Nutritional Considerations of ADHD and AUTISM

ADHD and AUTISM ON THE RISE

Recent years has seen an unprecedented rise in autism and attention deficit hyperactivity disorder (ADHD). Although researchers speculate on the reason for this rise, many factors likely contribute, including more accurate diagnosis. However, overwhelming evidence suggests that nutritional deficiencies may be a contributing factor.

OMEGA-3 FATTY ACIDS ARE KEY

Our brain and nerves are composed mostly of fat. The most important of these are called omega-3 fatty acids and are found primarily in fish or fish oil supplements. Also called EPA and DHA, they are absolutely necessary for human health, and their concentration in the brain makes them key players in neurological disorders such as autism and ADHD. Brain and nerve growth throughout childhood is extraordinarily rapid, and the need for omega-3 fatty acids remains critical all the way through adolescence and into adulthood. Overwhelming evidence implicates deficiencies in omega-3 fatty acids for the rise in autism and ADHD. Research shows that children with low scores on behavioral assessment tests consistently have lower omega-3 fatty acids levels, and when supplemented with fish oils, the symptoms of ADHD in these children such as hyperactivity, impulsiveness, and inability to pay attention - dramatically improve.

WHY MEASURE THE OMEGA-6 TO OMEGA-3 RATIO?

We are familiar with the expression that a child's brain is like a sponge, ready to absorb information at an astounding rate. A truly appropriate analogy, it stems from the fact that our brains can actually create nerve pathways in response to new experiences and learning environments. Called "neuronal plasticity," this phenomena is crucial for long-term memory and learning. Proper levels of the omega-3 fatty acid, DHA (docosahexaenoic acid), is important for membrane fluidity. The ratio of omega-6 fatty acids, which differ in structure and function, to omega-3 fatty acids affect neuronal plasticity as well. Scientists now agree that the ratio of omega-6 fats to omega-3 fats is as important as the actual levels, especially in autism and ADHD. A lower ratio is better and when this ratio is improved, symptoms of autism and ADHD can improve as well.

ZINC – THE MOOD MINERAL

Zinc deficiency is often implicated in ADHD because it is an important co-factor to several neurotransmitters, which directly affect mood and learning ability. Specifically, zinc affects the production of dopamine, a feel-good chemical in our brains that is needed for learning and certain emotions like motivation and pleasure. In fact, studies show that zinc levels correlate with anxiety and behavioral problems, as well as have a significant effect on information processing in boys with ADHD. Since zinc levels are much lower in autistic and ADHD individuals, children with ADHD show positive behavioral and cognitive results after zinc supplementation.In addition, zinc is essential for proper elimination of the toxic metal mercury from our brain tissue, which has also been linked to autism and ADHD.

VITAMINS AND AUTISM

Low levels of vitamin D have been linked with autism and in some cases of severe deficiency, high-dose vitamin D therapy actually reversed some of the autistic behaviors. Some research even suggests that the nutritional status of the mother during gestation can affect behavior in children. One study confirmed that low folate status in pregnancy was associated with hyperactivity in children. Other studies show that persons who carried a common gene that predisposes them to folate and vitamin B12 deficiency (called the MTHFR gene) were more likely to suffer from

ADHD. Supplementation with thiamine (vitamin B1) has shown clinical benefit to some autistic children. Specifically, a deficiency in vitamin B1 has been associated with delayed language development in childhood. When deficient, biotin (vitamin B7) can potentially cause neurological problems associated with autism since the brain is quite vulnerable to biotin deficiency.

Micronutrient Testing

MAGNESIUM AND VITAMIN B6 – A WINNING COMBINATION

Like most nutrients, magnesium and vitamin B6 work together in improving clinical symptoms of autism and ADHD. When a group of autistic children were supplemented with magnesium and vitamin B6, 70% of the children showed improvement in social interaction and communication. Interestingly, when the supplements were stopped, the clinical symptoms reappeared. In another study, physical aggression and inattention improved after supplementation with magnesium and vitamin B6 for a few months.

THE ROLE OF NEUROTRANSMITTERS

Neurotransmitters are tiny chemicals that transmit information from the outside world to various parts of our brains and from our brains to the rest of our bodies. Although neurotransmitters, such as choline, glutamine, asparagine and inositol may not be recognized as household names, they profoundly affect emotions, thinking and social behavior. For example, levels of glutamine and asparagine are lower in autistic children and some adults with ADHD.

AN AMINO ACID THAT IMPROVES CARNITINE – BEHAVIOR

Carnitine is an amino acid whose primary function is to transport fatty acids, including the ever-so-important omega-3 fatty acids into cells so they can be used for energy. In autistic individuals, carnitine levels are significantly reduced, which then affects the patient's ability to use the fatty acids that are so critical to their learning and social development. A recent study demonstrated that carnitine can reduce hyperactivity and improve social behavior in boys diagnosed with ADHD, and may actually represent a safe alternative to the use of stimulant drugs for the treatment of ADHD in children.

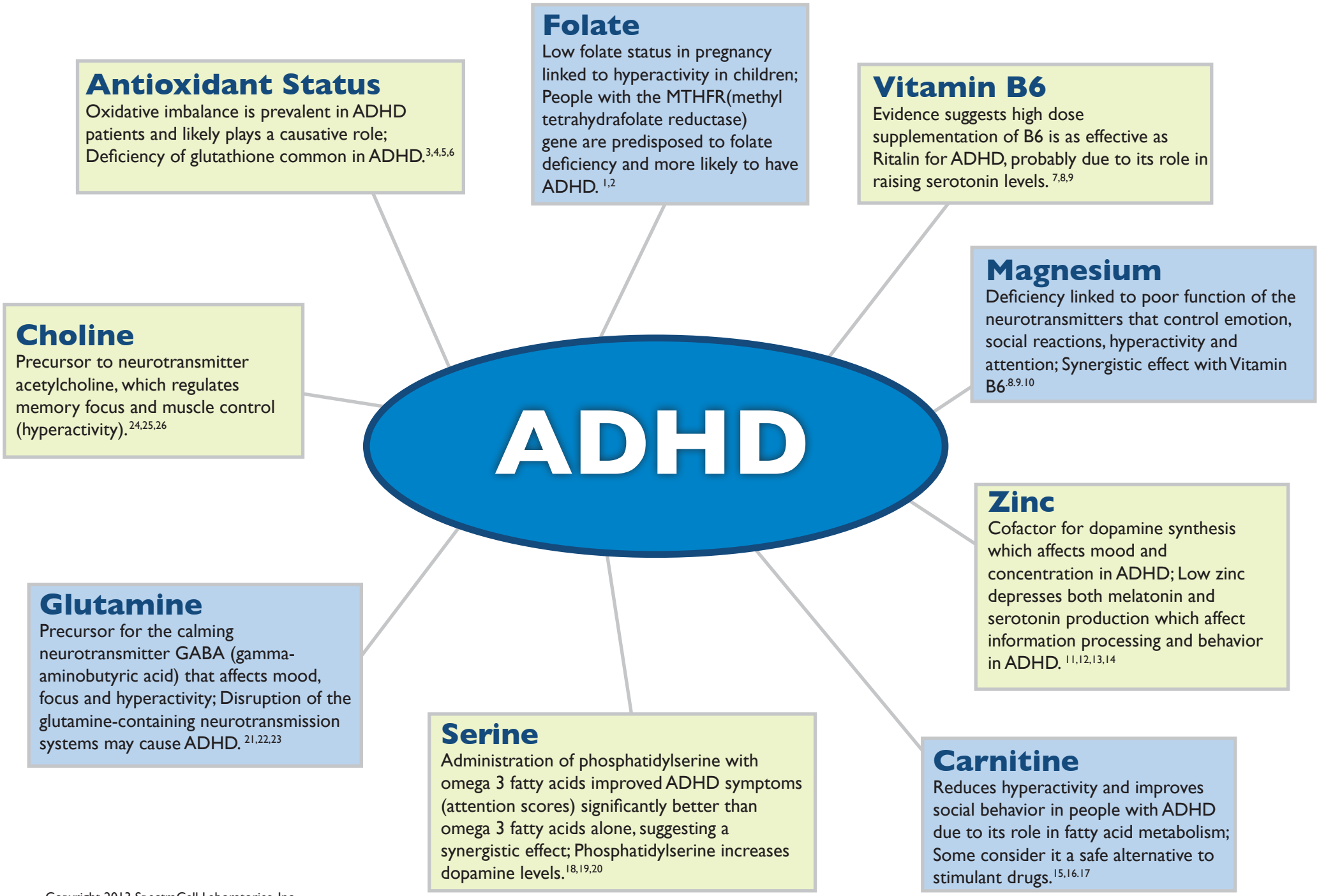
ADHD AND AUTISM – AN OXIDATIVE STRESS DISORDER?

Oxidative stress is a term used to describe damage to our cells that occurs on a daily basis throughout our bodies. Fortunately, our bodies have built-in defenses against the onslaught of internal and external toxins causing oxidative stress in our tissues. Interestingly, several studies show an increase in oxidative stress in both autism and ADHD, resulting in an impaired ability to eliminate toxins. Specifically, adults with ADHD have extremely low levels of some of the most powerful antioxidants in the body. One study linked damage in fatty tissue surrounding our cells to symptoms of autism and ADHD. Minerals such as selenium and copper, antioxidants such as cysteine and vitamin E and several other nutrients ensure the body's powerful defense systems work optimally.

A MULTI-FACETED APPROACH

Since so many nutrients are needed to keep our amazingly complex brain and nervous system functioning properly, a comprehensive assessment of your nutritional status is key. In disorders like autism and ADHD, the potential improvement of symptoms when even a single deficiency is corrected can often be quite dramatic.

SpectraCell's micronutrient tests measure 33 vitamins, minerals and antioxidants in your body and evaluates how well your body absorbs and utilizes each nutrient.



REFERENCES

[1]Krull R, Brouwers P, Jain N et al. Folate pathway genetic polymorphisms are related to attention disorders in childhood leukemia survivors. J Pediatr 2008;152:101-105.

[2]Schlotz W, Jones A, Phillips D et al. Lower maternal folate status in early pregnancy is associated with childhood hyperactivity and peer problems in offspring. J Child Psychol Psychiatry 2010;51:594-602.

[3]Selek S. Savas H, Gergerlioglu H et al. Oxidative imbalance in adult attention deficit/hyperactivity disorder. Biol Psychol 2008;79:256-259.

[4]Dvorakova M, Sivonova M, Trebaticka J et al. The effect of polyphenolic extract from pine bark, Pycnogenol on the level of glutathione in children suffering from attention deficit hyperactivity disorder (ADHD). Redox Rep 2008;11:163-172.

[5]Spahis S, Vanasse M, Belanger S et al. Lipid profile, fatty acid composition and pro- and anti-oxidant status in pediatric patients with attention-deficit/hyperactivity disorder. Prostaglandins Leukot Essent Fatty Acids 2008;79:47-53.

[6]Bulut M, Selek S, Gergerlioglu H et al. Malondialdehyde levels in adult attention-deficit hyperactivity disorder. J Psychiatry Neurosci 2007;32:435-438.

[7]Coleman M, Steinberg J, Tippett J et al. A preliminary study of the effect of pyridoxine administration in a subgroup of hyperkinetic children: a double-blind crossover comparison with methylphenidate. Biol Psychiatry 1979;14:741-751.

[8]Mousain-Bosc M, Roche M, Polge A et al. Improvement of neurobehavioral disorders in children supplemented with magnesium-vitamin B6. I. Attention deficit hyperactivity disorders. Magnes Res 2006;19:46-52.

[9]Mousain-Bosc M, Roche M, Rapin J et al. Magnesium VitB6 intake reduces central nervous system hyperexcitability in children. J Am Coll Nutr 2004;23:545S-548S.

[10]Huss M, Volp A, Stauss-Grabo M. Supplementation of polyunsaturated fatty acids, magnesium and zinc in children seeking medical advice for attention-deficit/hyperactivity problems - an observational cohort study. Lipids Health Dis 2010;9:105.

[11]Arnold L, DiSilvestro R. Zinc in attention-deficit/hyperactivity disorder. J Child Adolesc Psychopharmacol 2005;15:619-627.

[12]Yorbik O, Ozdag M, Olgun A et al. Potential effects of zinc on information processing in boys with attention deficit hyperactivity disorder. Prog Neuropsychopharmacol Biol Psychiatry 2008;32:662-667.

[13]Arnold L, Pinkham S, Votolato N. Does zinc moderate essential fatty acid and amphetamine treatment of attention-deficit/hyperactivity disorder? J Child Adolesc Pychopharmacol 2000;10:111-117.

[14]Dodig-Curkovic K, Dovhanj J, Curkovic M et al. The role of zinc in the treatment of hyperactivity disorder in children. Acta Med Croatica 2009;63:307-313.

[15]Arnold L, Amato A, Bozzolo H et al. Acetyl-L-carnitine (ALC) in attention-deficit/hyperactivity disorder: a multi-site, placebo-controlled pilot trial. J Child Adolesc Psychopharmacol 2007;17:791-802.
16Van Oudheusden L. Scholte H. Efficacy of carntine in the treatment o children with attention-deficit hyperactivity disorder. Prostaglandins Leukot Essent Fatty Acids 2002;67:33-38.

[17]Torrioli M, Vernacotola S, Peruzzi L et al. A double-blind, parallel, multicenter comparison of L-acetylcarnitine with placebo on the attention deficit hyperactivity disorder in fragile X syndrome boys. Am J Med Genet 2008;146:803.812.

[18]Kidd P. Omega-3 DHA and EPA for cognition, behavior, and mood: clinical findings and structural-functional synergies with cell membrane phospholipids. Altern Med Rev 2007;12:207-227.

[19]Vaisman N, Kaysar N, Zaruk-Adasha Y et al. Correlation between changes in blood fatty acid composition and visual sustained attention performance in children with inattention: effect of dietary n-3 fatty acids containing phospholipids. Am J Clin Nutr 2008;87:1170-1180.

[20]Pellow J, Solomon E, Barnard C. Complementary and alternative medical therapies for children with attention-deficit/hyperactivity disorder (ADHD). Altern Med Rev 2011;16:323-337.

[21]Perlov E, Philipsen A, Hesslinger B et al. Reduced cingulated glutamate/glutamine-to-creatine ratios in adult patients with attention deficit/hyperactivity disorder – a magnetic resonance spectroscopy study. J Psychiatr Res 2007;41:934-941.

[22]Carrey N, MacMaster F, Gaudet L et al. Striatal creatine and glutamate/glutamine in attention-deficit/hyperactivity disorder. J Child Adolesc Psychopharmacol 2007;17:11-17.

[23]Rusch N, Boeker M, Buchert M et al. Neurochemical alterations in women with borderline personality disorder and comorbid attention-deficit hyperactivity disorder. World J Biol Psychiatry 2010;11:372-381.

[24]Barth V, Need A, Tzavara E et al. In vivo occupancy of dopamine d3 receptors by antagonists produces neurochemical and behavioral effects of potential relevance to attention-deficit-hyperactivity disorder. J Pharmacol Exp Ther 2013;344:501-510

[25]English B, Hahn M, Gizer I et al. Choline transporter gene variation is associated with attention-deficit hyperactivity disorder. J Neurodev Disord 2009;1:252-263.

[26]Kronenberg G, Ende G, Alm B et al. Increased NAA and reduced choline levels in the anterior cingulum following chronic methylphenidate. A spectroscopic test-retest study in adult ADHD. Eur Arch Psychiatry Clin Neurosci 2008;258:446-450.

Additional references at http://www.spectracell.com/online-library-mnt-adhd-abstracts/