

ADD/ADHD

Biologic Causes And Non-Pharmaceutical Treatments

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Introduction

Attention deficit hyperactivity disorder (ADHD) has become the most commonly diagnosed behavioral disorder of childhood. ADHD is now estimated to affect 3-5% of all American children (and some say 4-12%). The diagnosis is based on historical reporting or observation of a core set of symptoms involving an age inappropriate level of attention, concentration, activity, distractibility and impulsivity. The number of children being treated pharmaceutically has steadily increased over the past 20 years. Currently there are 8 million children in the USA being prescribed psychiatric drugs.

There is ongoing controversy over whether this “disorder” actually represents a “disease” or if it is just a description of certain childhood behaviors that are simply part of a spectrum at one end of the normal range of childhood behavior. This is a very important debate since, if ADHD is established as a disease, it might be arguable that it should be treated with pharmaceuticals. On the other hand, if it is a normal variation of childhood behavior, there is a legitimate concern over whether we are exposing a very large number of children to drugs with serious potential side effects for the sole purpose of controlling behavior.

In 1998 the NIH convened a panel of experts to prepare a Consensus Statement regarding the diagnosis and treatment of ADHD.¹ The following excerpts represent key conclusions:

- Although “short term studies have found beneficial effects on the defining symptoms of ADHD...stimulant treatments do not “normalize” the entire range of behavior problems, and...of concern are the consistent findings that...there is little improvement in academic achievement or social skills.”
- Although “the diagnosis of ADHD can be made reliably using...interview methods...we do not have an independent, valid test for ADHD, and there are no data to indicate that ADHD is due to a brain malfunction.”
- “There is no information on the long-term outcomes of medication-treated ADHD individuals in terms of educational and occupational achievements, involvement with the police, or other areas of social functioning.
- “There are no long-term studies testing stimulants or psychosocial treatments.”
- “There are no data on the treatment of ADHD, inattentive type.”
- “There are no conclusive data on treatment in adolescents and adults with ADHD.”
- “Psychostimulants, particularly amphetamines, may cause central nervous system damage, cardiovascular damage and hypertension. In addition, higher doses have been associated with compulsive behaviors and...movement disorders. There is a very small percentage...who have hallucinogenic responses.”
- “Existing studies come to conflicting conclusions as to whether use of psychostimulants increase or decrease the risk of abuse.”
- “There is no evidence regarding the appropriate ADHD diagnostic threshold above which the benefits of psychostimulant therapy outweigh the risks.”
- “Finally, after years of clinical research and experience with ADHD, our knowledge about the cause or causes of ADHD remains speculative. Consequently, we have no strategies for the prevention of ADHD.”

¹ NIH Consensus Statement, Diagnosis and Treatment of ADHD, November 16-18, 1998

Pharmaceutical Treatments:

1. Psychostimulants: Methylphenidate (Ritalin), dextroamphetamine (Dexedrine and Adderall), methamphetamine (Desoxyn) and pemoline (Cylert)
 - Act on the central nervous system as dopamine agonists (chemicals that act like dopamine). Alcohol, cigarettes, caffeine, heroin, cocaine, overeating and sexual orgasms also effect dopamine activity.
 - Dopamine, especially the D4 receptor in the brain increases alertness.
 - Side effects of psychostimulants include appetite suppression, depression, sleep disturbances, liver damage, and suspicious behavior. Recent report found 200-300% increase in the amount of chromosomal damage in every one of the 12 children taking Ritalin in the study. Most of the chromosome changes have been related to increased risk of cancer.
2. Bupropion (Wellbutrin) a combined dopamine and norepinephrine reuptake inhibitor.
 - Has been associated with seizures and weight gain.
3. Norepinephrine Reuptake Inhibitors: Atomoxetine (Strattera)
 - This is the class of drugs used early on for depression and it includes common names like Elavil and Tofranil.
 - Most serious side effect of Strattera is life threatening liver failure.

Diagnostic Dilemmas:

To compound the problem of diagnosis, there are several medical problems that may demonstrate many of the symptoms of ADHD. These may lead to an incorrect diagnosis. But since we do not have any objective diagnostic test for ADHD, we cannot be certain whether there really is an ADHD aside from situations that seem to exacerbate the symptoms.

- Thyroid dysfunction: Thyroid hormone levels are typically normal when tested but the hormone receptors may be under responsive to the hormone signal. In 1993, Hauser et al reported that ADHD was strongly associated with resistance to thyroid hormone.²
- Adrenal dysfunction: Researchers compared cortisol (stress hormone) responses in children with persistent ADHD symptoms with children no longer symptomatic. They found that children with persistent ADHD symptoms had blunted cortisol responses to stressful situations, compared to children no longer symptomatic.³
- Nutritional deficiency: A 2002 study from the Netherlands reported that 62% of children diagnosed with ADHD showed significant improvements in behavior over 3 weeks with dietary changes alone. Stephan Shoenthaler, Ph.D. (California criminologist) evaluated the effects of dietary changes to simply increase fruits, vegetables and whole grains and decrease fats and sugars. In this study, conducted at 12 juvenile correctional facilities and 803 public schools, there was a 47% decrease in antisocial behavior, 40% decrease in learning disabilities and 16% increase in academic performance.
- Mineral Deficiency: William Walsh, MD from the Pfeiffer Institute reported findings on an outcome study to measure the effectiveness of biochemical therapy for 207 consecutive violent criminals. These patients presented with a diagnosed behavior disorder. 88% of patients who were compliant with treatment exhibited a reduced frequency of destructive incidents and 53% achieved elimination of the behavior.⁴
- Constipation: A case study of one child reported that he no longer needed any psychostimulant medications after his stool impaction was treated.

² Hauser, et al. Attention Deficit-Hyperactivity Disorder in People with Generalized Resistance to Thyroid Hormone. *New England Journal of Medicine* 1993 April 8; 328(14): 997-1001.

³ King, et al. Attention-Deficit Hyperactivity Disorder and the Stress Response. *Journal of Biological Psychiatry* 1998; 44: 73-74.

⁴ Walsh WJ et al. Reduced violent behavior following biochemical therapy. *Physiol Behav.* 2004 Oct 15;82(5):835-9. Pfeiffer Treatment CenterWarrenville, IL 60555 PMID: 15451647

Comprehensive Evaluations:

- Food sensitivities may be tested by IgG Elisa Panel or Lymphocyte Response Assay. Elimination diets can also be tried in order to help tract down reactive foods.
- May want to assess bowel health with a functional assay such as a Comprehensive digestive Stool Analysis.
- Urine Organic Acids (OAT) can give information about metabolic activities in the body and identify activities of organisms that may inhabit the patient's body such as yeast organisms.
- Mineral status can be assessed with appropriate samples of hair, blood or urine.
- Serum and urinary amino acids can give information about absorption and adequate quantities of these protein precursors.
- Provocation testing and hair testing can identify higher levels of heavy metals
- Cell membrane fatty acid analysis can help identify an imbalances in these essential elements
- Kryptopyrrol and other specific tests can help uncover functional vitamin deficiencies. Functional deficiencies refer to the situation when the blood level of the vitamin is "normal" but it is not performing the expected functions.

Non-Pharmaceutical Treatments:

1. Dietary

- Avoid MSG and Aspartame (NutraSweet). Glutamate and aspartate are neuro-excitatory substances.
- Feingold Diet. Works best in people who are zinc deficient and are intolerant of tartrazine, a yellow food dye that chelates zinc.
- Food elimination can be an inexpensive way to tract down reactive foods.

2. Specific minerals

- Zinc: Necessary to balance absorption and activity of copper. Copper is neurotoxic. Zinc stimulates production of metallothione, which lines the intestines and blood-brain barrier. Metallothione has the major role of preventing absorption of excess copper and other toxic metals including mercury. Zinc is also an important cofactor in all of our digestive enzymes. These digestive enzymes are necessary for the proper absorption of nutrients necessary for production of proteins including neurotransmitters. Zinc is a cofactor in the production and function of GABA. The FDA reported that zinc is deficient in the diets of 50% of Americans.
- Magnesium: Cofactor in over 300 different intracellular enzyme reactions. It has calming effects and is essential for development of serotonin, dopamine and other neurotransmitters. Magnesium was found to be deficient in the diets of over 70% of Americans.
- Boron in doses of 3-4 mg/day has been found to increase alertness in adults.
- Lithium orotate: Lithium is essential for brain function and for preservation of brain cells from degeneration (aging). Pharmaceutical lithium is in the lithium carbonate form which is very poorly absorbed into brain and therefore has to used with high doses. The orotate salt is very well absorbed and can be used in doses so low that it does not even register on blood level testing. Nonetheless it can be very effective in helping with balancing brain activity.

3. Specific Vitamins

- B12 and Folic acid (methylcobalamine, methyltetrahydrofolate): There is growing evidence of defective methylation underlying ADHD and all ASD. There is also growing evidence that this is directly related to toxic effects of heavy metals especially mercury from the environment. These heavy metals are very potent poisons of the methionine synthase and methyl-transferase enzymes. The enzymes are necessary for the activation of B12 and folic acid. Without activation of these two vitamins we have breakdown of the highly essential homocysteine→methionine→S-AdoMet→SAH→homocysteine→methionine cycle. It is from this central mechanism that the body derives glutathione for detoxification, taurine for brain stability, carnitine for energy metabolism in the brain and even activation of the dopamine D4 receptor that increases alertness.

- Pyridoxine (B6) is essential for many functions including the production of serotonin, melatonin, dopamine, and norepinephrine. It has been found to be deficient in the diets of 80% of Americans. Pyridoxine and magnesium have been the most commonly helpful vitamin and mineral in all children with autism spectrum disorders (ASD).
- DMG (DiMethylGlycine) and TMG (TriMethylGlycine) have been very effective adjuncts to the methylation needs of children with ASD and ADHD.

4. Supplements

- Pycnogenol (PCO) is a proanthocyanidin that is found in grape skins and pine bark. It has powerful antioxidant effects and can cross the blood brain barrier. It has been reported to have significant effects in some children with ADHD.
- Essential fatty acids (EPA and DHA): These are omega 3 fatty acids. They make up cell membranes and are especially concentrated in the brain. They are necessary for proper transmission of information from cell to cell. As the name suggests, they are essential and must be obtained from the diet since we cannot produce them in adequate quantity to sustain health.
- Ginkgo improves nutritional uptake of brain cells. This can be helpful in some children.
- Phosphatidyl serine increases glucose metabolism by brain cells and increases receptor site responsiveness to neurotransmitters. It can also down regulate the over expression of cortisol, the stress hormone. This allows the child, who is always hyper-alert to relax or “stand down” in military terms.
- DMAE (DiMethylAminoEthanolamine) aids in concentration by improving nerve impulse transmission in the brain. May also have an antidepressant effect.
- NADH increases production of dopamine, norepinephrine and serotonin and potentiates the energy producing effects of Coenzyme Q 10.

5. Amino Acids

- GABA is a neurotransmitter with the function of filtering out extraneous sensory input. When the GABA receptor is stimulated it allows us to concentrate without being distracted.
- Glutamine is the amino acid used to make GABA. It is also necessary in the production of glutathione essential in the detoxification process.
- Theanine is naturally found in tea. It stimulates GABA production.
- Taurine is the only amino acid that is not incorporated into proteins. It serves the primary function of transporting magnesium and potassium into cells. In the heart this improves strength of contraction and decreases irritability of heart muscle. In the brain it also stabilizes membranes and decreases seizure activity (brain irritability).
- Tyrosine is the amino acid used to produce dopamine, epinephrine and norepinephrine as well as the thyroid hormones.
- Glycine is a sweet tasting amino acid that can be used sublingually as a treatment of acute anxiety situations.
- Tryptophan is an essential amino acid that is the precursor of serotonin and melatonin.

6. Prescription options

- Huperzine A (an extract derived from club moss) is a cholinesterase inhibitor (blocks the breakdown of acetylcholine) that improves memory and learning abilities.
- Piracetam (a novel class of nootropic drugs that increase brain function) increases memory acquisition and retention.

I believe that our children deserve our best efforts at giving them an opportunity to develop to their potential and an opportunity to live in a body and in a world that is pure and clean. Six hundred years ago Voltaire cautioned, “drugs are something about which we know little, that we put into a body about which we know even less.” The situation has not changed much over the millennia. The ancient Greek physician, Hippocrates taught his students *Pimum non nocere*, “first do no harm.” It is not unreasonable to ask our physicians to do whatever is possible to treat all of us, but especially our children, with the most effective therapies, starting with the safest and, only if necessary, progressing to less safe options.