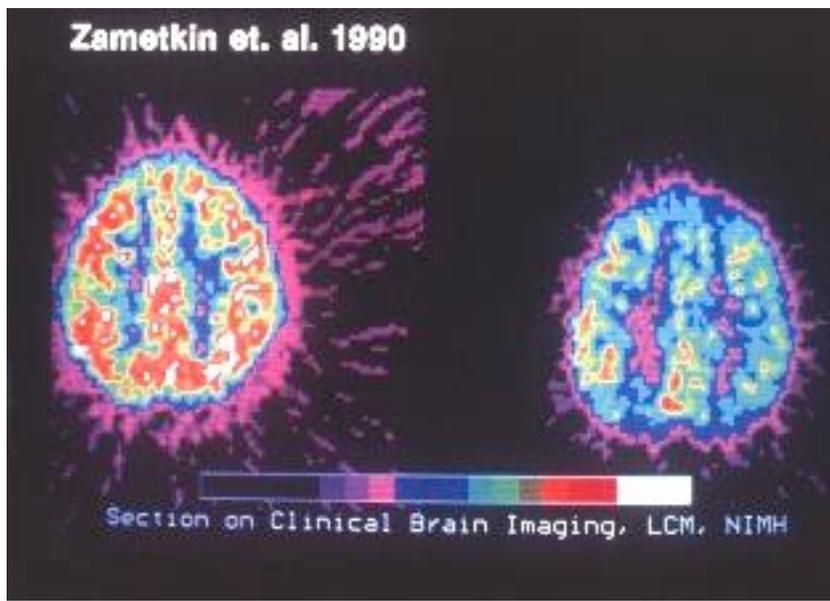


Attention Deficit Disorder (ADD) and
Attention Deficit Hyperactivity Disorder (ADHD)
--Recent Research--

The attached brain scan images from a *National Institute of Health* study clearly show that “it is in the head”.

- **Brain scan images produced by positron emission tomography (PET) show differences between an adult with Attention deficit Hyperactivity Disorder (right) and an adult free of the disease (left). (1)**



- “It is one of the most common **neurological disorders** in children.”(1)
- “In 2003, **4.4 million (7.8%) children in U.S.** diagnosed ADHD.” (2)
- “Of these, **56% were on medication.**” (2)
- “Two to three times more boys than girls affected.” (1)

“Furthermore, experts' opinions differ as to what ADD or ADHD actually is, and this causes even more grief and confusion for parents and those suffering with the symptoms. For example, the **American Psychiatric Association** lists fourteen signs, of which at least eight must be present for a child to be officially classified as ADD/ADHD. These fourteen signs are:

1. OFTEN FIDGETING WITH HANDS OR FEET, OR SQUIRMING WHILE SEATED.
2. HAVING DIFFICULTY REMAINING SEATED WHEN REQUIRED TO DO SO.
3. BEING EASILY DISTRACTED BY EXTRANEOUS STIMULI.
4. HAVING DIFFICULTY AWAITING TURN IN GAMES OR GROUP ACTIVITIES.
5. OFTEN BLURTING OUT ANSWERS BEFORE QUESTIONS ARE COMPLETED.
6. HAVING DIFFICULTY IN FOLLOWING INSTRUCTIONS.
7. HAVING DIFFICULTY SUSTAINING ATTENTION IN TASKS OR PLAY ACTIVITIES.
8. OFTEN SHIFTING FROM ONE UNCOMPLETED TASK TO ANOTHER.
9. HAVING DIFFICULTY PLAYING QUIETLY.
10. OFTEN TALKING EXCESSIVELY.
11. OFTEN INTERRUPTING OR INTRUDING ON OTHERS.
12. OFTEN NOT LISTENING TO WHAT IS BEING SAID.
13. OFTEN FORGETTING THINGS NECESSARY FOR TASKS OR ACTIVITIES.
14. OFTEN ENGAGING IN PHYSICALLY DANGEROUS ACTIVITIES WITHOUT CONSIDERING POSSIBLE CONSEQUENCES.” (3)

- Do you see any problems in the above, and how helpful is this criteria for diagnosis?
- Many times, these disorders carry-over into adulthood and can be linked to comorbidities such as alcoholism, unemployment, violent behavior, and even imprisonment.(1,5)
- One study concluded:
 - Hyperactive children had significantly lower birth weights.
 - Hyperactive children were more likely to have frequent coughs (44% vs. 6%).
 - 52% of hyperactive children had an abnormal degree of thirst vs. 6% in the control group.
 - Hyperactive children were more likely to have speech and language difficulties (32% vs. 6%) and difficulties in learning (67% vs. 6%).
 - Hyperactive children also had significantly **depressed** levels of **DHA (an omega 3 “essential fatty acid”, EFA)** and related amino acids.

- Hyperactive children also tend to have **lower zinc** levels.
- Hyperactivity is far more common in boys than in girls, and this is consistent with other research that shows male animals require **3 times as much EFA's (essential fatty acids) as do females** in order to achieve neonatal and infant development.(4)

Dr. Barabara Levine, Professor of Nutrition in Medicine at Cornell University reports that, "**Low levels of DHA** have been recently associated with depression, memory loss, dementia, and visual problems." Dr. Levine believes that. "...postpartum depression, **ADHD**, and low IQ's are all linked to the dismally **low DHA** intake common in the United States." (6)

Researchers at Purdue University (1995) report that hyperactive children have lower levels of key acids in their blood and suffer more from symptoms associated with **essential fatty acid (EFA) deficiency** (thirst, frequent urination, and dry hair and skin) and were also much more likely to have asthma and to have had many ear infections. (7)

Dr. Jacqueline Stordy of the University of Surrey (UK) believes, based upon her recent studies, "...long-chain polyunsaturated fatty acid supplements may benefit children with dyslexia, dyspraxia, and **ADHD**." (8)

Researchers at Purdue University now (2000) believe they have narrowed their search to a shortage of **omega-3 acids** (rather than the omega 6's) as the prime nutritional deficiency in ADHD. (9)

Countless recent studies are further confirming the relationship between a person's biochemical status and performance. Blood tests reveal that **75% of hyperactive, learning disabled children have low blood sugars** and/or allergies. (10,11,12)

University of Minnesota researchers, over a 40 year period, have consistently demonstrated that children who lack **optimal**

amounts of essential nutrients experience reduced attention span and intellectual ability. Additionally, Jeff Blumberg, Ph.D. and Professor of Nutrition at Tufts University states, "It's virtually impossible to get sufficient quantities of some key nutrients from food alone---even with the most healthful diets." (13)

Study after study positively link various nutrient deficiencies to a wide variety of disorders including ADD/ADHD. These nutrients include vitamin B-6, B-12, thiamin (B-1), vitamin E, vitamin A (beta carotene and carotenoids), vitamins C, and D, and a host of other critical nutrients. (11,28,29,30,31,32,33,34) A 2004 study published in the *Archives of Pediatric Adolescent Medicine* found iron deficiencies associated with 84% vs. 18% of ADHD vs. control group. Iron deficiency is known to cause abnormal dopaminergic neurotransmission (the cause of Parkinson's) and may contribute to ADHD. (**Caution:** Do NOT use iron-containing supplements without professional health care advice.) (14)

Nutrient deficiencies of other minerals e.g. magnesium, have been unquestionably linked to a huge variety of health disorders in the U.S. **Approximately 90% of people** experiencing long-term health issues are found to be **lacking in magnesium**, which is critical in the role played by vitamin D, which is also a **hormone**. Without proper vitamin D levels, absorption of calcium is severely impaired. If you live at a latitude similar to Chicago, Illinois, it is impossible for your skin to produce enough vitamin D for four months during winter, even if you were outside (in the sun) all day. If you think your vitamin D enriched milk, etc, will be adequate, think again.

The **Journal of Child Psychology and Psychiatry** reported a significant correlation between **zinc** and **fatty acids, both being decreased in children with ADHD**. In another study at Ohio State University, researchers observed that children diagnosed as ADHD may be zinc deficient, and that this deficiency may result in poor response to stimulant therapy. (15)

While diets, in particular "**elimination diets**", have been found very helpful in the majority of ADHD children, it should be remembered that these diets do nothing to correct nutrient

deficiencies. The role of these diets is often related largely to reducing the “triggers” of episodes or what might be termed an **abnormal reaction (behavior) or “allergy”**.

At the Institute of Child Health in London, researchers found that use of an elimination diet resulted in significant behavioral improvement of hyperactive children. Additionally, the prestigious medical journal, *Lancet*, reported that it appears food “allergies” are associated with hyperactivity. (15)

A similar study found that 62% of the hyperactive children improved on elimination diets. Foods listed as possible causes included: sugar, milk, wheat, chocolate, soy, eggs, and some other foods. (16)

The journal *Pediatrics* reported that sugar was a likely instigator of ADHD behavior. The *Journal of Autism and Developmental Disorders* reported that children with ADHD exhibited “abnormal rhythms in the **stress hormone cortisol**”. Cortisol is important in the metabolism of **carbohydrates**. (17)

Following the carbohydrate trail, Yale researchers confirmed that children with ADD may have a problem with metabolizing glucose. They learned that offering children doses of oral glucose significantly diminished their ability to concentrate. (18,15)

While many parents recognize the wisdom of at least limiting a child’s intake of sugar e.g. candy bars, soda, etc, few parents know that **a piece of white bread will spike your glucose level faster than a spoonful of sugar on your tongue!**

“High-glycemic foods like white bread, white flour, rice and potatoes are absorbed into our blood stream rapidly, causing our blood sugar to spike faster than if we were spooning table sugar onto our tongue.” (19)

A high-glycemic meal spikes our blood glucose levels which, in turn, spikes our insulin levels in the blood as our body tries to down regulate our blood sugar. This often drives our blood sugar

levels below the fasting level, into what is known as a **"hypoglycemic range"**. After the insulin surge, the body needs to get the blood sugar back up. "This **triggers the release of counterregulatory hormones e.g. cortisol (your stress hormone), adrenaline (your fight or flight hormone),** growth hormone and glucagon." (19) Given this **hormonal roller coaster** that we daily place our kids on, **is it any wonder why so many kids and adults have problems?**

Because diet clearly affects brain chemistry, and brain chemistry affects behavior and health, neurologists have long studied these relationships. **Dr. Linus Pauling (two time Nobel winner)**, more than thirty years ago clearly demonstrated how neurobehavioral disorders such as schizophrenia could be successfully treated with proper nutrition. (20) He also demonstrated how cancerous lesions could be reduced with just vitamin C. (21)

Recently, a massive array of new information has grown out of National Institute of Health linked neurological studies related to Alzheimer's dementia. Much of this has come via coordinated studies linking brain imagery (as seen earlier) with chemical analyses, much of it focused on **phospholipid activity** and **oxidation** of neuron (nerve cell) membranes. It is believed by most that **oxidative stress at the cellular level**, caused by **"free radicals"** (charged atoms or molecules) damaging otherwise healthy cells, is at the root cause of more than **70 chronic degenerative diseases.** (27) This includes most neurobehavioral disorders.

Of major significance is the recent evidence that disproportionate amounts of omega 6 vs. omega 3 "essential fatty acids" (EFA's) play key roles in this destructive oxidative process by supplying the fuel for accelerated oxidation. This makes sense when we realize how fast lipids (fats) oxidize and become rancid outside our bodies. However, it may be surprising to know that within our bodies, **omega 3's actually reduce oxidative damage.**(22,23)

This concept is further supported by the fact that the U.S. diet contains far too many omega 6's. In the U.S., the ratio of **omega 3's vs. omega 6's** in our average diet **is about 1:15** . Most experts agree that it **should be closer to 1:3** . (24)

The good news, however, is that we can do a lot to correct this dietary imbalance by making smarter life-style choices. We need to **strictly reduce our consumption of trans fats and saturated fats, while increasing our consumption of omega-3 "essential fatty acids" (EFA's)**. They are called "essential", because they are that important, and animals can not produce them. They must be obtained from our diet. Omega 3 EFA's are best obtained from oily, coldwater fish (e.g. mackerel, salmon, etc.) and flaxseed oil. Other sources simply do not supply enough. **"U.S. Pharmaceutical Ingredient Verification" and "U.S.P. Good Manufacturing Practices (GMP's)"** should be sought to insure against mercury, DDT, and dioxin contamination.

Additionally, there will always be some production of free radicals (also known as ROS or reactive oxygen species). For this reason, it is important to **always have enough antioxidants** within our bodies **to instantly neutralize these charged particles** before they cause damage. This applies to all ages. Eating intelligently helps, but it is virtually impossible to get what we need from our food alone. This is why the **A.M.A. now recommends that, "it appears prudent for all adults to take vitamin supplements."** They explain, **"recent evidence has shown that suboptimal levels of vitamins, even well above those causing deficiency syndromes, are associated with increased risk of chronic diseases including cardiovascular disease, cancer and osteoporosis."** (25,26)

With children of all ages undergoing major growth and developmental changes that will largely determine the future of their lives, it should be obvious how important **optimal nutrition** is to them.

Over two thousand years ago, Hippocrates, the “Father of Medicine”, said “**Let thy food be thy medicine and thy medicine be thy food.**” Part of the problem today is that our foods are lacking in the nutrients that they once had.

Additionally, we have an increased need for additional nutrients to counter the sea of pollution and chemicals that we call our home. Well chosen, all natural, quality USP grade supplements **are food.** They can have a huge impact on improving our health, including ADD/ADHD.

Comments and inquiries are welcome. **Speakers** with customized Power Point presentations **available** for special interest groups, e.g. school faculties, medical staff, PTA’s, Rotary Clubs, employers, parent groups.

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