

## [24] AUTISM

Autism is an abnormal neurological development syndrome seen and recognized increasingly in children during the last two decades of the twentieth century. Whether the number of cases is truly on the rise or we're getting better at diagnosing it is debatable. In either case, most estimates suggest that from two to six of every 1,000 children is at risk, and these numbers are on the rise.

Also called autistic spectrum disorder, autism is diagnosed relatively early, usually before the age of three. One initial sign is the child's resistance to cuddling and affection, which may initiate a pattern of difficulty in forming interpersonal relationships. Over time, autistic children tend to withdraw into their own world and show minimal interest in family, friends and their surroundings. Language, communication skills, eye contact, physical contact and relationships never quite develop normally.

Aside from social difficulties, autistic children often exhibit repetitive body movements – such as rocking, hand flapping or finger flipping. Common symptoms include the repetition of words or phrases (echolalia) and dependence on familiar or rigid routines. Autistic children may also be unusually preoccupied with lights or moving objects. A particularly disturbing effect can be self-inflicted mutilation or other injury.

### Causes of Autism

The cause for autism remains unknown. Several theories have become credible and most researchers now agree that more than one mechanism is at work. Forms of autism have been shown to run in families, so there seems to be a genetic component. Other evidence points to environmental factors. Conventional wisdom marries these two theories – a genetic predisposition towards autism that is triggered by exposure to certain environmental substances. It seems that several different forms of autism may exist. What's clear that older psycho-dynamic theories linking autism to parental neglect or behavior are mistaken.

Autism is associated with several diseases, including congenital rubella (German measles), Fragile X syndrome, abnormal purine metabolism, William's syndrome, tuberous sclerosis, Down syndrome and others.

Researchers have long sought 'biomarkers' or specific genes that lead to autism and dozens of potential candidates have been identified – but none of them are found in every single case. For this reason autism is called a 'complex disorder', not meaning that it's complicated but that it's not the simple result of a simple cause. Research into the causes of autism have pointed to such various factors as autoimmunity, chronic inflammatory state, exposure to teratogens in early pregnancy, viral infection, phospholipid abnormalities, oxytocin administration during birth, and exposure to toxins – notably mercury.

Any identifiable feature of autism presents scientists with a potential avenue to either prevent or treat it. Since environmental toxins – a potentially controllable circumstance – seem to be a contributing factor in the development of this disease, scientists are hard at work trying to identify the culprits.

### Mercury-Thimerosal Link

In sufficient concentrations, the heavy metal mercury is a potent neurotoxin. Most of the heavy metals we are exposed to come from fish, but other sources include the mercury amalgams of dental fillings, industrial pollution and some preservatives. The effects of mercury and heavy metal poisoning are discussed in Chapter 2 [GSH & Detoxification].

Mercury exposure in adults can lead to recognizable changes in nervous and mental function. Its effects on newborn and young children is less well known. Studies at the National Center for Health Statistics, Center for Disease Control and Prevention suggest that heavy metal concentrations in about eight percent of American women of childbearing age exceeded the US Environmental Protection Agency's recommended exposure. Several public advocacy agencies

have subsequently challenged the FDA (Food and Drug Administration), pushing for stricter guidelines for fish consumption in women and children.

Thimerosal, consisting of about 50% ethyl mercury, is an effective preservative used by the pharmaceutical industry for a range of products from contact lens solutions to immunizations. From 1988 to 2002 American children had been routinely exposed to Thimerosal during their first six months of life – and even before. Unborn children (in utero) of Rh-negative mothers were exposed when their mothers were given their ‘RhoGAM’ shot. The influenza vaccination was another source of potential mercury exposure. Routine immunizations including the MMV vaccine (measles, mumps and varicella) also once contained Thimerosal. Most state governments are removing Thimerosal from many immunizations and other states seem ready to ban this preservative outright.

The question of whether Thimerosal causes autism remains hotly debated. Those who think it does point to epidemiological studies (population statistics) showing that increased use of immunizations in the United States was matched by increased rates of autism. Opponents believe that the increased numbers are due to more effectively diagnosing autism. While the debate continues and no clear answer is apparent, the conservative approach would suggest avoiding any substance with potentially devastating results. This doesn’t mean avoiding immunizations, but avoiding the mercury-based preservatives they may contain.

### **Glutathione and Autism**

The first easily-to-locate article on glutathione and autism dates back a quarter century to France. A team in Paris tried to identify various scenarios in which autism occurs, and were perhaps the first to discover that glutathione activity was lower in this group of patients. Other than some rare reports, also of French origin, the association between glutathione and autism was not noted in other major centers.

The work was picked up in Turkey at the dawn of the twentieth century by two groups, one of child psychiatrists and one of biochemists. Both demonstrated a statistically significant decrease in glutathione activity in autistic children as compared to healthy controls. They proposed that oxidative stress was at work, causing neurological damage.

Meanwhile, North American scientists were hard at work looking for a “cause” (etiology) for autism, but with increasing evidence that such a finding was unlikely. Back in 2003 Eigsti and Shapiro from Columbia University (NY) looked at all the work being done examining the genetic, biochemical and anatomical differences described in this disease, and bluntly stated that, “autism is a heterogeneous disorder and is likely to have multiple possible etiologies.” It seemed that answers might come by finding some pathways common to different circumstances, and perhaps intervening in these events.

Researchers attempt to intervene through dietary changes by eliminating such potential causes as gluten and casein, with some promising outcomes. Some teams focused on environmental toxins while others looked to allergens as potential culprits.

Recently, a research team led by Jill James from University of Arkansas, has started assembling the various pieces of this puzzle. Since previous studies indicated a higher load of oxidative stress in autistic children, and implicated mercury toxicity in the development of this disease, it seemed possible that glutathione played a greater role than previously thought.

The idea arose that many autistic children were unable to protect themselves from neurotoxic heavy metals. This team from Arkansas demonstrated a significant glutathione deficiency in up to four out of five cases. It was also noted that several genes normally associated with normal glutathione metabolism were often faulty in autistic children. They went one step further and attempted to address this deficiency with dietary supplementations, with reasonable success.

Janet Kern and her associates at University of Texas Southwestern Medical Center were interested in using a dietary supplement to raise glutathione. They initiated a pilot study using the bioactive whey protein isolate Immunocal on autistic children to ensure its tolerability, since

many of these children appear highly sensitive to a wide variety of foods. The bioactive isolate was well tolerated, and although not statistically relevant because of the small numbers of patients, a definite trend was observed in improvement of behavioral parameters. A much larger study is underway at the time of writing this chapter, with many researchers anxiously awaiting the results.

Although it is early to consider raising glutathione as an accepted treatment, many clinicians anticipate that further research in this direction will bear fruit. Anecdotally, several clinicians have related success stories. E. Memper, an associate professor of clinical pediatrics at the University of Virginia has been quoted as saying that many of the patients she has been involved with have shown marked improvement using this approach. Other studies are underway using intravenous glutathione.

### **Conclusion**

Autism is a multi-factorial disease involving a combination of genetics and environmental triggers. No single “cause” for autism is likely to be found, but one notable problem identified is a deficiency in normal glutathione activity. Early trials suggest that raising glutathione has potential, and research efforts to establish this strategy are currently being investigated.

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