this reason that I spend up to an hour a week with many parents when we first begin the journey of attempting to halt the progression of autism.

The program that we use at Holistic Health Consultants has three basic phases:

Reinforce the child's diet with a variety of herbs, vitamins, and nutritional supplements. The idea is to compensate for any imbalances in the body due to the malfunctioning of a number of organ systems. The number of supplements utilized varies from approximately 5 to 50 or more, depending on the severity and the number of the imbalances in an individual child. The systems or imbalances that may require supplementation include the pancreas, the intestinal tract, excessive acid production in the stomach, the liver, hormonal imbalances, thyroid, adrenals, and neurotransmitter imbalances among others.

Once we are seeing less stims, better eye contact, increased social ability, increased language, improved cognitive abilities, less tantrums and/or aggressive behavior, we are then ready to move on. At this point the body is more balanced and is functioning properly. This verifies the fact that the supplementation in phase 1 has done its job. At this point we phase out of the "multiple individual" supplementation program and switch to a "whole organ" supplementation program. The idea behind this phase of supplementation is to strengthen and support the organs in general and the immune system specifically.

Phase 3 is the "elimination" part of the program. Supplements are added during this phase to help support the body's natural ability to eliminate chronic virus and heavy metals. The supplementation program from phase 2 continues into phase 3 to ensure that the immune system and other organs are well supported during this phase.

Some children need as few as five supplements in phase 1. Other children may require as many as fifty supplements in phase 1, as well as phase 2 and phase 3 of the program. It truly depends on the needs of each individual child. The standards that I set for improvement are high. I am not content that a child is simply doing better than they were before working with me- I expect that to occur. My goal is for the children that I work with to reach the same level that I set for my own children. It is this level of achievement is what I strive for in the children I work with. As I have previously written, I believe that autistic children are extremely intelligent. It is precisely because of their high intelligence, and additional glutamate receptors that they are particularly susceptible to autism.¹ The problem is not with input, it is with output. The purpose of phases 1-3 is to address and modify the output problem.

I have not yet reached a ceiling with any of the other types of neurological cases that I work with (ALS, SLE, Parkinson's, MS, Myasthenia gravis) and I do not anticipate a ceiling for autism. What I mean by this is that the people I work with continue to improve without reaching a plateau. I work with an individual who has a form of ALS. Over the past 2 years his ALS has ceased to progress, and in fact most of his symptoms have dissipated. This is what I expect to see from the autistic children that I work with.

Finally, I believe that the incidence of autism would drop rather than continuing to increase at such an alarming rate, given the following simple parameters:

1. Ongoing universal vaginal screening and treatment program for maternal streptococcal infection. Streptococcus is routinely isolated from vaginal cultures. This could represent an initial form of exposure of this pathogen to the newborn. The recent practice of screening pregnant woman for vaginal streptococci and treating at delivery may help to reduce the incidence of autism if streptococcal infection is in fact a predisposing condition as I suspect. While this would not entirely eliminate the problem, as many infants contract streptococcal infections through the respiratory

- route of transmission, it would certainly help to reduce the incidence of underlying streptococcal infection.
2. Parents should wait to vaccinate any child until they are thoroughly clear of any evidence of streptococcal infection, ear infections and off antibiotics for at least a week to be certain of no relapses. From my own personal experience this may mean postponing vaccines month after month if your child has been sick. Two out of three of my daughters had what seemed to be one constant ear infection for the first nine months of their lives. They were winter babies, and this may have contributed to the problem. Much to the chagrin of the pediatrician we continued to postpone vaccinations. It finally reached the point where I would send my husband to the doctor with the girls; I was tired of getting the lecture and exasperated looks upon postponing vaccines for yet another month. This brings up another point. Pediatricians need to be made aware and to be sensitive to fact that this is a very serious issue. It would be helpful if doctors did not use their influence to suggest that children receive vaccines if they are only "a little sick", or still taking antibiotics. Under these circumstances I know that I felt pressured to vaccinate my children by our pediatrician.
 3. Parents should be aware of predisposing conditions in addition to streptococcal infections that may make a child more susceptible to autism. These conditions can include any type of recent or chronic infection of the child, recent use of tylenol (severely depletes glutathione), family history of liver disease or alcoholism, intolerance to dairy or wheat products, asthma, heavy metal levels of the mother, and underlying chronic viral infections of the mother, among others. I also believe there may be a relationship between adult vaccination of the mother and autism in the child. This is a preliminary observation, but worth mentioning. Many of the mothers of the autistic children that I work with are either teachers, nurses, work in a hospital or hold a job that required vaccination. Other mothers received passive immunization through direct viral exposure following vaccination and active viral infection from siblings. This may be an additional predisposing factor for autism. Certainly every teacher, nurse, hospital worker, or doctor does not have an autistic child so this is not a direct correlation. Perhaps a more delayed vaccination schedule and greater caution should be exercised when vaccinating children whose mother received vaccinations, or significant viral exposure as an adult.
 4. Finally, I think a lot of heartache could be avoided if changes were made in the timetable for required vaccines. The immune system of a young child is trying to determine "what's me" and "what's not me". In immunology lingo this is part of the development of self-tolerance. I personally believe that if we vaccinate children too young, we interfere with this delicate process of developing tolerance and run the risk of a whole host of immunological problems, now or later in life. Years ago, when I was involved in the development of the Haemophilus influenza vaccine, I clearly remember the difficulties we encountered with early versions of the vaccine. It appeared that the vaccine was not immunogenic in children under two, which was precisely the population one desired to protect. It was not until the HIB vaccine was given simultaneously with other vaccines that the immune system responded. I left the vaccine program at that time, as I had questions about the direction of the project. As a result I do not know if it simply was not a strong enough immunogen or if we needed to trick the immune system in order for it to respond. Regardless, based on this experience, my personal opinion is that one waits to vaccinate with the MMR until the immune system has a chance to become more mature; certainly no sooner than the age of two.

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