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## **ADHD WITHOUT DRUGS**

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### **What is ADHD?**

Attention Deficit Hyperactivity Disorder (ADHD) is an increasingly common behavioral disorder characterized by impulsivity, inattentiveness, and hyperactivity. According to Swanson, *et al* in Neuropsych Review in 2007, there was a 400% increase in ADHD over the past 20 years and a 7-fold increase in prescription medications for ADHD. Although it is largely diagnosed in children or adolescents, ADHD also affects adults and the negative impact it can have on learning, school or work performance, and personal relationships is universal.

### **Are Pharmaceuticals the Right Treatment Choice?**

Pharmaceuticals may act as a patch and cause improvement, but they often mask signs and symptoms of underlying medical problems and thus are often ineffective. In those with co-morbid psychiatric illnesses, the medication used for ADHD (usually stimulants) can even be dangerous. Spencer, *et al* proposed that many with ADHD have undiagnosed bipolar disorder and stimulant medications used in ADHD may exacerbate that problem. Other studies by DuPaul, *et al* and Piska show that stimulants are ineffective in 70% of ADHD children with comorbid anxiety. The potential issues of medication intolerance and development of side effects over time are other reasons to exercise caution in reaching to medication first when treating someone with ADHD.

### **What causes ADHD?**

Accumulating evidence suggests the etiology of ADHD is multi-factorial and therefore it may not always respond to stimulant medication. Potential causes of ADHD include, but are not limited to,

- Nutritional deficiencies and imbalances
- Impaired detoxification
- Allergies and immune dysfunction
- Gastrointestinal disorders
- Mitochondrial dysfunction.

### **Treating the Root Cause Rather than the Symptoms**

The expanding nature of the ADHD population, scope of potential contributing factors, and increasing reliance on often ineffective medication, signals the demand for a more individualized and comprehensive approach for the ADHD population. Underlying medical issues often trigger internal dysregulation in one or more organ systems that manifests as changes in behavior and cognition. Finding and treating these underlying issues often improves behavior and cognition, which promotes more effective learning and greater success in many areas of life.

This article highlights aspects of the integrative approach for those with ADHD, concentrating on studies involving diet/nutrition and toxins as underlying contributing factors. Everything presented



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here is only meant for information and education, not direct diagnostic or treatment recommendations.

### **Why Diet and Nutrition Matter:**

- Subtle dietary changes can promote significant behavioral and cognitive changes. The impact of early poor nutrition depends on timing in relation to critical brain development, but if poor nutrition continues or develops later, it can have profound negative effects. Liu, *et al*, showed a 15.3 point IQ deficit in a prospective, longitudinal study of malnourished children at age 3. As far back as 1922, there were published reports of improvement in hyperactivity and learning issues with an elimination diet (Shannon WR), a diet that eliminates certain foods like wheat, soy or dairy. Dr. Ben Feingold's work in the 1970's highlighted the relationship between hyperactivity and artificial food colorings, flavorings, preservatives, and salicylates. Many other researchers have found similar results.
- The relationship between dietary peptides (like gluten from wheat and casein from dairy) and neurologic function and behavior is well documented as well. Horvath, *et al*, and others, have shown that increased intestinal permeability can allow poorly digested peptides (as well as toxins, allergens, etc) into the bloodstream where they can trigger inflammation, immune dysregulation, and affect neurologic and psychological function. In 2006, Niederhofer showed that ADHD-like symptomatology is often present among untreated celiac disease (lifelong gluten intolerance) patients and a gluten-free diet can improve those symptoms.
- In terms of general nutrition, it is clear that vitamins and minerals are essential to cognitive function. Various researchers have found low levels of vitamins and minerals in children with a range of neurodevelopmental disorders, as well as cognitive, behavioral, and academic improvement in those receiving specific supplementation. For instance, in one study by Schoenthaler, *et al*, 50% of US daily RDA (daily vitamin-mineral supplement) for 4 months (versus placebo) lowered institutional violence and antisocial behavior by nearly 50%.

### **Medical Research Indicates that Vitamin and Mineral Deficiencies Correlate with Symptoms of ADHD and Supplementation Can Improve Symptoms**

The information below on supplements and how they can affect behavior and cognition, illustrates the importance of finding and treating nutritional imbalances in those with ADHD. Note: All supplementation should be done under the guidance of a qualified medical professional.

#### **IRON:**

- Children with moderately severe iron-deficiency anemia as infants had lower scores on tests of mental and motor functioning at school entry (Lozoff, et al. 1991 NEJM;325(10):687-694).



- Low iron associated with changes in serotonin, noradrenaline, and dopamine levels; iron supplementation has short and long-term benefits in behavior and psychomotor development (Parks, et al. 1989 Acta Paediatr Scand Suppl;361:71-7).
- 23 children with ADHD, ages 5 to 8, with serum ferritin (iron stores) < 30; for 12 weeks, 18 given iron-sulfate and 5 given placebo; decreased ADHD rating scales (Konofal E, et al. Jan 2008 Pediatr Neurol;38(1):20-6).
- 73 girls with low serum ferritin; 8-week study; randomly assigned ferrous sulfate or placebo; iron group performed better on verbal learning and memory tests (Bruner AB, et al. Oct 1996 Lancet;348(9033):992-6).

*Note: Iron supplementation should be done with caution as it could further exacerbate mitochondrial dysfunction—seek the advice of a medical professional*

#### **ESSENTIAL FATTY ACIDS:**

Essential fatty acids are the “good fats” such as Omega 3s found in cod liver oil and flaxseed oil.

- Study with 44 hyperactive children and 45 matched controls; various essential fatty acid levels were significantly lower in the hyperactive group (Mitchell EA, et al. 1987;26:406-411).
- Randomized, double-blind, placebo-controlled 6-week pilot trial; effects of omega-3-fatty acids in 13 children with autistic disorders and severe tantrums, aggression or self-injurious behavior; Aberrant Behavior Checklist done at 6-weeks; advantage of omega-3 fatty acids compared with placebo for hyperactivity and stereotypy (Amminger GP. Feb 2007 Biol Psychiatry;61(4):551-3).
- Pure EPA effective for depression and schizophrenia; Combination of EPA and DHA better for ADHD (Richardson AJ. 2006 Int Rev Psychiatry;18(2):155-172).

#### **PYCNOGENOL:**

Pycnogenol is a natural plant extract that has powerful antioxidant and anti-inflammatory effects.

- Improvement in attention; antioxidant; helps to regenerate vitamins C and E; anti-inflammatory properties; immune support; treats allergies; reports of improvements in EEG, handwriting, and academic success
  - (Greenblatt, et al. 199 J Am Acad Child Adolesc Psychiatry;38(10):1209-1210).
  - (Liu, et al. 1998 Cell Mol Life Sci;54(10)):1168-1172).
  - (Liu, et al. 2000 Biol Pharm Bull;23(6):735-737).
  - (Rohdewald P. Int J Clin Pharmacol Ther;40(4):158-168).

#### **MAGNESIUM:**

- 116 children with ADHD, ages 9 to 12 years old; magnesium deficiency in 95% (hair > red blood cell > serum) (Kozielec, et al. 1997 Magnes Res;10(2):143-8).



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**VITAMIN B6:**

- Improved behaviors of some children with ADHD, compared to methylphenidate (Coleman, et al. 1979 Biol Psychiatry;14:741-751).

**ACETYL-L-CARNITINE:**

- Decreases hyperactivity in fragile X patients (Calvani, et al. 2001 Rev Neurol;33 Suppl 1:S65-S70).

**CARNOSINE:**

- It can be neuroprotective (De Marchis S, et al. 2000 Biochemistry (Moscow);65(7):874-93 and Trombley PQ, et al. 2000 Biochemistry (Moscow);65(7):807-16).

**ZINC:**

- Often low in ADHD (Bekaroglu, et al. 1996 J Child Psychol Psychiatry;37:225-227).
- Low zinc may predict poor response to amphetamine treatment in ADHD (Arnold, et al. 1990 Int J Neurosci;50:103-107).

**PHOSPHATIDYLSERINE:**

- Important for synaptic membrane and neurotransmitter function
- Study of 21 patients with ADHD, ages 4 to 19; 4-month trial; helped approximately 90% with attention and learning (Ryer, et al. Lancet (letter), Benefits of PS against attention deficit in a preliminary study).

**OTHER:**

- AD-FX (combination of American Ginseng and Ginko Bilboa) – study with 36 ADHD patients, ages 3 to 17; 4-week study; 44% social improvements and 74% improvements in Conners' ADHD index and hyperactive/impulsive behaviors (Lyon, et al. 2001 J Psychiatry Neurosci;26(3):221-228).

**Why Harmful Environmental Exposures Should be Minimized:**

Toxic load due to chemicals, toxic metals, and allergens can cause oxidative stress, increased burden on the immune system, and behavioral and cognitive changes. Infections, trauma/injury, stress, and poor diet can all further increase oxidative stress.

Many chemicals and metals are recognized causes of neurodevelopmental disorders and subclinical brain dysfunction. Exposure during early fetal development can trigger brain injury at doses much lower than those affecting adult brain function. The information below from various studies highlights the importance of exploring causes of oxidative stress as contributing factors in ADHD.



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- Children exposed to higher chlorpyrifos (insecticide) levels were more likely to experience Psychomotor Development Index and Mental Development Index Delays, attention problems, ADHD, and pervasive developmental disorder problems at 3 years of age (Rauh, et al. 2006 Pediatrics' 118;e1845-1859).
  - Prenatal environmental tobacco smoke is a risk factor for ADHD (Braun JM, et al. Dec 2006 Environ Health Project;114(12):1904-1909).
  - Dose-response relationship between childhood lead exposure and ADHD (Braun JM, et al. Dec 2006 Environ Health Project;114(12):1904-1909).
  - In Texas report – on average, for each 1000 lbs of environmentally released mercury, there was a 43% increase in the rate of special education services and a 61% increase in the rate of Autism (Palmer, et al. Helath & Place 12; 2006:203-209).
  - Case report – 4 ½ year-old boy with ADHD and Autism; increased blood lead level; treated with succimer (a medicine used to remove lead and other metals) and repetitive behavior and hyperactivity stopped; regression when succimer stopped (Eppright, et al. 1996 Mo Med;93(3):136-8).
  - Environmental lead exposure in children who have maximal blood lead < 7.5 µg/dl is associated with intellectual deficits (Lanphear BP, et al. 2005 Environ Health Perspect;113(7)).
  - Pollen exposure is a cause of regression in neurobehavioral function in children with Autism and ADHD (Boris MJ, et al. 2004 J of Nutritional and Environmental Medicine;14(1):47-54).
  - Three large German studies suggest a strong and independent association between atopic dermatitis and ADHD – one of the studies (by Schmitt, et al) reported a 2.67-fold increased likelihood of ADHD in those with atopic dermatitis and parent-reported sleep problems (article by Bruce Jancin in Internal Medicine News; studies from JAMA and Pediatric Allergy Immunology journals cited in this article).

In looking at possible underlying medical problems as contributing factors in ADHD, the integrative approach to those with ADHD offers an individualized and comprehensive alternative approach that can either make medication unnecessary or reduce it to a temporary and adjunctive intervention. As the medical community continues to learn about the etiologies of ADHD, the information presented here provides more pathways for a patient to explore with his or her physician and may ultimately lead to more natural treatment options for those with ADHD.