

# An Introduction to Possible Biomedical Causes and Treatments for Autism Spectrum Disorders

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An increasing number of parents are seeking biomedical interventions for their children on the autism spectrum. Various theories on biomedical treatments exist. Making the decision to explore biomedical interventions more difficult are the unique differences among individuals, the cost involved for evaluations, testing, and treatments, the lack of knowledgeable professionals to consult, and the relatively small amount of easily accessible and understandable research and information available to review.

Current opinion is that there are many potential causes of autism spectrum disorders. Most agree that there are multiple factors involved. Research on the possible genetic basis of autism spectrum disorders is expanding along with research on biomedical triggers. In the majority of cases, there is likely a complex relationship between a genetic predisposition and an environmental trigger that results in the behavioral symptoms of an autism spectrum disorder diagnosis.

This article will briefly highlight the biomedical theories of causation and the associated biomedical interventions that are more commonly pursued by families. Resources for more information will be provided throughout. This brief article can not begin to address all the important issues and information related to biomedical treatments. It is merely an attempt to provide basic information. The information contained in this article is not to be considered a recommendation or endorsement for a particular theory or approach for treatment. It is important to understand the status of research and carefully examine treatment options and interventions whether they are educational, therapeutic, or biomedical in nature.

## Some Biomedical Based Causal Theories of Autism Spectrum Disorders

There is no universally accepted theory of causation. It appears there is a complex interplay of factors that can result in symptoms leading to a diagnosis of an autism spectrum disorder. There is now believed to be a number of genetic and environmental causes. The purpose of this article is not to focus on genetic theories of causation. Here, the only focus will be on the most commonly cited biomedical concerns thought to be implicated. Later, the more commonly cited interventions which address these biomedical concerns will be shared.

Currently, there are four broad areas of focus which conceptualize the possible biomedical causes of autism spectrum disorders. Most researchers and practioners feel that all four areas are intertwined and that each affects the other. Gastrointestinal abnormalities, immune dysfunctions, detoxification abnormalities, and/or nutritional deficiencies or imbalances have all been suggested as potential biomedical "triggers" for autism spectrum disorders. It is hard to determine which scenario came first. It is felt that one problem is connected to the next that follows. But deciding which came first seems to be another part of the puzzle to address for each individual.

Gastrointestinal abnormalities, immune dysfunctions, detoxification irregularities, and nutritional deficiencies or imbalances may cause some of the same symptoms. Often a problem in one of the four biomedical areas impacts one or more of the other areas. However, for purposes of simplification and clarity, each of these will be discussed separately.

For children on the autism spectrum, symptoms of gastrointestinal problems may include; diarrhea, constipation, reflux, food cravings, bloating, fatigue, aggression, sleep difficulties, "spaciness," agitation, inappropriate laughing and "stim" behaviors including hand movements, toe walking, and spinning objects or self. Gastrointestinal abnormalities may be due to the following ailments:

- Bacteria, yeast, or fungus overgrowth (Shaw, 1998);
- "Leaky gut" defined as increased permeability of the intestinal lining, often caused by chronic inflammation that is often due to yeast and/or the inability to break down proteins from casein (dairy products) and gluten (wheat, barley, rye, oats and other grains) which then leak into the bloodstream and travel to, and impact various tissues, including the brain, possibly causing an opiate affect in the brain (McCandless, 2002);
- Alteration of intestinal flora as a result of antibiotic use for common childhood infections such as earaches (Shaw, 1998); or
- Enterocolitis; a unique inflammation due to the presence of the measles virus in the intestinal tract: ileal hyperplasia (McCandless, 2002).

Signs of impaired immunity in children on the autism spectrum may include; cyclic fevers, compulsive behaviors, skin rashes or eczema, impulsivity, aggression, and bowel problems such as diarrhea, constipation, impaction, and/or blood and mucus in stools. There are also anecdotal stories of children with autism who spike a high fever that result in a dramatic increase in awareness as well as communication and social abilities (Blakeslee, 2005). This effect is lost again when the fever subsides. This is thought to relate to differences in the immune system. Immune system dysfunctions are believed to impact brain development or functioning in susceptible individuals.

Immune dysfunction is thought to be a result of the following genetically linked or environmentally acquired ailments:

- Viruses that are present that may or may not be detected according to the symptoms presented (McCandless, 2002);
- "Leaky gut" (McCandless, 2002);
- Infections treated with antibiotics that over time alter the immune system (Shaw, 1998);
- Genetic predisposition to autoimmune diseases in the family (McCandless, 2002); or
- Allergies or sensitivities to foods (Marohn, 2002).

Children on the autism spectrum may show signs of impaired detoxification such as: sensory issues, sleep difficulties, stimming, impulsivity, aggression, compulsive behaviors, night sweats, anxiety, dilated pupils, and lack of speech or pica (ingestion of inedible items). Detoxification abnormalities may be related to a genetically linked susceptibility or an environmentally acquired condition such as the following:

- Methionine cycle abnormalities; part of the bodies required sulfation process (James, 2005);
- Methylation may be impaired for some individuals; this is a process by which organic chemicals are made available for various important body functions (Marohn, 2002);
- Glutathione synthesis abnormalities; glutathione naturally rids the body of heavy metals (James, 2005);
- Metallothionein (MT) dysfunction has been seen in some individuals; zinc-copper balance and detoxification of heavy metals are key roles of MT, a protein in the body (McCandless, 2002); or
- Oxidative stress; damage caused by build-up of metabolic by-products often due to glutathione depletion (James, 2005).

Detoxification abnormalities are thought to contribute to the build up of heavy metals in the tissues including the brains of individuals on the autism spectrum. Symptoms of heavy metal exposure are similar to many of the symptoms of autism spectrum disorders.

Nutritional deficiencies or imbalances are a fourth major biomedical area of concern that families and professionals address. Common symptoms of nutritional abnormalities in children on the autism spectrum may include: under weight or over weight, anxiety, mood swings, sensory issues, lack of speech, stimming, aggression, impulsivity,

eye poking, dry hair or skin, and pica (ingestion of inedible items).

Whether nutritional deficiencies and imbalances are a cause of or a result of an autism spectrum disorder is not clear. Nutritional problems can result from malabsorption of nutrients and/or problems with digestion that may be associated with the gastrointestinal, immune, and detoxification problems.

## Some Potential Biomedical Treatments

There continues to be disagreements about biomedical treatment options. This is due the limited published research. And, for various reasons, there is also controversy as to the significance of the research that has been published. This disagreement and controversy then carries over to discussion of biomedical related interventions. There are a limited number of professionals in Indiana as well as elsewhere who are informed about biomedical theories and treatments. Some may be willing and interested to learn more. Even among those professionals that are using biomedical treatments with patients, there seems to be many differences in knowledge and approaches used.

There is disagreement for example as to which area to begin addressing first; the gastrointestinal issues, the immune dysfunction, the detoxification needs, or the nutritional imbalances. There are different testing protocol used among professionals and also disagreement about how to interpret the testing results. There is a network of doctors that families often access called DAN! practitioners. DAN! is an acronym for Defeat Autism Now!

DAN! practitioners may include other medical personal such as nurses, nurse practitioners and homeopaths as well as physicians. The Autism Research Institute (ARI) offers a registry of DAN! practitioners who provide biomedical treatments for children and adults with autism spectrum disorders. ARI does not endorse, "certify" or guarantee the knowledge or skills of any individual listed. These practitioners are not screened or held to any standard of knowledge or experience. As of January 2008, there are two lists, one for licensed healthcare providers and one for others such as naturopaths and homeopaths that are not required by the laws of their state to have a license. For an individual to be listed they must attend a DAN! Clinician Seminar at least once every two years and sign a statement that he or she conducts their practice following the DAN! philosophy.

Further information about the Defeat Autism Now! philosophy and practitioners is available at:

<http://www.autism.com/dan/index.htm>. Many families and practitioners who are successfully pursuing biomedical treatments do belong to a network such as DAN!, an internet Listserv or other informal group interested in biomedical approaches for the treatment of individuals with autism spectrum disorders.

Currently, the prevailing thought among doctors is to start biomedical interventions by healing the gut (digestive system). This may include:

- Gluten free/casein free diet or possibly the specific carbohydrate diet. The gf/cf diet eliminates most common grains (gluten) and dairy products. This does take some time and effort as these ingredients are often hidden in pre-packaged foods. Attention has to be given to preparing meals that are nutritionally balanced and appealing. This can be hard and time consuming at first.
- Allergy testing is often done to check for allergies to common foods and additives in the diet such as corn, soy, and eggs. Any additional food allergies are also addressed.
- Medication may be considered for acid reflux.
- Bacteria, yeast or fungal overgrowth or parasites in the gut is often treated with probiotics, anti-fungal medication, and/or specific antibiotics that may be used for many months or longer.
- Viral inflammation will be treated with an anti-viral medication. Treatment for viruses may take months, a year, or more.
- Digestive enzymes are often considered. There are special formulations of enzymes that a few suppliers offer

especially for children with autism spectrum disorders ( McCandless, 2002).

- Nutritional, mineral, and vitamin supplements will usually be considered; as with enzymes, there are a number of mail order supplement suppliers that specialize in products for individuals with an autism spectrum disorder (Marohn, 2002).

As the diet, enzymes, and medication heal the gut and the supplements work to treat nutritional deficiencies, the immune system may be helped. There is other more invasive or alternative biomedical treatments that are used, by some, to boost the immune system:

- Transfer factor therapy; molecules produced by white blood cells used to transfer immunity to the recipient (McCandless, 2002);
- IVIG therapy; Intravenous Immune Globulin is a blood plasma product containing antibodies used to treat immune deficiency (McCandless, 2002); and
- Treatment of allergies may consist of traditional treatments or NAET; Nambudripad's Allergy Elimination Techniques named after the doctor who developed this treatment of healing techniques combining homeopathy, acupuncture, chiropractic, kinesiology, and nutrition (Nambudripad, 1999).

After the gut and immune system are "ready," there may be metabolic system treatments considered and introduced. Certain detoxification protocols are most often, but not always, the last phase of biomedical intervention to be implemented. There is continued debate about which detoxification protocol to follow. More caution is followed because not enough is known about the path of heavy metals out of the body and brain when using certain protocols for detoxification of heavy metals.

- Methylcobalamin, which is one type of vitamin B-12, is often used to help activate biochemical pathways related to sulfur detoxification as well as methylation. The common way to administer Methyl B-12 in by subcutaneous injection (Neubrandner, 2005).
- Chelation is a treatment to rid the body of heavy metals. In healthy individuals, the kidneys and other organs do this appropriately. There are various substances and programs used to chelate. Information on this is very diverse and somewhat controversial (Green, 2006).
- Intravenous glutathione might be used to treat a glutathione deficiency ((McCandless, 2002).
- Metabolic imbalances including oxidative stress may be treated with various supplements, vitamins, minerals, and amino acids (James et. al, 2004).
- Metallothionein defects, in some cases, may be successfully treated with supplements (Marohn, 2002).

More and more families are pursuing alternative treatments for their children. Some who are using biomedical interventions are seeing a lot of positive results despite the limited published double-blind, placebo-controlled research studies on many of these biomedical interventions. There is more anecdotal evidence which continues to grow along with clinical trials that support some of the biomedical treatments for autism spectrum disorders. Though most current clinical trials do not follow the rigorous double-blind, placebo controlled standard, the results are still considered important by many and used as a basis for treatment decisions.

At this time, there are many biomedical treatments in various stages of acceptance and use by families and professionals. However, not everyone sees results with biomedical treatments and there is little available to help predict who might benefit from a particular biomedical intervention. There is disagreement, too, about the significance of side effects and how to proceed if side effects are seen. There is still so much that needs to be learned. This article is merely an introduction to the current biomedical theories of causation and treatment. No endorsement of any theory or treatment should be implied. Not all biomedical theories and treatments related to autism spectrum disorders are represented here. Those interested in learning more are encouraged to do so. The

references and resources cited can be used to help gather further information.

## Resources

### Books

- Alecson, D.G. (1999). *Alternative treatments for children within the autism spectrum: Effective, natural solutions for learning disorders, attention deficits, and autistic behaviors*. Los Angeles, CA: Keats Publishing.
- Bock, K. and Stauth, C. (2007). *Healing the new childhood epidemics: autism, ADHD, asthma and allergies; the groundbreaking program for the 4-A disorders*. New York, NY: Ballantine Books.
- Jepson, B. and Johnson, J. (2007). *Changing the course of autism: A scientific approach for parents and physicians*. Boulder, CO: Sentient Publications.
- Marohn, S. (2002). *The natural medicine guide to autism*. Charlottesville, VA: Hampton Roads Publishing Company.
- McCandless, J. (2005). *Children with starving brains: A medical treatment guide for autism spectrum disorders*. (2nd ed.). North Bergen, NJ: Bramble Books.
- Seroussi, K. (2000). *Unraveling the mystery of autism and pervasive developmental disorder: A mother's story of research and recovery*. New York, NY: Simon and Schuster.
- Shaw, W. (2002). *Biological treatments for autism and PDD*. (Rev. ed.). Kansas City, KS: Great Plains Laboratory.

### Newsletters

**Autism Research Review International:** Published by the Autism Research Institute; [www.autism.com/ari/newsletter/subscribe.htm](http://www.autism.com/ari/newsletter/subscribe.htm).

**New Developments:** Published by Developmental Delay Resources: <http://www.devdelay.org/>.

### Online Support Groups

**Autism Biomedical Discussion:** <http://health.groups.yahoo.com/group/abmd/>.

**Indiana Biomedical Kids:** <http://indianabiomedicalkids.com>.

### Websites

**Autism Research Institute:** <http://www.autism.com/>.

**Autism Research Unit:** <http://osiris.sunderland.ac.uk/autism>.

**DAN!:** [www.autism.com/dan/index.htm](http://www.autism.com/dan/index.htm).

**Developmental Delay Resources:** <http://www.devdelay.org/>.

**Treating Autism:** [www.treatingautism.uk.com/home.ukml](http://www.treatingautism.uk.com/home.ukml)

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