

## The Case for a Link to Autism Spectrum Disorders

By Russell L. Blaylock, M.D.

In 1976, children received 10 vaccines before attending school. Today they will receive over 36 injections. The American Academy of Pediatrics and the Center for Disease Control assured parents that it was safe to not only give these vaccines, but that they could be given at one time with complete safety.

Is this true? Or are we being lied to on a grand scale?

The medical establishment has created a set of terms, which they use constantly to boost their egos and firm up their authority as the unique holders of medical wisdom—the mantra is “**evidence-based medicine**”, as if everything outside their anointing touch is bogus and suspect. A careful examination of many of the accepted treatments reveals that most have little or no scientific “evidence-based” data to support it.

One often repeated study found that almost 80 percent of medical practice had no scientific backing.

This is not to say that medical practice should be purely based on pure and applied science, as understood in the fields of physics and chemistry. Medicine, as pointed out by many of the great men of medicine, is an art. For a discussion on the proper role of medicine I refer the reader to my paper titled *–Regimentation in Medicine and the Death of Creativity–* on my website ([www.russellblaylockmd.com](http://www.russellblaylockmd.com)).

### The Scientific Double Standards of Vaccine Safety

Most men of medicine recognize that some things are obvious without a placebo controlled, double-blind, randomized study. For example, there has never been such a study to see if smashing your finger with a hammer will be painful, but we accept it without such pristine evidence. The same is true with removing brain tumors or sewing up severe lacerations.

I find it interesting that there exist an incredible double standard when it comes to our evidence versus theirs.

The proponents of vaccination safety can just say they are safe, without any supporting evidence what-so-ever, and it is to be accepted without question. They can announce that mercury is not only safe, but that it seems to actually increase the IQ, and we are to accept it. They can proclaim thimerosal safe to use in vaccines without their having ever been a single study on its safety in over 60 years of use, and we are to accept it.

Yet, let me, or anyone else, suggest that excessive vaccination can increase the risk of not only autism, but also schizophrenia and neurodegenerative diseases, and they will scream like banshees –*Where is the evidence? Where is the evidence?*

When we produce study after study, they always proclaim them to be insufficient evidence or unacceptable studies. More often than not, they just completely ignore the evidence. This is despite the fact that we produce dozens or even hundreds of studies that not only demonstrate the link clinically and scientifically, but also clearly show the mechanism by which the damage is being done –even on a molecular level. These include cell culture studies, mixed cell cultures, organotypic tissue studies, *in vivo* animal studies using multiple species and even human studies.

To the defenders of vaccine safety-our evidence is never sufficient and, if we face reality – never will be.

### Scientific Nitpicking Costs Lives

When I was in medical school, there was no proof that cigarette smoking causes lung cancer. The connection was as obvious as the layman’s observation that smashing your finger with a hammer would cause pain and even the town drunk knew it was true, but to the medical elite –there was no proof.

No one had ever produced lung cancer in animals by exposing them to cigarette smoke. In fact, my pathology professor, Dr. Jack Strong, had trained monkeys to chain smoke, and after years of smoking none developed lung cancer. Yet, he was

convinced that smoking caused lung cancer.

Dr. Alton Oschner, founder of the famed Oschner Clinic in New Orleans, led the charge in proclaiming the link between cigarette smoking and lung cancer. It took almost another decade before the medical elite was willing to admit that smoking caused most cases of lung cancer.

Almost 30 years passed from the time some iconoclastic men of medicine tried to convince the medical establishment that smoking caused most cases of lung cancer until it was generally accepted.

The question that needs to be asked is – How many people died of lung cancer, the most prevalent cause of cancer death in the United States, during this time?

Data from the National Cancer Institute estimated that in the year 2004, 157,000 people died of lung cancer. If 80 percent were secondary to smoking that would be 125,000 dead. Over a ten-year period that would be over one million dead and over 30 years almost 4 million people who died from a preventable cause of death that at the time was still being hotly debated by the medical purist. Lung cancer death rates were actually higher during that time period.

So we see that questions of medical importance that are nitpicked to death on points of scientific purity can cost a lot of lives – millions of lives.

### **The Compelling Link Between Autism and the Vaccination Program**

There are over one million children and even adults with autism and the numbers continue to grow. This is a medial disaster of monumental proportions.

The link to the vaccine program is scientifically and logically compelling but these same medical elitists refuse to listen. Like smoking and lung cancer, we have enough proof today to call a halt to the present excessive vaccine program and ban any level of mercury in vaccines.

In 1983, before the autism epidemic began, children received 10 vaccinations before attending school and the autism incidence was 1 in 10,000. Today they are receiving 24 vaccines before 1 year and 36 by the time they attend school and the autism rate is now 1 in 150 births.

Medical “experts” have provided no other explanation for this dramatic and sudden rise in autism cases, despite a draconian effort to find one.

They attempted to say it was genetic, but geneticists were quick to respond that genetic disorders do not suddenly increase in such astronomical proportions. They then said it was because of better diagnosis, despite the fact that the diagnosis is obvious in virtually every case and that the criteria officially accepted for diagnosis has become **more** restrictive not less.

When trapped by a lack of evidence, defenders of a nefarious position resort to their old standby –the epidemiological study.

Statisticians will tell you that the least reliable type of study is an epidemiological study because it is easy to manipulate the data so that the study tells you anything you wish it to.

Every defense offered by vaccine defenders is based on such studies and never the actual science. Then they announce that the issue is settled and no further studies need be done. After the media has been informed that the issue has been settled, those who continue to present the evidence are considered kooks and the great unwashed ignorant.

### **The Autism Disaster: Is It Man Made?**

Today, specialists speak of the autism spectrum disorders (ASD), which include a number of related neurodevelopmental disorders such as classical autism, Rhett’s syndrome, Asperser’s syndrome, childhood disintegrative disorder (CDD) and pervasive developmental disorders not otherwise specified (PDD-NOS).

I have noticed over the years that when specialists know very little about a disorder, they spend an inordinate amount of time naming and sub-classifying it –periodically.

In addition they go to great lengths to define characteristics and symptoms of the disorder that must be present to meet the criteria of classification. Those who fail to meet these criteria are dispensed with into another dimension, that is, they are

ignored.

In the early 1980s, the incidence of autism was 1 in 10,000 births. By 2005, the incidence had leaped to 1 in 250 births and today it is 1 in 150 births and still climbing.

One of the strongest links to this terrible set of disorders was a drastic change in the vaccine programs of the United States and many other countries, which included a dramatic increase in the number of vaccines being given at a very early age.

No other explanation has been forthcoming from the medical elite.

In this paper I shall present evidence, some of which has not been adequately discussed, that provides strong evidence for a connection between excessive vaccination and neurodevelopmental disorders.

In a paper I wrote in 2003, I stated that removing the mercury from vaccines would help relieve the problem, but it would not eliminate it. This was based on a number of studies in the neuroscience literature that indicated that excessive and especially repeated immune stimulation could result in severe disruption of brain development and even neurodegeneration.

In this paper and a follow-up paper, I attributed the central mechanism to excessive and prolonged microglial activation with an interaction between inflammatory cytokines and glutamate receptor subtypes. The Vargas et al study, published two years later in 2005, strongly supported this hypothesis, with the finding of elevated inflammatory cytokines as well as the presence of extensive, widespread activated microglia and astrocytes in examined autistic brains from age 5 years to 44 years of age.

This indicated that the brain's immune activation persisted for decades.

Recent research indicates that this phenomenon is not that uncommon and can be reproduced in the laboratory using a variety of immune stimulating agents and neurotoxins, including mercury and aluminum.

### **Autoimmunity and Vaccinations**

A number of studies have suggested a link between autoimmune disorders and autism risk.

Support comes from studies showing an increased risk of ASD in children of mothers with autoimmune disorders.<sup>1-3</sup> Yet, not all studies agree, since at least one carefully done study found no strong link.<sup>4</sup>

Other more carefully done studies provided evidence suggesting some link. For example, in one study serum from a mother with an autistic child was found to bind immunologically with specific brain cells (Purkinje cells).<sup>5</sup> When this serum was injected into pregnant mice, their babies demonstrated neurological changes suggestive of autistic behavior, indicating a transfer of the autoantibodies into the developing baby mouse.

A number of studies have found autoantibodies in a significantly higher number of autistic children to various brain structures, such as serotonin receptors, myelin basic protein, neuron axon filament protein, nerve growth factor and cerebellar neurofilaments.<sup>6-10</sup>

It should be understood that these autoantibodies are not found in all cases and that they may develop as a result of the damage caused by the disease itself, rather than causing the disease. For example, we know that after a stroke or head injury a substantial number of people will develop autoantibodies to brain proteins. Nevertheless, the autoantibodies can worsen the damage and prolong the damaging pathology.

It has also been demonstrated that methylmercury (from fish) and ethylmercury (in thimerosal) are both powerful immunosuppressants and are associated with a high incidence of autoimmunity.<sup>11</sup> In this study, researchers found that unlike methylmercury, thimerosal (ethylmercury) initially caused immune suppression and then strong TH2-induced autoimmunity. They attributed this to the higher conversion of ethylmercury to ionic mercury (Hg+) than seen with methylmercury.

In fact, one study found that strains of mice highly susceptible to developing autoimmune diseases were sensitive to the ASD-like behavioral effects upon mercury exposure, whereas mouse strains genetically not susceptible to autoimmunity do not develop ASD behaviors.<sup>12</sup>

It is obvious from the extremely high incidence of ASD that these autoimmune-related genes are very common, but they remain silent until triggered by vaccines or other environmental toxins.

Immunologists have now concluded that autoimmune disorders are not the result of excessive activation of a normal immune system, but rather activation of a dysfunctional immune system.

The question remains -- what is causing such widespread immune dysfunction among our population?

### **Immune Dysfunction – The Result of “Bystander Damage”**

Studies have shown that the number of autoimmune diseases has increased over the past 30 years, with asthma, type 1 diabetes and eczema rates increasing over two-fold. There is also compelling evidence to indicate that certain vaccinations are associated with these autoimmune-related conditions.<sup>13,14</sup>

A compelling number of studies have shown an increased incidence of autoimmune reactions in children with autism spectrum disorders (ASD), especially involving measles antigens, milk antigens and antibodies to gliadin and gluten.<sup>15-17</sup> Some of these have been shown to cross-react with brain-derived proteins as well, especially those in the cerebellum, a major structure affected in these disorders.<sup>18</sup>

Recently, neuroscientists have shown that much of the damage done in cases of autoimmunity is not due to direct immune reactions with brain structures, but rather results from the release of storms of free radicals and lipid peroxidation products during the immune reaction, something I call a “hand grenade in a shopping mall effect”. If you use a hand grenade to target a single person in a crowd you will not only kill and injure the intended target, but all of the bystanders as well.

Neuroscientists P.L. McGeer and E.G. McGeer have named this effect **bystander damage**.<sup>19</sup>

The immune attack caused by the autoimmune reaction in the autistic person’s brain damages a number of surrounding structures, especially brain connections called dendrites and synapses. Subsequent studies have confirmed that bystander damage is the most destructive reaction of autoimmunity.

Some studies, as referred to above, have shown that autism is much more common in families with a hereditary tendency for autoimmune diseases, which makes sense because they will have dysfunctional immune systems.

There is also compelling evidence that vaccines themselves can damage the immune system of immature animals, leading to a higher incidence of autoimmunity and abnormal brain development.<sup>20-24</sup> Mercury, even in small concentrations, is also known to induce autoimmunity in a high percentage of those exposed.<sup>11</sup>

Ironically, things that suppress a portion of the immune system, usually cellular type immunity, increase the likelihood of autoimmunity. Immunologists speak about a Th1 to Th2 shift and vice versa. This can occur with exposure to mercury as well as in response to vaccination.<sup>25</sup> A great number of autoimmune diseases are associated with a Th2 shift.

### **How Immune Reactions to Vaccines Differ Depending on Age**

The immune system is a very complex system, which at birth is incompletely formed. This means, and has been confirmed in animal and human studies, that immune reactions to vaccinations differ at different ages, so that small babies have a different reaction than adults. This has been shown with the hepatitis B vaccine now given to newborns.

The rate of maturation of the immune system also differs considerably among babies and children, meaning we cannot say what effect will occur in all children. There are a great many variables, including diet.

The immune system’s reaction to infection and immunization can be quite different. Normally the immune system relies on a shifting of T-lymphocyte function to determine which is better for the particular situation.<sup>26</sup>

The T-helper lymphocytes (Th) can exist as either Th1, Th0, or Th2 forms. When no infection is occurring, the system is in the Th0 mode (an uncommitted phase). If a virus invades, it quickly switches to the Th1 phase, which allows immune cells to secrete a group of cytokines that kill viruses. It also activates immune lymphocytes that kill viruses and bacteria.

At other times, the immune system needs a whole different set of immune signals and cells, which are supplied by the Th2 phase. The Th2 phase favors the production of antibodies, mainly supplied by B-cells, but in general they reduce immune reactions.

Infants are stuck in the Th2 mode during intrauterine life, so as to prevent being immunologically rejected by the mother

during pregnancy (much like transplant rejection), since the baby is seen as a foreign body to the mother's immune system.

Upon birth, the baby remains in a Th2 mode, but has a limited ability to switch to the Th1 defensive mode if the need arises, say from an infection. Months later the baby switches to the adult Th1 mode.

If the baby's immune system remains in a Th2 mode, it has a high risk of developing an autoimmune disorder, such as eczema, asthma or other allergies.

Presently, vaccine authorities recommend every baby be vaccinated with the Hepatitis B vaccine at birth. But, is this safe?

A recent study looked at the immune reaction in newborn infants up to the age of one year who had received the HepB vaccine to see if their immune reaction differed from adults getting the same vaccine.<sup>27</sup> What they found was that the infant, even after age one year, did react differently. Their antibody levels were substantially higher than adults (3-fold higher) and it remained higher throughout the study.

In essence, they found that the babies responded to the vaccine by having an intense Th2 response that persisted long after it should have disappeared, a completely abnormal response.

### **Autistic Children More Prone to Develop Autoimmune Diseases and Infections**

Autistic children have been described as having a Th2 predominance, which would explain their propensity to developing autoimmune diseases and being more susceptible to infections early in life.<sup>20,28-30</sup>

Elevated proinflammatory cytokines, particularly TNF-alpha, have been described in studies of the cytokine profile in autistic children. As we shall see later, an excess production of B-cell cytokines and suppression of T-lymphocyte TH1 activity, as seen in autism, is associated with a high incidence of neurological damage by excitotoxins.

Several things about these immune responses are important to all parents, including effects of such immune over-stimulation during pregnancy. For example, it has been shown that excess immune stimulation, as occurs with vaccination, can significantly increase the risk of a pregnant woman having a child with autism or schizophrenia later in life, depending on when the vaccine is given.<sup>31,32</sup>

In addition, persistent Th2 responses caused by the HepB vaccine puts your child at a great risk of developing an autoimmune disorder and impairing your baby's ability to fight off infections. This means that immediately after birth this vaccine has put your child at a greater risk of all childhood related infections, including H. Influenza meningitis, meningococcal meningitis, rotavirus, measles, chickenpox, etc.

Not only that, but numerous studies have shown that such immune suppression greatly increases the number of severe complications associated with these infections, which means that should your child be exposed to measles or chickenpox they are more likely to suffer neurological damage, seizures or other systemic disorders.<sup>12,33,34</sup>

When this occurs, rather than admit that the science indicates that the vaccine program is the cause of the complications and deaths, the vaccine proponents scream that it demonstrates again the need for greater efforts to vaccinate our children.

### **Immune Suppression by Live Virus Containing Vaccines**

It is also known that certain viruses powerfully suppress immunity, such as the measles virus.<sup>35</sup>

The MMR vaccine contains live measles viruses and recent studies have shown that immune suppression after vaccination with this virus suppresses immunity in a profound way that last as long as six months.<sup>36-41</sup> In fact, the CDC recommends separating this vaccine from other live virus vaccines to prevent viral overgrowth (Yet, they combine it with two other live viruses-rubella and mumps viruses).

Yet, they never address the obvious question – wouldn't this vaccine also make the child more susceptible to other naturally occurring infections such as hemophilus B influenza meningitis, meningococcal meningitis, persistent measles infection, influenza infection and even chickenpox? This has been strongly suggested by a number of studies.<sup>42</sup>

Not only would they be more susceptible, but severe complications and even death would be more common as well.

When death and severe complications occur due to these infections, pediatricians, the CDC and the American Academy of

Pediatrics use this as a justification for more vaccines, never admitting that the increase incidence of these infections and complications was caused by their previous vaccine recommendations.

This risk is especially high in families with a number of other children in the household or in children in day care centers. With a prolonged suppressed immune system, exposure to other sick children would put this child at a high risk of contracting the infection and of having complications or dying from the infection as stated.

Studies have also shown that vaccines that cover only a few strains of a virus or bacteria that naturally have a great number of strains (some have over a hundred strains), can cause a shift in strain dominance so that the strain not included in the vaccine then becomes the dominant disease causing strain. We see this with the meningococcal and pneumococcal vaccines.<sup>43-45</sup>

This is discussed in the scientific literature but the public is never informed. Most pediatricians are completely unaware of this.

When combined with mercury, which is also an immune suppressing substance, the effect is compounded. Fluoroaluminum, formed in fluoridated drinking water, also interferes with immune function, as do many insecticides and herbicides used around the home.<sup>46</sup>

Often forgotten, is the substantial evidence that omega-6 oils powerfully induce inflammation and immune suppression when consumed in large amounts. Those eating a Western diet are consuming 50-fold higher amounts of this type of oil (called linoleic acid) than needed for health. These oils include corn, safflower, sunflower, canola, peanut and soybean oils. So, we see that the average child is exposed to a number of substances in their food and environment that can also alter immunity, making them not only more susceptible to natural infection, but also to vaccine complications.

In essence, by over-vaccinating our children, public health officials are weakening their immune system, making them more susceptible to a number of infections and less able to combat the infections. This gives them an endless source of "horror stories" to justify even more vaccines.

Remember also that mercury is an immune suppressant, both from vaccines and seafood contamination.

One can see that a pregnant mother having dental amalgam fillings, who eats a diet high in methylmercury-containing seafood, and living in an area with high atmospheric mercury, such as West Texas, would be at a greater risk of having an autistic child than one not exposed to these other sources of mercury.

These differences in environmental mercury exposure are never considered by those insisting all children have the same vaccines, including mercury-containing vaccines such as the flu vaccine.

### **The Autistic Prone Child**

What is becoming obvious is that certain children are at a higher risk of developing autism than others, for a variety of reasons.

It is also obvious that these newborns and small children develop infections at a higher rate than less vulnerable children. This may be because of a developmental immune deficiency, which can affect only a portion of the immune system and so be easily missed by their pediatrician. Indeed, it has been noted that a great number of cases of childhood immune deficiencies are missed by practicing pediatricians, especially the more subtle cases, which may make up the majority of ASD-prone children.

For example, many physicians treating autistic children have noted a high incidence of ear infections. These are treated with broad-spectrum antibiotics, which often lead to a high incidence of Candida overgrowth in the child's body.

Both infections will prime the microglia in the child's brain – which is the brain's specific resident immune cell. This priming effect shifts these normally resting microglia immune cells into overdrive.<sup>47</sup> If stimulated again within weeks or even months, they generate extremely high levels of free radicals, lipid peroxidation products, inflammatory cytokines and two excitotoxins glutamate and quinolinic acid.<sup>48</sup>

### **Studies have shown that this is the major mechanism for both viral and vaccine-related brain injury.**

The high incidence of infection in these children indicates the possibility of preexisting immune system dysfunction. As

stated, this also increases the risk of an autoimmune reaction.

The stage is then set for the autism cascade to develop and this can be triggered by early vaccination or a recurrent infection. Remember, the microglia have been primed, either by a natural infection or an earlier vaccination (such as the hepatitis B vaccine given soon after birth).

The vaccine is different from a natural infection in that the vaccine produces brain immune stimulation for very prolonged periods.

It has been proven, in both animal studies and human studies, that systemic infections or immune activation by vaccines, rapidly activate the brain's microglial system and can, in the case of vaccines, do so for prolonged periods.<sup>49-53</sup> Once the primed microglia are reactivated by the subsequent vaccination or infection, the microglia activate fully and pour out their destructive elements as discussed above.

With a natural infection, the immune system quickly clears the infection and then shuts off the immune activation, thus allowing repair of what damage was done. This shutting down of the microglia is very important. There is evidence that with repeated and excessive vaccine-triggered immune stimulation, the microglia do not shut down.<sup>47</sup>

This is what was found in the *Vargas et al* study, in which they examined the brains of 11 autistics from age 5 years to 44 years of age dying without active infectious diseases as compared to age matched controls.<sup>54</sup> That is, they found widespread activation of inflammatory cells (microglia and astrocytes) in the brains of the autistic patients. This explains the widespread brain damage seen in all autism cases.

This study was one of the most carefully conducted, extensive examinations of the immune reactions in the autistic brain ever done and involved immunocytochemistry, cytokine protein assays and enzyme-linked immunosorbent assays of the brain tissue. They also performed similar assays of spinal fluid from an additional six living autistic patients, which confirmed the intense immune activation and inflammation.

The average child receiving all of the recommended vaccines will have some 24 inoculations by age one year and 36 by the time they enter school.

**Most of these will be spaced within one month of each other, which means the priming and activation cycle of the microglia will be continuous.** In addition, the dose of immune stimulants is excessive. At birth they receive 1 vaccine, at two months of age they receive 6 additional vaccines, at four months of age 5 vaccines, at age six months 7 vaccines and at age one year, 5 vaccines.

In addition, should they follow the new CDC recommendation; they will receive the flu vaccine every year starting at age 6 month through age 18 years. These vaccines contain a full dose of thimerosal mercury.

In addition, we must consider the effect of the measles and rubella portions of the MMR vaccine, which begins at age 1 year. The profound immune suppression, which last up to 6 months after it is given, will not only increase the risk of developing other infections, but will increase the risk of an autoimmune reaction and measles virus persistence in the brain.

Cytomegalovirus is also a powerful immune suppressing virus that commonly infects newborns and small children, especially if they are immune suppressed.

So, we see that giving a live, immunosuppressant vaccine early in life can dramatically increase the risk of autoimmune disorders, increase microglial brain injury as well as increase the risk of infection by other immune-suppressing viruses and pathogenic organisms. And, it dramatically increases the risk of your child developing one of the autism spectrum disorders.

It should also be appreciated that the *Candida* infections in these children trigger a prolonged systemic immune reaction, which means a prolonged brain immune response as well and a worsening of any autoimmune disorder it may have produced.

## Seizures and Autism

It is estimated that 30 percent to as high as 82 percent of autistic children develop seizures, depending on the sensitivity of the examination.<sup>55-56</sup>

Growing evidence indicates that there is a close correlation between brain inflammation (by microglial released inflammatory cytokines and glutamate) and seizures, just as we see with excessive brain immune stimulation with vaccines. Using

lipopolysacchride as a vaccine-based immune stimulant, scientists have induced seizures in experimental animals of various species.<sup>57,58</sup>

A considerable amount of evidence links excitotoxicity and seizures.

In addition, a number of the newer anti-seizure medications work by blocking glutamate receptors or preventing glutamate release. One of the central mechanisms linking excessive immune stimulation with seizures, as with vaccines, is the induced release of the excitotoxin glutamate and quinolinic acid from immune stimulated microglia and astrocytes.<sup>59-61</sup>

In many cases these seizures are clinically silent or manifest as behavioral problems, often not recognized by pediatricians as seizures. Yet, they can alter brain function and eventually result in abnormal brain development.

Even the CDC and American Academy of Pediatrics recognizes that infants and children with a history of seizure should not be vaccinated.

It is also known that autistic children who regress, that is begin to show a sudden worsening of mental development, have a significantly higher incidence of seizures, both clinical and subclinical, than those who do not regress.

Interestingly, studies have shown that during early brain development after birth the number of glutamate receptors (that trigger the seizures) increase steadily until the age of two when it peaks.<sup>62</sup> Thereafter they decline in number. This means that the immature brain is significantly more susceptible to seizures than the more mature brain and this is when your child is being given 24 vaccine inoculations, many of which are associated with a high incidence of seizure.

Let just use the case of the 1 year-old child who is taken by his mother for his vaccines and the pediatrician convinces the mother to allow him/her to give all five vaccines recommended for that age group at that one office visit. After all, both the CDC and the American Academy of Pediatrics assures mothers and fathers that it is completely safe to give them all at once. This not only means that the child's immune system will be assaulted by 7 different antigens (viruses, three of which are alive) but by five full doses of immune adjuvant – a powerful mix of immune stimulating chemicals.

This intense immune stimulation not only results in a red, swollen and painful site where the shots were given, but a hyperintense activation of the brain's immune system.

Mothers and fathers are familiar with the high-pitched crying their babies have after such a series of vaccines. Often, this high pitched crying, lethargy and poor feeding last weeks to months. This is not due to the pain of the injection, as the pediatrician will assure you, rather it is secondary to brain inflammation – what we call an encephalitic cry.<sup>63</sup>

### **Combination Vaccines Cause More Seizures**

Recently, information was released that the combination vaccine by Merck, ProQuid resulted in twice as many seizures as giving the vaccines separately.

This vaccine contains the MMR antigens as well as chickenpox viral antigen (in a dose 5x that of the single vaccine). The study was conducted by comparing 43,000 kids getting the ProQuid vaccine versus those getting the shots separately. While they attributed the increased seizures to fever caused by the vaccine, this is only part of the story.

I have seen a number of febrile seizures during my neurosurgical practice and my research indicates that the reason some kids are susceptible to febrile seizures and not others is that the susceptible ones are deficient in neuroprotective nutrients and are often exposed to neurotoxic substances, such as mercury and aluminum, which increase sensitivity to seizures. Consistently found in the studies of febrile seizures is the presence of low blood sodium levels (called hyponatremia).<sup>64</sup>

It is known in neurology that very low sodium blood levels can trigger seizures, even in normal people. It can also result in rapid coma and death, especially in a child.

In the presence of brain inflammation, the incidence of hyponatremic seizures is much higher. One of the major causes of hyponatremia in infants and small children is the doctor giving IV fluids that contain little or no sodium chloride (salt). During my practice I constantly tried to convince pediatricians to stop using D<sub>5</sub>W (5% dextrose and water) as an IV solution in sick children, because it induced seizures. I am convinced that a significant number of children who died following a meningitis infection actually died of hyponatremia induced by a combination of the infection and the pediatrician giving hypotonic IV fluids (D<sub>5</sub>W) during treatment.

I will always remember the case of a little girl who developed H. Influenza meningitis and was in a deep coma. The

pediatricians consulted me, suspecting a brain abscess. This was quickly ruled out. I noted the child was getting D<sub>5</sub>W as an IV solution. A simple blood test demonstrated she had severe hyponatremia. Because she was comatose, the pediatricians wanted me to let her die. I refused. They even went so far as to approach my partners to have them take me off the case. Fortunately, they refused to intervene. I corrected her sodium deficiency and she made a good recovery and had no further seizures.

Studies have also shown that glutamate, as MSG, given to small animals with immature nervous systems, also increase the likelihood of seizures from other causes, such as fever.<sup>65,66</sup> Excess vaccination increases brain levels of glutamate.

Keep in mind that the child by age one will already have had 24 vaccine inoculations, each spaced no more than one or two months apart. This means the brain microglia are maintained in a constant primed state. Each vaccine increases dramatically the damage done by the previous vaccine series. One is not surprised that so many vaccinated children develop seizures, often repetitive seizures, or that we have such a high incidence of autism. And I can assure the elite of the American Academy of Pediatrics and the CDC that over one million autistic children far exceeds the danger measles, mumps, diphtheria, chickenpox, tetanus, rotavirus, HiB meningitis and hepatitis pose to our youth.

Also, keep in mind that for every fully autistic child there are ten times that many with lesser degrees of impairment.

Compelling evidence indicates that the death rates from the childhood vaccines fell dramatically in developed countries prior to the mass vaccination programs, as documented in Neil Z. Miller's book, ***Vaccines: Are They Really Safe and Effective?***<sup>67</sup>

Objective studies attribute the fall in death rates to better nutrition and improved public sanitation. So, when you hear health authorities warn that stopping the present vaccine program will mean a return of millions of children dead from childhood diseases, they are lying and know they are lying.

### **Human Brain Development is Different**

The human being has an unusual brain development in that there is a prolonged period of maturation and neuroanatomical pathway development occurring years after birth. The most rapid brain development occurs during the last trimester of intrauterine life and two years after birth – what is referred to as the brain growth spurt. It is the areas regulating higher brain functions, such as emotions, emotional control, thinking, complex memory and language function that is last to develop.

Recent studies using functional MRI scans (fMRI) and PET scanning have shown that brain development continues until about age 26 or 27. Using such brain mapping techniques as volumetric parcellations that give a 3-D view of the brain, researchers examined the brains of 13 children followed for 10 years with scans being done every 2 years.<sup>68</sup> What they found is that there was an overdevelopment of synaptic connections after birth that was slowly removed (called pruning) in developmental cycles during early childhood and even adolescence.

For example, around age 4 to 8 years there was a thinning of the cortex in the language areas of the brain (parietal lobes) that spread to the temporal lobes and finally to the frontal lobes. This thinning moved the brain into a more functional state of development, that is, it got rid of unnecessary pathways and connections-sort of a final correction.

Further, they found that the language areas of the brain matured around age 11 to 13 years and the brain areas controlling higher brain function, the prefrontal cortex, matured in the mid twenties.<sup>69,70</sup>

What this means is that during the first two years of life, the child's brain is undergoing rapid and very critical development and that the more advanced cognitive portions of the brain continued their development even later – much later.

There is compelling evidence that the pruning of these excess synapses is essential. Otherwise the brain would be inundated with an enormous array of competing signals – that is a lot of static and misinterpreted messages. This pruning process, as well as the growth, maturation and migration of neurons, is carried out by a combination of signals, which include carefully controlled fluctuating glutamate brain levels and appearance of specific microglia-released cytokines in a timed sequence.<sup>63,71-75</sup>

This is all very exacting and easily disturbed by a number of toxins, such as mercury and aluminum. It is also critically dependent on the presence of thyroid hormone.

Anything that alters these fluctuating glutamate and cytokine levels can affect, sometimes in drastic ways, the development of the brain, which as we have seen continues far into young adulthood.<sup>76-79</sup>

Pathological studies of autistic brains demonstrate three areas that are especially affected –the **cerebellum**, the **limbic brain** and the **prefrontal area**.<sup>80-83</sup>

There exist intimate connections between the cerebellum and the prefrontal cortex and between the prefrontal cortex and the limbic system – in particular the amygdalar nuclei. These are also areas frequently affected by inflammatory cytokines during immune stimulation, such as with vaccinations.<sup>84</sup> In the *Vargas et al* study, the most intense microglial activation was in the cerebellum.<sup>54</sup>

In low concentrations, both the cytokines and glutamate act to protect developing brain cells and promote brain development (neurotrophic function), but in higher concentrations they can be very destructive, especially in combination. Of particular importance are the inflammatory cytokines interleukin 1a and 1β (IL-1a and IL-1β), IL-6 and tumor necrosis factor-alpha (TNF-alpha).<sup>85-89</sup>

Evidence that alteration in these cytokines can cause developmental brain problems comes in part from studies of schizophrenia, a disorder that can be produced by stimulating inflammatory cytokine surges during pregnancy.<sup>90-92</sup>

### **Avoid the Flu Vaccine During Pregnancy**

It is known, for example, that women who are infected with the flu during pregnancy are significantly more likely to give birth to an autistic child or a child with schizophrenia, depending on when the infection occurs.

At first, they assumed this was due to the virus being passed to the fetus, but subsequent studies found that it was not the virus, but the mother's immune reaction that caused the problem – that is, it was the immune cytokines (IL-1, IL-2, IL-8, IL-6 and TNF-alpha) that was causing the injury to the baby's developing brain.

The insane policy of having every pregnant woman vaccinated with the flu vaccine flies in the face of what we know concerning the neurotoxic effect of excessive immune stimulation during pregnancy. Even if the vaccine prevented the flu (studies show it reduces it only in a select few), instead of a small percentage of pregnant women being at risk, they would make sure every woman was at risk.

Keep in mind these pregnant women will have been receiving the flu shot (containing mercury) every year since age 6 months (according to present CDC recommendations), meaning they will have accumulated a significant amount of mercury and will, as a result, have a hyperintense cytokine response to the flu vaccine during their pregnancy. In addition, they will have accumulated a significant amount of neurotoxic mercury.

It is also important to keep in mind that immune activation with vaccination differs from natural immunity, in that it persist much longer – even for years following a vaccination. This does not allow the brain time to repair itself either in the mother or in the unborn child. In addition, the way the immune system reacts differs with vaccination, especially in the very young, as we have seen.

A new study from the Weizmann Institute in Israel by Hadas Schori and co-workers found that with a normally functioning immune system, the T-lymphocytes actually protected neurons from glutamate excitotoxicity, but if the immune system was dysfunctional, as seen in most of the ASD children, the opposite happened.<sup>93</sup> That is, stimulating the immune system was significantly destructive of the brain's cells. Their study found that under conditions of immune dysfunction, B-cells predominated in invading the brain and this dramatically increased the destructive effect of excess glutamate.

Another study also found that mercury toxicity was greatest in mice prone to develop autoimmune diseases, thus confirming the above study.<sup>12</sup> Further, the Schori study indicates that even in animals without an autoimmune-prone genetic makeup, suppression of T-lymphocyte function increased excitotoxic damage.

Both the measles and cytomegalovirus inhibit T-cell function, as does mercury and the hepatitis B vaccine.<sup>11,27,35,41,</sup>

The *Vargas et al* study also demonstrated that T-lymphocytes failed to infiltrate the autistic brains examined, meaning that protective T-lymphocyte protection was not in evidence.<sup>54</sup> Under these conditions, systemic immune activation, as seen with multiple and sequential vaccinations, would increase the excitotoxic damage caused by the microglial and astrocytic activation.

When all the evidence is taken together, these studies provide powerful evidence that sequential, multiple vaccinations in newborns and small children maximizes the inflammation of the brain and as a consequence dramatically enhances the excitotoxic pathology, and does so for prolonged periods (decades).

The more vaccines that are added to the vaccine schedule, the more frequently this devastating effect will be seen and in worse forms.

### What About the Adjuvants Used in Vaccines?

While mercury has gotten all the attention, aluminum (found in most vaccines) is also a major culprit in this shocking saga.

Added to most vaccine are a number of substances either used during manufacturing or designed as an immune booster (adjuvant). These include albumin, aluminum (either as aluminum hydroxide, aluminum phosphate or alum also known as aluminum potassium sulfate), various amino acids, DNA residues, egg protein, gelatin, monosodium glutamate (MSG), MRC-5 cellular protein and various antibiotics.

Not listed on official lists are bacterial and viral contaminants, which can include their particulate, fragmented matter.<sup>94-99</sup>

The purpose of the aluminum compounds is to dramatically boost the immune reaction to the vaccine and make it prolonged, since some of the aluminum remains in the site of injection for years.

Aluminum was first added to vaccines in 1926. Many of the other components added to the vaccines also boost immunity, especially that of undesirable components of the immune system, such as the B-cells.

Because these vaccine adjuvants are designed to produce a prolonged immune stimulation, they pose a particular hazard to the developing nervous system. Studies have shown that immune activation can last as long as two years after vaccination. This means that the brain's microglial cells are also primed for the same length of time, and possibly longer.

A new emerging syndrome called **macrophagic myofasciitis** has been attributed to the aluminum adjuvant in vaccines and is especially associated with the hepatitis B vaccine and the tetanus vaccine.<sup>100</sup> Victims of this syndrome suffer severe muscle and joint pains and severe weakness. Subsequent studies, since the syndrome was first described in France, indicate widespread, severe brain injury as well, as confirmed by MRI scanning.<sup>101,102</sup> This brain syndrome has been described in American children as well.

It is known that aluminum accumulates in the brain and results in neurodegeneration. The evidence for a link between aluminum neurotoxicity and Alzheimer's disease continues to grow stronger. Aluminum, like mercury, activates microglia leading to chronic brain inflammation, which is a major event in both Alzheimer's disease and Parkinson's disease.<sup>103-110</sup>

Flarend and co-workers studied the fate of vaccine injected aluminum in the dose approved by the FDA (0.85 mg per dose) using radiolabeled aluminum adjuvant –either aluminum hydroxide or aluminum phosphate, the two approved forms of adjuvants used in vaccines.<sup>111</sup>

They found that the aluminum was rapidly absorbed into the blood from both forms of aluminum, but that the aluminum phosphate was absorbed faster and produced tissue levels **2.9x higher** than aluminum hydroxide. Blood levels of aluminum remained elevated for **28 days** with both adjuvants. Elevated aluminum levels were found in the kidney, spleen, liver, heart, lymph nodes and brain.

This indicates that aluminum from vaccines is redistributed to numerous organs including brain, where it accumulates. Each vaccine adds to this tissue level of aluminum. If we calculate the aluminum dose from 36 vaccines, we see that the total dose is 30.6 mg and not the 0.85 mg considered safe by the FDA. Of course not all this aluminum ends up in the tissues, but they will accumulate substantial amounts, especially when added to the amount from foods and drinking water. When a number of aluminum-containing vaccines are given during a single office visit, aluminum blood levels rise rapidly and to much higher levels and this elevation persist for over a month, all the time infiltrating the tissues, including the brain with aluminum.

It is also known that aluminum enhances the toxicity of mercury and that aluminum, even from other sources, increases inflammation in the body.<sup>106</sup>

The question no one seems to be asking is -- does the aluminum act as a constant source of brain inflammation? Research, especially that showing aluminum-triggered microglial activation, seems to indicate it does.<sup>112</sup>

Dr. Anna, Strunecka, a professor of physiology, found that aluminum readily binds with fluoride to form fluoroaluminum and that this compound can active G-protein receptors, which controls a number of neurotransmitters, including glutamate receptors.<sup>46</sup>

Giving multiple aluminum-containing vaccines at once would raise blood and tissue levels much higher than when give

separately, thus increasing brain levels as well. Fluoride in drinking water, foods and dental treatments would react with the brain aluminum, creating the neurotoxic fluoroaluminum combination. Studies have shown that fluoride also accumulates in the brain.

### The Role of Mercury in Developmental Brain Damage

Mercury also activates microglia and does so in concentrations below 0.5 microgram (3 to 5 nanograms).<sup>113</sup> This is well below the concentration seen with giving mercury-containing vaccines to children.

Ethylmercury, like its cousin methylmercury, enters the brain very easily but once within the brain it is de-ethylated, forming ionic mercury ( $Hg^+$ ).<sup>114</sup>

There is evidence that ionic mercury is significantly more neurotoxic than organic mercury. Once it is converted, the mercury is difficult, if not impossible, to remove. Studies using monkeys demonstrated that ionic mercury is redistributed in the brain.<sup>115</sup>

This same series of studies also demonstrated that there was extensive microglial activation in the monkey's brain and it persisted over 6 months after the mercury dosing was stopped, indicating that even when the plasma mercury disappears the brain mercury remains.<sup>116</sup>

**This is important to remember when you hear from the vaccine safety promoters that new studies have shown that ethylmercury (in thimerosal) disappears from the blood within several days. Actually, the mercury leaves the plasma and enters the brain, where it is de-ethylated and remains for a lifetime.**

What they fail to mention is that recent studies have shown that only 7 percent of methylmercury is converted to ionic mercury, whereas 34 percent of ethylmercury is converted within a short time.<sup>117</sup> This means that more of the most destructive form of mercury is retained in the brain following mercury-containing vaccine exposure than exposure to mercury from fish.

They also fail to mention that the vaccine-based mercury that was removed from the blood enters the stool in high concentrations, where it recirculates repetitively, meaning that with each cycle the mercury has access to the brain.

Mercury has another link to this immune/excitotoxic reaction. A number of studies have shown that mercury, in submicromolar concentrations, interferes with the removal of glutamate from the extracellular space, where it causes excitotoxicity.<sup>118-120</sup>

This removal system is very important, not only in protecting the brain but also in preventing abnormal alterations in brain formation.<sup>121</sup> As you will recall, it is the carefully programmed rise and fall in glutamate levels in the brain that allow the brain's pathways to develop and for proper development of its connections (called synaptogenesis).

Another way mercury damages the brain is by interfering with its energy production.

The mitochondria of the neuron (the energy factory) accumulate more mercury than any other part of the cell. It is known that when you interfere with the neuron's ability to produce energy, you greatly magnify its sensitivity to excitotoxicity, so much so that even physiological concentrations of glutamate can become excitotoxic.<sup>122-125</sup>

One of the destructive reactions of both excitotoxicity and mercury toxicity is the generation of storms of free radicals and lipid peroxidation products. Essential to the protection of brain cells is the antioxidant enzymes (catalase, glutathione peroxidase and SOD). Mercury poisons these protective enzymes.

One of the most important protective systems is the glutathione molecule, which is present in every cell in the body. Mercury dramatically lowers glutathione levels by a number of mechanisms. (See Dr. Boyd Haley's work for more information).<sup>126</sup> So, we see that mercury can greatly aggravate this entire destructive mechanism.

It is important to appreciate that as important as mercury is, it is not the lone essential element in this process. Rather, essential to this process is a combination of pre-existing or vaccine-induced immune dysfunction and excess immune stimulation by a crowded vaccine schedule.

This is why autism will not go away, even when mercury is completely removed from all vaccines.

It also important to appreciate that mercury can never be removed from the picture because of the numerous sources of

mercury in our environment, such as contaminated seafood, atmospheric mercury and dental amalgam.

### **Why Males Are Affected More Often**

One of the enigmas of autism is why it occurs in males more often than females.

Actually there are a number of toxins that have this gender selectivity. Studies have shown, for example, that both mercury and monosodium glutamate (MSG) have greater neurotoxicity in males than females.<sup>127</sup>

The reason appears to be the enhancing effect of testosterone on both substances' toxicity.<sup>128,129</sup>

Glutamate is the most abundant neurotransmitter in the brain and operates through a very complex series of receptors (3 major ionotropic receptors- NMDA, AMPA and kainate receptors, and 8 metabotropic receptors). As stated, the presence of glutamate outside brain neurons, even in very small concentrations, is brain cell toxic. Because of this, the brain is equipped with a very elaborate series of mechanisms to remove glutamate quickly, primarily by utilizing glutamate uptake proteins (EAAT1-5).

Mercury, aluminum, free radicals, lipid peroxidation products and inflammatory cytokines can easily damage these.<sup>130,131</sup>

One of the important ways glutamate regulates neuron function is by allowing calcium to enter the cell and by the release of calcium within cell storage depots. When calcium (glutamate operated) channels are opened, the calcium flows in as a wave of concentrated calcium. These are referred to as calcium waves or oscillations. They regulate a number of neuron functions, one of which plays a vital role in brain development.

During brain development, the future neurons are lined up along membranes within the core of the undeveloped brain. These cells must migrate outwardly to reach their final destination and they do so by guided chemical signals mainly released by microglia and astrocytes. These trillions of connections also develop during a process called synaptogenesis, and use many of the same signals.

Studies have shown that the calcium waves cause developing brain cells to migrate, which is essential for development of the brain (it forms the architectonic structures and functional columns of the brain).<sup>132</sup>

Interestingly, testosterone also affects embryonic brain cell migration by regulating calcium waves, and mercury, probably by stimulating glutamate release, does the same thing.<sup>133</sup> Estrogen reduces calcium oscillations and stops the migration. Other chemical signals in the brain also play a role (reelin).

If calcium oscillations are not properly regulated, that is -- there are too many calcium oscillations, the brain develops abnormally.

Testosterone and glutamate have an additive effect on these calcium waves. In this way, testosterone enhances the damaging effect of excessive glutamate and mercury.

Studies have shown that higher doses of MSG during brain formation can cause abnormalities of brain development that closely resemble mercury poisoning and the toxic effects of high levels of inflammatory cytokines.<sup>76</sup> Interestingly, vaccination has been shown to significantly increase the toxicity of several other neurotoxins, so much so that they can trigger brain cell destruction or synaptic loss even when sub toxic concentrations of the toxicants are used. Testosterone aggravates this toxicity as well.

Studies of autistic children show an elevated level of androgens in most, even in female autistic children.<sup>134</sup> In general, androgens, such as testosterone, enhance neurological injury and estrogens tend to be protective of the brain.<sup>135</sup>

### **The Role of the Leaky Gut Phenomenon and Food Intolerances**

Wakefield and his co-workers demonstrated a connection between the MMR vaccines and abnormal gut function in a landmark article appearing in the journal *Lancet* in 1998.<sup>136</sup>

In this carefully conducted study they biopsied the lining of the intestines of autistic children having GI symptoms and demonstrated lymphocytic infiltration as well as elevated levels of inflammatory antibodies and cytokines. TNF-alpha release was particularly high from these gut-based immune cells. The entire GI tract, from the stomach to the colon, was infiltrated by

these immune cells.

Subsequent studies have shown a high incidence of abdominal pain, bloating, diarrhea and constipation in children with ASD.<sup>138,139</sup> A number of other studies have shown problems with digestive enzymes, defective detoxification, and an overgrowth of a number of pathogenic bacteria and fungi in the colon and intestine of ASD children.<sup>140,141</sup>

Not surprisingly, a few studies have shown significant improvement in behavior when ASD children are placed on diets devoid of identified food allergens.<sup>142-144</sup> Antibodies to food components, such as casein, gliadin and gluten have also been described as well as cross-reactions between food antigens and brain components.<sup>145</sup>

One disease that closely resembles the case of ASD in terms of brain injury associated with food allergens is celiac disease, in which there is an immune sensitivity to the food components gliadin and gluten. Approximately 6 percent of such patients will demonstrate neurological damage, most frequently cerebellar ataxia.<sup>146</sup> Other studies have also found seizures, cranial nerve damage, dementia and impaired frontal lobe function.<sup>147-151</sup>

Autopsy studies indicate that the most commonly found neurological damage occurs in the cerebellum, as we see in autism. Other studies have shown an immunologic cross-reactivity between gluten antibodies and Purkinje cells in the cerebellum.<sup>144</sup>

Like the celiac cases, in autism the most intense microglia activation and neuronal loss occurred in the cerebellum. In many of the cases of autistic brains examined, virtually all of the Purkinje cells were lost.<sup>54</sup>

Studies looking for the incidence of GI symptoms in autistic children indicate that from 20 percent to 84 percent will have complaints. It is interesting to note that in the studies on celiac-related neurological problems, only 13 percent complained of GI symptoms, so ASD children can have gut-related brain effects without obvious GI symptoms.<sup>151</sup>

Some feel that the gliadin, casein and gluten can be converted to opioid-like substances, such as gliadomorphin and casomorphin that can produce a morphine response in the brain, leading to abnormal behavior.<sup>152,153</sup> These opioids also suppress immunity and increase excitotoxicity.<sup>154</sup>

While the opioid effect exists, I feel it is the recurrent immune stimulation of primed microglia that is causing most of the damage seen in autism.<sup>155</sup>

Studies have also found frequent dysbiosis in autistic children, that is, an overgrowth of pathogenic bacteria and fungi and a loss of beneficial probiotics organisms.<sup>138</sup>

It has been demonstrated that *Candida* organisms can penetrate the gut wall and enter the blood stream, where they can be distributed to all tissues and organs, including the brain.<sup>156</sup> The same is true for pathogenic bacteria and bacterial toxins. These brain implanted organisms act as continuous sources of immune stimulation, which is especially damaging to the brain because of vaccine-triggered microglia priming and/or activation occurring before the gut problem presents itself, with repeated vaccination aggravating the injury.

With each subsequent vaccination, the microglia response is enhanced because of the recurrent immune activation by food antigens and microbiological antigens. It is interesting to note that trials of antibiotic vancomycin, which is not absorbed from the gut, objectively improved the cognitive function of a number of autistic children.<sup>157</sup> We also know that with children having celiac disease even a very small amount of the offending food can have devastating neurological effects.

## CONCLUSION

I have presented a considerable amount of evidence for a connection between the present vaccine schedule and the development of autism spectrum disorders, yet even this paper is only a brief review of what we know.

A more in-depth discussion of the immune/excitotoxic will appear in my paper-- ***Interaction of activated microglia, excitotoxicity, reactive oxygen and nitrogen species, lipid peroxidation products and elevated androgens in autism spectrum disorders.*** Anna Strunecka and I are also working on another paper discussing this vaccine-triggered mechanism, which will appear in an upcoming special autism issue of the journal ***Alternative Therapies in Health and Medicine.***

Much of this information is being totally ignored by the medical elite and especially the media.

The Simsonwood conference proceedings, in which over 50 scientists, vaccine pharmaceutical company representatives and representatives from the World Health Organization met secretly in Norcross, Georgia, disclosed that the safety of your

children is not their primary interest – their only interest is selling vaccines to the public.

A friend of mine, while speaking to an audience of scientists and public health officials in Italy, was rudely told by a public health official that (paraphrased) – We all know that vaccines can cause neurological damage, but we must keep this from the public because it might endanger the vaccine program.

It is also important to understand that most practicing pediatricians have never heard what I have disclosed to you. Most have very little understanding of immune function and have no idea of the pathological effect on the brain of giving multiple vaccines on a large scale. These effects are widely discussed in the neuroscience literature, but few practicing physicians, especially pediatricians, ever read such articles.

Immunology, like nutrition, gets only scant attention in medical school and even less in residency training of physicians. Older doctors have no concept of the newer discoveries in immunology, especially neuroimmunology.

The human immune system is one of the most complex systems in physiology and our studies indicate an even greater complexity is to be found. Despite a renewed interest in the immune system's function in neonates and small children, much remains unknown concerning the immune effects of exposing infants and small children to such a barrage of vaccine early in life. Yet, what we do know is that they react quite differently than adults and it can have devastating consequences on brain development and function.

Vaccinating millions of children with the hepatitis B vaccine at birth can only be described as dangerous idiocy.

The vast majority of infants, children and adolescents are in no danger from this infection -- even the medical authorities agree on that. It is also known that the effectiveness of the vaccine in children last no more than two years and has little or no effectiveness in the immune suppressed child.

The nefarious plan by these vaccine geniuses is to force vaccines all babies, since they would have difficulty convincing adults, that is, the one at any danger, to get the vaccine.

The problem with this "plan" is that the vaccine is ineffective by the time the child reaches the age of risk. Now that they have discovered this, they are recommending that all children have a booster vaccine every two years.

The American Academy of Pediatrics and the CDC, the forces behind this vaccine mania, assure parents that giving all of the required vaccines at once is perfectly safe. As we have seen, the scientific "evidence" does not support this policy. To do so exposes the child to a high concentration of immune-stimulating adjuvants that will intensely activate the brain's immune system (microglia) during the brain's most active growth period, that is, during the first 2 to 6 years of life.

The maturation and development of the brain continues to a large degree throughout adolescence. As we have seen, excessive vaccination can result in brain inflammation and brain swelling that can be prolonged, even lasting years, if not decades (as we have seen in the *Vargas et al* study). This can result in seizures, high pitched crying, severe lethargy, weakness and behavioral problems, such as agitation, depression, anger and other autistic behaviors.

In addition, giving the vaccines all at once exposes the brain to higher levels of neurotoxic aluminum as proven by the radiolabeled aluminum study quoted above.

If a person were to follow recommended vaccine guidelines they would receive over 100 vaccines in a lifetime.

Because of the way the vaccines are given, this would not allow the brain's microglial cells to shut down, which is essential.

One of the effects of chronic microglial activation, other than brain inflammation, is an elevation in brain glutamate levels. Studies have shown this can lead to chronic neurodegeneration and is suspected as a common mechanism associated with neuropathic viruses, such as the measles and borna viruses.<sup>158-160</sup> In fact, blocking certain of the glutamate receptors can prevent brain damage by the measles virus, as well as other viruses.<sup>158</sup>

We also know that the prognosis of spinal meningitis can be determined by the spinal fluid glutamate levels, with high levels having the worst prognosis.<sup>161</sup> Studies of autistic children have also shown elevated glutamate levels in their blood and spinal fluid.

## **Foods and Supplements For the Autistic Child**

Because excitotoxicity plays such an important role in autism, parents of autistic children should avoid feeding their children

foods containing excitotoxic additives, such as MSG, hydrolyzed protein, vegetable protein extracts, soy protein or soy protein isolate, natural flavoring, yeast enzymes, etc.

There are many disguised names for high glutamate food additives. A recent study has also shown that there is an interaction between certain food dyes and glutamate and aspartame that enhances neurotoxicity significantly.

They should also avoid immune suppressing oils, such as the omega-6 oils (corn, soybean, peanut, safflower, sunflower and peanut oils). As stated, people in this country eat 50-times the amount of this immune suppressing oil than they need for health.

While omega-3 oils are healthy, the EPA component is significantly immune suppressing and as a result, high intakes should be avoided. Studies have shown suppressed lymphocyte function (NK cells) with high intake of EPA.<sup>162</sup> It is the DHA component that has most of the beneficial effects, especially as regards brain repair and inflammation reduction.<sup>163</sup> DHA also inhibits excitotoxicity. Because the autistic child has intense brain inflammation, a combination of EPA and DHA is preferable, with a lower content of EPA (no more than 250 mg).

Milk and milk products should be avoided and foods containing gliadin and gluten should also be avoided.

Soy foods are also responsible for a significant number of food allergies as well as being very high in glutamate, fluoride and manganese.

Fluoride should be avoided, especially in drinking water. Water is also a significant source of aluminum in the diet (it is added as a clarifying agent) and in fluoridated water the fluoride complexes with aluminum to form the highly neurotoxic fluoroaluminum compound.

The greatest dietary source of aluminum is biscuits, pancakes, black tea and baked goods made with aluminum-containing baking powder.

Low magnesium intake, which is common in the United States, is associated with higher degrees of inflammation in the body and lower glutathione levels. It also enhances excitotoxicity, since magnesium is a natural modulator of the NMDA glutamate receptor. Low intakes of magnesium greatly enhance glutamate receptor sensitivity, worsening excitotoxicity. Low magnesium also lowers brain glutathione levels, which increases brain sensitivity to mercury toxicity.

Increasing magnesium levels, reduces inflammation, raises glutathione levels and reduces excitotoxic sensitivity.

A number of flavonoids are neuroprotective, especially against inflammation and excitotoxicity. These include curcumin, quercetin, ellagic acid, natural vitamin E (mixed tocopherol), epigallocatechin gallate (from white tea), theanine, DHEA and hesperidin. All are available as supplements and most have a high safety profile.

### **Other Live Vaccine Dangers**

The live virus vaccines, such as chickenpox, measles, mumps and rubella, pose a special danger in the immunosuppressed child, because some of these viruses can take up permanent residence in the body, including the brain.

In one study, which examined the tissues of elderly dying of non-infectious causes, researchers found live measles virus in 45 percent of the bodies examined and 20 percent of their brains.<sup>164,165</sup> These measles viruses were highly mutated, meaning they could result in a number of diseases not normally suspected with measles infection.

I have omitted discussions about vaccine contamination, which is a major problem. Several studies found a high incidence of microorganism contamination in vaccines made by a number of major pharmaceutical companies, with figures as high as 60 percent of the vaccines being contaminated.<sup>94-99</sup>

Bacterial and viral fragments have also been found in a number of vaccines.

While vaccine promoters were quick to assure us that these viral fragments should cause no problem, research says otherwise. In fact, a non-viable viral fragment implanted in microglia and astrocytes in the brain causes the devastating dementia associated with the HIV virus.<sup>167,168</sup>

The virus does not infect the brain neurons themselves. The mechanism proposed is an immunological/excitotoxic-induced toxicity, just as we see with repeated vaccination. The same mechanism is seen with a number of viruses, including measles

viruses, borna virus and the herpes virus.<sup>168-172</sup>

When brain glial cells or neurons are chronically infected with these viruses (called a persistent viral infection) the smoldering immune/excitotoxic reaction slowly destroys the brain cell connections because the immune system is attempting to destroy the infectious microorganism. Since it can never kill the organism, the destruction (and intense microglial activation) continues for decades, as we saw in the autistic brain.<sup>54</sup>

The same effect can occur with viral fragments, the Lyme disease organism, aluminum and mercury that accumulates in the brain from either contaminated vaccines or from vaccine additives. And because excessive vaccination, especially with immune-suppressive viruses, can depress proper immune function, the child is at a greater risk of developing such a persistent viral infection.

Likewise, they are at a greater risk of developing deadly invasive bacterial infections, such as H. Influenza meningitis, pneumococcal and meningococcal meningitis.

When it occurs, the vaccine promoters scream that we need more vaccines to protect the children, never admitting that it was the vaccine program itself that destroyed the lives of these children.

### **“Universal Health Care” May Increase Vaccine Danger**

While a number of people and even physicians, think they desire a universal health care system (a euphemism for socialized medicine), here is something to consider. The government will use access to health care as a way to mandate vaccinations for all Americans. Those who refuse any of the mandated vaccines will be denied access to health care, meaning you will not be able to see a doctor or enter a hospital or clinic.

All federal programs will have completion of vaccine mandates as a requirement. This could be linked to social security, food stamps, housing subsidy programs and other such federal programs. Remember, they use such tactics now for access to schools and daycare centers. One may even have to prove that they have had all their required vaccinations before they can use public transportation, such as busses, trains and airplanes.

Another thing to consider is that the communist Chinese are gradually taking over vaccine manufacturing. In fact, communist China is now the largest vaccine manufacturer in the world. They have over 400 biopharmaceutical companies busy making vaccines and poor quality drugs for the world.

The FDA admits that it inspects only 1.8 percent of the 714 drug firms in China and that, according to a GAO study, FDA inspections may be done 13 years apart (it is spaced 2 years apart in the United States).

Even more frightening is that the inspectors must depend on Chinese translators and US companies purchasing these vaccines and pharmaceuticals must, by agreement, have a Chinese communist official serve as its legal representative.

According to the Phyllis Schafly Report, one CEO was quoted as saying “every piece of information you get (from the Chinese) is suspect.”

With thousands of people dying and getting sick, not only in China, but in hundreds of nations receiving their tainted pharmaceutical products, this means future vaccines will be an even greater danger.

The risk of millions of Americans and others living in the West receiving contaminated vaccines is extremely high. It could even be done on purpose, since the Chinese communist have declared their intention to defeat the United States.

Infecting over a hundred million Americans with contaminated vaccines would be an easy way to defeat us. The irony would be that our public officials would have aided them in our destruction.

Parents must appreciate that those in positions of authority are lying to them.

Most pediatricians think they are doing what is right, because they too are victims of years of propaganda by elite members in the CDC and American Academy of Pediatrics. Most truly believe what they are telling parents. They should wake up and join the fight to bring some sense to this insane policy.

## References

1. Money J et al. Autism and autoimmune disease: A family study. *J Autism Child Schizophr* 1971; 1: 146-160.
2. Comi A. et al. Familial clustering of autoimmune disorders and evaluation of medical risk factors in autism. *J Child Neurology* 1999; 14: 388-394.
3. Sweetwen TL et al. Increased prevalence of familial autoimmunity in probands with pervasive developmental disorders. *Pediatrics* 2003; 112: 420.
4. Creen LA et al. Maternal autoimmune disease, asthma and allergies, and childhood autism spectrum disorders: a case-control study. *Arch Pediatr* 2005;159: 151-157.
5. Dalton P et al. Maternal antibodies associated with autism and language disorders. *Ann Neurol* 2003;53: 533-537.
6. Singh VK, Rivas WH. Prevalence of serum antibodies to caudate nucleus in autistic children. *Neuroscience Lett* 2004; 355: 53-56.
7. Singh VK et al. Antibodies to myelin basic protein in children with autistic behavior. *Brain Behavior Immunol* 1993; 7: 97-103.
8. Singer HS et al. Antibrain antibodies in children with autism and their unaffected siblings. *J Neuroimmunol* 2006; 178: 149-155.
9. Singh VK et al. Circulating autoantibodies to neural and glial filament proteins in autism. *Pediatr Neurol* 1997; 17: 88-90.
10. el-Fawal HA e al. Exposure to methylmercury results in serum autoantibodies to neurotypic and gliaotypic proteins. *Neurotoxicology* 1996; 17: 531-539.
11. Havarinasab S et al. Immunosuppressive and autoimmune effects of thimerosal in mice. *Toxicol Appl Pharmacol* 2005; 204; 109-121.
12. Hornig M, Chian D, Lipkin WJ. Neurotoxic effect of postnatal thimerosal are mouse strain dependent. *Mol Psychiatry* 2004; 9: 833-845.
13. Tishler M, Shoenfeld Y. Vaccination may be associated with autoimmune disease. *Isr Med Assoc J* 2004; 6: 430-432.
14. Shoenfeld T, Aron-Maor A. Vaccination and autoimmunity-'vaccinosis' a dangerous liaison? *J Autoimmunity* 2000; 14: 1-10.
15. Vojdam A et al. Antibodies to neuron-specific antigens in children with autism: possible cross-reaction with encephalitogenic proteins from milk, Chlamydia pneumoniae and Streptococcus group A. *J Neuroimmunol* 2002; 129: 168-177.
16. Lucarelli S et al. Food allergy and infantile autism. *Panminerva Med* 1995; 37: 137-141.
17. O'Banion D et al. Disruptive behavior: a dietary approach. *J Autism Child Schizophr* 1978; 8: 325-337.
18. Vojdani A et al. Immune response to dietary proteins, gliadin and cerebellar peptides in children with autism. *Nutr Neuroscience* 2004; 7: 151-161.
19. McGeer PL and McGeer EG. Autotoxicity and Alzheimer Disease. 2000; 57; 289-290.
20. Malek-Ahmadi P. Cytokines and etiopathogenesis of pervasive developmental disorders. *Med Hypothesis* 2001;

56: 321-324.

21. Weizman A et al. Abnormal responses to brain tissue antigen in the syndrome of autism. *Am J Psychiatry* 1982; 139: 1462-1465.
22. Lee SC et al. Cytokine production by human fetal microglia and astrocytes. Differential induction by liposaccharide and IL-1beta. *J Immunol* 1993; 150: 2659-2667.
23. Bauer S et al. The neuropoetic cytokine family in development, plasticity, disease and injury. *Nature Reviews/Neuroscience* 2007; 8: 221-232.
24. Boulanger LM, Shatz CJ. Immune signaling in neural development, synaptic plasticity and disease. *Nature Reviews/Neuroscience* 2004; 5: 521-531.
25. Agrawal A et al. Thimerosal induces TH2 responses via influencing cytokine secretion by human dendritic cells. *J Leukocyte Biol* 2007; 81: 1-9.
26. Kidd P. Th1/Th2 balance: The hypothesis, its limitations, and implication in health and disease. *Altern Medicine Rev* 2003; 8: 223-246.
27. Martin OC et al. Hepatitis B immunization induces higher antibody and memory Th2 responses in new-borns than adults. *Vaccine* 2004; 22: 511-519.
28. Cohly HH, Panja A. Immunologic findings in autism. *In Rev Neurobiol* 2005; 71: 317-341.
29. Singh VK. Plasma increase of interleukin-12 and interferon-gamma. Pathological significance in autism. *J Neuroimmunol* 1996; 66: 143-145.
30. Jyonouchi H et al. Proinflammatory and regulatory cytokine production associated with innate and adaptive immune responses in children with autism spectrum disorders and developmental regression. *J Neuroimmunol* 2001; 120: 170-179.
31. Pandey RS et al. Autoimmune model of schizophrenia with special reference to antibrain antibodies. *Biol Psychiatry* 1981;16: 1123-1136.
32. Zhang XY et al Elevated interleukin-2, interleukin-6 and interleukin-8 serum levels in neuroleptic-free schizophrenia: association with psychopathology. *Schizophr Res* 2002; 57: 247-258.
33. Turner W et al. Measles associated encephalopathy in children with renal transplants. *Am J Transplant* 2006; 6: 1459-1465.
34. Larner AJ, Farmer SF. Myelopathy following influenza vaccination in inflammatory disorder treated with chronic immunosuppression. *Eu J Neurol* 2000; 7: 731-733.
35. Kerdile YM et al. Immunosuppression by measles virus: role of viral proteins. *Rev Med Virol* 2006; 16: 49-63.
36. Abernathy RS, Spink WW. Increased susceptibility of mice to bacterial endotoxins induced by pertussis vaccine. *Fed Proc* 1956; 15: 580.
37. Auwaerter PD et al. Changes within T-cell receptor V beta subsets in infants following measles vaccinations. *Clin Immunol Immunopathol* 1996; 79: 163-167.
38. Hussey GD et al. The effect of Edmonston-Zagreb and Schwartz measles vaccines on immune responses in infants. *J Infect Dis* 1996; 173: 1320-1326.
39. Hirsch RL et al. Measles virus vaccination of measles seropositive individuals suppresses lymphocyte proliferation and chemotactic factor production. *Clin Immunol Immunopath* 1981; 21: 341-350.
40. Daum RS et al. Decline in serum antibody to the capsule of *Haemophilus influenzae* type b in the immediate

postimmunization period. *J Pediatrics* 1989;1114: 742-747.

41. Pukhalsky AL et al. Cytokine profile after rubella vaccine inoculation: evidence of the immunosuppressive effect of vaccination. *Mediators Inflammation* 2003; 12: 203-207.
42. Miller NZ. *Vaccine Safety Manual: For Concerned Families and Health Practitioners*. New Atlantean Press, NM, 2008.
43. Pichichero ME et al. Pathogen shifts and changing cure rates for otitis media and tonsillopharyngitis. *Clin Pediatr* 2006; 45: 493-502.
44. Moore MR et al. Impact of conjugate vaccine on community wide coverage of nonsusceptible *Streptococcus* in Alaska. *J Inf Dis* 2004; 190: 2031-2038.
45. Pichichero ME, Cary JR. Emergence of a multiresistant serotype 19A pneumococcal strain not included in the 7-valent conjugate vaccine as an otopathogen in children. *JAMA* 2007; 298: 1772-1778.
46. Strunecka A., Patocka J, Blaylock RL et al. Fluoride interactions: From molecules to disease. *Current Signal Transduction Therapy* 2007; 2
47. Block ML, Zecca L, Hong J-S. Microglia-mediated neurotoxicity: uncovering the molecular mechanisms. *Nature Reviews/Neuroscience* 2007; 8: 57-69.
48. Mandu P, Brown GC, Activation of microglial NADPH oxidase is synergistic with glial NOS expression in inducing neuronal death: a dual-key mechanism of inflammatory neurodegeneration. 2005; 2: 20.
49. Cagnin A et al. In vivo visualization of activated glia by [<sup>11</sup>C] (R)- PK11195-PET following herpes encephalitis reveals projected neuronal damage beyond the primary focal lesion. *Brain* 2001; 124: 2014-2027.
50. Lemstra AW et al. Microglia activation in sepsis: a case-control study. *J Neuroinflamm* 2007; 4: 4
51. Buttini M, Lumonta S, Boddeke HW. Peripheral administration of lipopolysaccharide induces activation of microglial cell in rat brain. *Neurochem Int* 1996; 29: 25-35.
52. Cunningham C et al. Central and systemic endotoxin challenges exacerbate the local inflammatory responses and increased neuronal death during chronic neurodegeneration. *J Neurosci* 2005; 25: 9275-9284.
53. Godbout JP et al. Exaggerated neuroinflammatory and sickness behavior in aged mice following activation of the peripheral innate immune system. *FASEB J* 2005;19: 1329-1331.
54. Vargas DL et al. Neuroglial activation and neuroinflammation in the brain of patients with autism. *Ann Neurol* 2005; 57: 67-81.
55. Blaylock RL. Central role of excitotoxicity in autism. *JANA* 2003;6: 7-19.
56. Lewine JD et al. Magnetoencephalographic patterns of epileptiform activity in children with regressive autism spectrum disorders. *Pediatrics* 1999; 104: 405-415.
57. Auvin S et al. Inflammation exacerbates seizure-induced injury in the immature brain. *Epilepsia* 2007; 48: 27-34.
58. Rizzi M et al. Glia activation and cytokines increased in rat hippocampus by kainic acid-induced status epilepticus during postnatal development. *Neurobiol Dis* 2003; 4: 94-103.
59. Eastman CL et al. Increased brain quinolinic acid production in mice infected with hamster neurotropic measles virus. *Exp Neurol* 1994; 125: 119-124.
60. Heyes MP et al. Human microglia convert L-tryptophan into neurotoxin quinolinic acid. *Biochem J* 1996; 320: 595-597.

61. Ida T et al. Cytokine-induced enhancement of calcium-dependent glutamate release from astrocytes mediated by nitric oxide. *Neurosci Lett* 2008; 432: 232-236.
62. Ye GL et al. AMPA and NMDA receptor-mediated currents in developing dentate granule cells. *Brain Res Dev Brain Res* 2005; 155: 26-32.
63. Menkes JH, Kinsbourne M. Workshop on neurologic complications of pertussis and pertussis vaccinations. *Neuropediatrics* 1990; 21: 171-176.
64. Kiviravanta T, Airaksinen EM. Low sodium levels in serum are associated with febrile seizures. *Acta Paediatr* 1995; 84: 1372-1374.
65. Bar-Peled O et al. Distribution of glutamate transporter subtypes during human brain development. *J Neurochem* 1997; 69: 2571-2580.
66. Arauz-Contreas J, Feria-Velasco A. Monosodium-L-glutamate-induced convulsions 1. Differences in seizure pattern and duration of effect as a function of age in rats. *Gen Pharmacol* 1984; 15: 391-395.
67. Neil Z. Miller. *Vaccines: Are they Really Safe and Effective? A Parent's Guide to Childhood Shots*. New Atlantean Press, NM 1999.
68. Toga Aw et al. Mapping brain maturation. *Trend Neurosci* 2006; 29: 148-159.
69. Gogtay N et al. Dynamic mapping of human cortical development during childhood and adolescence. *Proc Natl Acad Sci USA* 2006; 101: 8174-8179.
70. Jerigan TL, Tallal P. Late childhood changes in brain morphology observable with MRI. *Dev Med Child Neurol* 1990; 32: 379-385.
71. Maslinska D et al. Morphological forms and localizations of microglial cells in the developing human cerebellum. *Folia Neuropathol* 1998; 36: 145-151.
72. Monier A et al. Entry and distribution of microglial cells in human embryonic and fetal cerebral cortex. *J Neuropathol Exp Neurol* 2007; 66: 372-382.
73. Schwab JM et al. IL-6 is differentially expressed in the developing human fetal brain by microglial cells in zones of neurogenesis. *In J Dev Neurosci* 2001; 114: 232-241.
74. Schlett K. Glutamate as a modulator of embryonic and adult neurogenesis. *Curr Top Med Chem* 2006; 6: 949-960.
75. Kumuro H, Rakic P. Modulation of neuronal migration by NMDA receptors. *Science* 1993; 260: 95-97.
76. Marret S et al. Arrest of neuronal migration by excitatory amino acids in hamster developing brain. *Proc Natl Acad Sci USA* 1996; 93: 15463-15468.
77. Aarum J et al. Migration and differentiation of neural precursor cells can be directed by microglia. *Proc Natl Acad Sci USA* 2003; 100: 15983-15988.
78. Ekdahl CT et al. Inflammation is detrimental for neurogenesis in adult brains. *Proc Natl Acad Sci USA* 2003; 100: 13632-13635.
79. Chao CC et al. Tumor necrosis factor-alpha potentiates glutamate neurotoxicity in human fetal cell cultures. *Dev Neurosci* 1994; 16: 172-179.
80. Kemper TL et al. Neuropathology of infantile autism. *J Neuropathology Exp Neurol* 1998; 57: 645-652,
81. Bauman MI, Kemper TL. The neuropathology of autism spectrum disorders: What have we learned? *Novartis*

Foundation Symp 2003; 251: 112-122.

82. Bauman M, Kemper TL. Developmental cerebellar abnormalities: a consistent finding in early infantile autism. *Neurology* 1986; 36 (Suppl 1): 190.
83. Courchesne E. Brainstem cerebellar and limbic neuroanatomical abnormalities in autism. *Curr Opin Neurobiol* 1997; 7: 269-278.
84. Buller KM, Day TA. Systemic administration of interleukin 1beta activates select populations of central amygdala afferents. *J Comp Neurol* 202; 452: 288-296.
85. Taylor DL et al. Stimulation of microglial metabotropic glutamate receptor mGlu2 triggers tumor necrosis factor  $\alpha$ -induced neurotoxicity in concert with microglial-derived Fas ligand. *J Neurosci* 2005; 25: 2952-2964.
86. Rothwell NJ. Cytokines-Killers in the brain? *J Physiol* 1999; 514.1: 3-17.
87. Samland H et al. Profound increase in sensitivity to glutamatergic –but not to cholinergic agonist-induced seizures in transgenic mice with astrocytes production of IL-6. *J Neurosci Res* 2003; 73: 176-187.
88. Bernardino L et al. Modulator effects of interleukin-1 $\beta$  and Tumor necrosis factor- $\alpha$  on AMPA-induced excitotoxicity in mouse organotypic hippocampal slice cultures. *J Neurosci* 2005; 25: 6734-6744.
89. Allan SM et al. Interleukin-1 and neuronal injury. *Nature Reviews/Immunol* 2005; 5: 629-640.
90. Burka SL et al. Maternal cytokine levels during pregnancy and adult psychosis. *Brain Behav Immunol* 2001; 15: 411-420.
91. Brown AS et al. Elevated maternal interleukin-8 levels and risk of schizophrenia in adult offspring. *Am J Psychiatry* 2004; 161: 889-895.
92. Ganguli R et al. Autoimmunity in schizophrenia: a review of recent findings. *Ann Med* 1993; 25: 489-496.
93. Schori H et al. Severe immunodeficiency has opposite effects in neuronal survival in glutamate-susceptible and resistant mice: adverse effect of B-cells. *J Immunol* 2002; 169: 2861-2865.
94. Cutrone R et al. Some oral polio vaccines were contaminated with infectious SV-40 after 1961. *Can Res* 2005; 65: 10273-10279.
95. Harasawa R, Tomiyama T. Evidence of pestivirus RNA in human virus vaccines. *J Clin Microbiol* 1994; 32: 1604-1605.
96. Geier M et al. Endotoxins in commercial vaccines. *Appl Environ Microbiol* 1978; 36: 445-449.
97. Giangaspero M et al. Genotypes of pestivirus RNA detected in live virus vaccines for human use. *J vet Med Sci* 2001; 63: 723-733.
98. Potts BJ et al. Possible role of pestivirus in microcephaly. *Lancet* 1987;1: 972-973.
99. Johnson JA, Heneine W. Characteristics of endogenous avian leukosis virus in chicken embryonic fibroblast substrates used in production of measles and mumps vaccine. *J Virol* 2001; 75: 3605-3612.
100. Gherardi RK et al. Macrophagic myofasciitis lesion assess long-term persistence of vaccine-derived aluminum hydroxide in muscle. *Brain* 2001; 124: 1821-1831.
101. Authier F-J et al. Central nervous system disease in patients with macrophagic myofasciitis. *Brain* 2001; 124: 974-983.
102. Bonnefont-Rousselot D et al. Blood oxidative status in patients with macrophagic myofasciitis. *Biomed Pharmacol*

2004; 58: 516-519.

103. Good PF et al. Selective accumulation of aluminum and iron in the neurofibrillary tangles of Alzheimer's disease: a laser microprobe (LAMMA) study. *Ann Neurol* 1992; 31: 286-292.
104. Esparza JL et al. Aluminum-induced pro-oxidant effect in rats: protective role of exogenous melatonin. *J Pineal Res* 2003; 35: 32-39.
105. Yokel RA et al. The distribution of aluminum into and out of the brain. *J Inorg Biochem* 1999; 76: 127-132.
106. Campbell A et al. Chronic exposure to aluminum in drinking water increases inflammatory parameters selectively in the brain. *J Neuroscience Res* 2004; 75: 565-572.
107. Bishop NJ et al. Aluminum neurotoxicity in preterm infants receiving intravenous feeding solutions. *N Engl J Med* 1997; 336: 1557-1561.
108. Campbell A. Inflammation, neurodegenerative disease, and environmental exposures. *Ann NY Acad Sci* 2004; 1035: 117-132.
109. Shirabe T et al. Autopsy case of aluminum encephalopathy. *Neuropathology* 2002; 22: 206-210.
110. Armstrong RA et al. Hypothesis: Is Alzheimer's disease a metal-induced immune disorder. *Neurodegeneration* 1995; 4: 107-111.
111. Flarend RE et al. In vivo absorption of aluminum-containing vaccine adjuvants using <sup>26</sup>Al. *Vaccine* 1997; 15: 1314-1318.
112. Platt B et al. Aluminum toxicity in the rat brain: histochemical and immunocytochemical evidence. *Brain Res Bull* 2001; 55: 257-267.
113. Brookes N. Specificity and reliability of the inhibition by HgCl<sub>2</sub> of glutamate transport in astrocytes cultures. *J Neurochem* 1988; 50: 1117-1122.
114. Vahter ME et al. Demethylation of methylmercury in different brain sites of *Macaca fascicularis* monkeys during long-term subclinical methylmercury exposure. *Toxicol Appl Pharmacol* 1995; 134: 273-284.
115. Charleston JS et al. Changes in the number of astrocytes and microglia in the thalamus of the monkey *Macaca fascicularis* following long-term subclinical methylmercury exposure. *Neurotoxicology* 1996; 17: 127-138.
116. Charleston JS et al. Increase in the number of reactive glia in the visual cortex of *Macaca fascicularis* following subclinical long-term methylmercury exposure. *Toxicol Appl Pharmacol* 1994; 129: 196-206.
117. Burbacher TM et al. Comparison of blood and brain mercury levels in infant monkeys exposed to methylmercury or vaccines containing thimerosal. *Environ Health Perspect* 2005; 113: 1015-1021.
118. Mutkus L et al. Methylmercury alters the in vitro uptake of glutamate and GLAST and GLT-1 transfected mutant CHO-K1 cells. *Biol Trace Elem Res* 2005; 107: 231-245.
119. Aschner M et al. Methylmercury alters glutamate transport in astrocytes. *Neurochem Int* 2000; 37: 199-206.
120. Kim P, Choi BH. Selective inhibitors of glutamate uptake by mercury in cultured mouse astrocytes. *Yonsi Med J* 1995; 36: 299-305.
121. Kugler P, Schleyer V. Developmental expression of glutamate transporters and glutamate dehydrogenase in astrocytes of the postnatal rat hippocampus. *Hippocampus* 2004; 14: 975-985.
122. Yel L et al. Thimerosal induces neuronal cell apoptosis by causing cytochrome C and apoptosis-inducing factor release from mitochondria. *In J Mol Med* 2005; 16: 971-977.

123. Humphrey ML et al. Mitochondria mediated thimerosal-induced apoptosis in a human neuroblastoma cell line (SK-N-SH). *Neurotoxicology* 2005; 26: 407-416.
124. Henneberry RC. The role of neuronal energy in neurotoxicity of excitatory amino acids. *Neurobiol Aging* 1989; 10: 611-613.
125. Zeevalk GD et al. Excitotoxicity and oxidative stress during inhibition of energy metabolism. *Dev Neurosci* 1998; 20: 444-445.
126. Haley BE. The relationship of the toxic effects of mercury to exacerbation of the medical condition classified as Alzheimer's disease. *Medical Veritas* 2007; 4: 1510-1524.
127. Sun YM et al. Sex-specific impairment in sexual and ingestive behaviors of monosodium glutamate-treated rats. *Physiol Behavior* 1991;50: 873-880.
128. Yang S-H et al. Testosterone increases neurotoxicity of glutamate in vitro and ischemia-reperfusion injury in an animal model. *J Appl Physiol* 2002; 92: 195-201.
129. Estrada M et al. Elevated testosterone induces apoptosis in neuronal cells. *J Biol Chem* 2006; 281: 25492-25501.
130. Aschner M et al. Involvement of glutamate and reactive oxygen species in methyl mercury neurotoxicity. *Braz J Med Biol Res* 2007; 40: 285-291.
131. Allen JM et al. The consequences of methylmercury exposure on interactive function between astrocytes and neurons. *Neurotoxicology* 2002; 23: 755-759.
132. Lautermilch NJ, Spitzer NC. Regulation of calcineurin by growth cone calcium waves controls neurite extension. *J Neurosci* 2000; 20: 315-325.
133. Estrada M et al. Ca<sup>2+</sup> oscillations induced by testosterone enhance neurite outgrowth. *J Cell Sci* 2005; 119: 733-743.
134. Geier DA, Geier MR. A clinical trial of combined anti-estrogen and anti-heavy metal therapy in autistic disorder. *Neuroendocrinol Lett* 2006; 27: 833-838.
135. Baker AE et al. Estrogen modulates microglial inflammatory mediator production via interactions with estrogen receptor  $\beta$ . *Endocrinology* 2004; 145: 5021-5032.
136. Wakefield AJ et al. Ileal-lymphoid nodular hyperplasia, non-specific colitis, and pervasive developmental disorders in children. *Lancet* 1998; 351: 637-641.
137. Ashwood P, Wakefield AJ. Immune activation of peripheral blood and mucosal CD3+ lymphocyte cytokine profiles in children with autism and gastrointestinal systems. *J Neuroimmunol* 2006; 173: 126-134.
138. Horvath K et al. Gastrointestinal abnormalities in children with autistic disorder. *J Pediatr* 1999; 135: 559-563.
139. Afzal N et al. Constipation with acquired megacolon in children with autism. *Pediatrics* 2003; 112: 939-942.
140. Feingold SM et al. Gastrointestinal microflora studies in late-onset autism. *Clin Infect Dis* 2002; 35: S6-S16.
141. Vojdani A et al. Antibodies to neuron-specific antigens in children with autism: possible cross-reaction with encephalitogenic proteins from milk, Chlamydia pneumonia and Streptococcus group A. *J Neuroimmunol* 2002; 129: 168-177.
142. Lucarelli S et al. Food allergy and infantile autism. *Panminerva Med* 1995; 37: 137-141.
143. Knivsberg AM et al. A randomized, controlled study of dietary intervention in autistic syndrome. *Nutri Neurosci* 2002; 5: 251-261.
144. Vojdani A et al. Immune response to dietary proteins, gliadin and cerebellar peptides with autism. *Nutr Neurosci*

2004; 7: 151-161.

145. Whitely P et al. A gluten-free diet as an intervention for autism and associated disorders: preliminary findings. *Autism* 1999; m3: 45-65.
146. Bushara KO. Neurologic presentation of celiac disease. *Gastroenterology* 2005; 128: S92-S97.
147. Kinney HC et al. Degeneration of the central nervous system associated with celiac disease. *J Neurol Sci* 1982; 53: 9-22.
148. DeSantis A et al. Schizophrenia symptoms and SPECT abnormalities in a coeliac patient: regression after gluten-free diet. *J Intern Med* 1997; 242: 421-423.
149. Beyenberg S et al. Chronic progressive leukoencephalopathy in adult celiac disease. *Neurology* 1998; 50: 820-822.
150. Burk K et al. Sporadic cerebellar ataxia associated with gluten sensitivity. *Brain* 2001; 124: 1013-1019.
151. Hu WT et al. Cognitive impairment and celiac disease. *Arch Neurol* 2006;63: 1440-1446.
152. Wakefield AJ et al. Review article: The concept of entero-colonic encephalopathy, autism and opioid receptor ligands. *Aliment Pharmacol Ther* 2002; 16: 663-674.
153. Peterson PK et al. The opioid-cytokine connection. *J Neuroimmunology* 1998; 83: 63-69.
154. Zhu L et al. Enhancing effect of beta-endorphins on glutamate toxicity. *Zhongguo Yao Li Xue Bao* 1998; 19: 108-111.
155. Blaylock RL. Interaction of cytokines, excitotoxins, and reactive nitrogen and oxygen species in autism spectrum disorders. *JANA* 2003; 6: 21-35.
156. Rao S, Ali U. Systemic fungal infections in neonates. *J Postgrad Med* 2005; 51 (suppl 1): S27-S29.
157. Sandler RH et al. Short term benefit from oral vancomycin treatment of regressive-onset autism. *J Child Neurol* 2000; 15: 429-435.
158. Anderson T et al. NMDA-receptor antagonist prevents measles virus-induced neurodegeneration. *Eur J Neurosci* 1991; 3: 66-71.
159. Eastman CL et al. Increased brain quinolinic acid production in mice infected with a hamster neurotropic measles virus. *Exp Neurol* 1994;125: 119-124.
160. Raslet A et al. *Borrelia burgdorferi* induces inflammatory mediator production by murine microglia. *J Neuroimmunol* 2002; 130: 22-31.
161. Ma W et al. Elevated cerebrospinal fluid levels of glutamate in children with bacterial meningitis as a predictor of the development of seizures or other adverse outcomes. *Pediatr Crit Care Med* 2003; 4: 170-175.
162. Zhao Y et al. Eicopentaenoic acid prevents LPS-induced TNF-alpha expression by preventing NFkB activation. *J Amer Coll Nutr* 2004; 23: 71-78.
163. Weldon SM et al. Docosahexaenoic acid induces an anti-inflammatory profile in liposaccharide-stimulated THP-1 macrophage mice more effectively than eicosapentaenoic acid. *J Nutr Biochem* 2007; 18: 250-258.
164. Katayama Y et al. Detection of measles virus nucleoprotein mRNA in autopsied brain tissue. *J Gen Virol* 1995; 76: 3201-3204.
165. Katayama Y et al. Detection of measles virus mRNA from autopsied human tissues. *J Clin Microbiol* 1998; 36:

299-301.

166. Hult B et al. Neurobiology of HIV. *Int Rev Psychology* 2008; 20: 3-13.
167. Gonzales-Sarano F, Martin-Garcia J. the neuropathogenesis of AIDS. *Nat Rev Immunol* 2005; 5: 69-81.
168. Rubin SA et al. Viral teratogenesis: brain developmental damage associated with maturation state at time of infection. *Brain Dev Rev* 1999; 112: 237-244.
169. Lellouch-Tubiana A et al. Immunocytochemical characterization of long-term persistent immune activation in human brain after herpes simplex encephalitis. *Neuropathology Appl Neurobiol* 2000; 26: 285-294.
170. Ovanesov MV et al. Activation of microglia by Borna disease virus infection: In vitro study. *J Virol* 2006; 80: 12141-12148.
171. Volmer R et al. Borna disease virus infection impairs synaptic plasticity. *J Virol* 2007; 81: 8833-8837.
172. De la Torre JC. Borna virus and the brain. *J Infect Dis* 2002; 186: (suppl2) : S241-S247.