

## Complementary and Alternative Medicine and Children with Autism Spectrum Disorder

Complementary and Alternative Medicine or CAM generally refers to treatments that are used in addition to or in replacement of standard or mainstream treatments. Standard treatments for children with Autism Spectrum Disorder (ASD) are educational and behavioral interventions. Complementary and alternative treatments include special diets, extra vitamins and minerals, food supplements such as 3 omega fatty acids and probiotics, digestive enzymes, glutathione, massage, acupuncture, anti-fungal medications, hyperbaric oxygen, chelation and many more. CAM has been used by 30% or more of families who have children with ASD.

Integrative medicine is a newer term. It refers to patient- and family-centered care that combines consideration of mainstream as well as CAM treatments based on the evidence of effectiveness and patient and family choice. The critical issues are whether the treatment is scientifically effective, whether the treatment has significant side effects, and the cost of treatment. My goals for the discussion of CAM treatments are as follows:

1. Families discuss their questions about all treatments including CAM with their child's health care provider;
2. Families receive information on efficacy, side effects and cost for specific treatments;
3. Both families and health care providers are satisfied with the process; and
4. Families are certain and comfortable with their choice.

*What is high-quality scientific evidence of effectiveness?* In general, I look for at least 2 well-designed studies that report the same benefits. The studies should have children in a group that gets the treatment (experimental group) and a group that gets a sham treatment (placebo group); and the children should be assigned randomly to either group (randomized clinical trial or RCT). It's also very important that neither the research staff nor the child and family know who is getting the real treatment and who is getting the sham treatment (double blind study). My confidence in recommending a treatment is also higher if research studies from different centers report the same positive outcomes.

Be cautious if a treatment is only supported by the description of positive results from use in several children (case studies). Positive case studies only potentially identify a treatment that needs further research with a RCT but do not give scientific evidence of benefit. Also be cautious if the treatment has not been studied in children who are the same age as your child and if the treatment is said to benefit many different disorders.

A useful way to categorize CAM treatments based on evidence of effectiveness and risk of side effects is as follows (adapted from Anagnostou & Hansen, 2011):

### Treatments are well tolerated and effective

Melatonin

### Treatments are well tolerated but unknown/inconclusive effectiveness

Gluten Free Casein Free (GFCF) Diet

Multi-vitamins and minerals

Vitamin C

Vitamin B6/Magnesium

Omega 3 Fatty Acids

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Oregon Center for Children and Youth with Special Health Needs

503-494-8303

occyshn@ohsu.edu

www.occyshn.ohsu.edu



Methyl B12, folic acid, DMG, glutathione

Digestive enzymes

Oxytocin

Craniosacral therapy

Massage

Acupuncture

Auditory integration training

Treatments are well tolerated but no evidence of effectiveness

Secretin

Treatments are unsafe/unknown safety and have inconclusive or no effectiveness

Chelation

Hyperbaric Oxygen Therapy (HBOT)

Immune therapies (for example, intra-venous immunoglobulin or IVIG)

Antifungal agents

Some treatments previously listed as CAM have been shown to be effective and well –tolerated and are now part of standard medical care. Melatonin used to treat sleep-onset problems (difficulty settling at night for sleep) is one example. Other treatments have been thoroughly studied, have been shown to be ineffective and have largely been discarded. Use of the pancreatic hormone Secretin is an example. A few treatments have been associated with marked side effects. The use of IV or intra-venous chelation is an example of this. For the treatments listed above as having unknown/inconclusive effectiveness, there is either very little research information on the treatment or contradictory information from different research studies. There has been recent research interest in the use of anti-oxidants to reduce “oxidative stress” for several different chronic neurologic conditions including ASD. N-acetylcysteine (NAC), Glutathione and vitamin B12 are anti-oxidants which have been used in children with ASD. Research on any benefits is still very preliminary and the concept of “oxidative stress” is unproven.

In general, research on CAM treatments has been limited although the number and quality of studies is improving. Many studies have only included small numbers of children, and some studies have been poorly designed. Now I will discuss a few commonly used CAM treatments.

*Vitamins and minerals.* The parents of children with ASD are more likely to give their children extra vitamin and mineral supplements than other CAM treatments. Currently there is insufficient data to support use of extra vitamins or minerals. In one well-designed study of a multi-vitamin and mineral supplement for children with ASD, Adams and colleagues reported limited positive change on some of the outcome measures but not all (Adams, et. al., 2012). Previous studies of vitamin B6 and magnesium supplements were contradictory and several studies were poorly designed. There is very limited data on supplementation with other individual vitamins such as vitamin C or vitamin B12. The reported side effects have been minimal although there is concern especially for very high doses of vitamin B6 and vitamin A. Please check with your child’s health care provider if you do plan to try these treatments.

As I commented in the nutrition handout, I recommend giving children with ASD and especially children with restricted diets a standard multi-vitamin daily. Check to make sure it contains 400 IU vitamin D. The RDA (Recommended Daily Allowance) for vitamin D for children older than 12 months is 600 IU. With the multi-vitamin and the food they eat,

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children will exceed their RDA. If your health care provider has determined your child is deficient in vitamin D, (by obtaining a 25-hydroxy vitamin D blood level), your child may benefit from being supplemented with higher amounts of vitamin D daily.

*Pre/probiotics.* There has been a good deal of recent research interest in the bacterial flora of the gastro-intestinal (GI) tract, the microbiota, and how GI problems can effect brain function, the so-called gut-brain connection. Is the GI microbiota different in kids with ASD? Some studies report Yes and some No, the studies are not consistent. What about using pre and probiotics to restore natural GI function? Probiotics are so-called good or healthy bacteria. Prebiotics are indigestible dietary fibers in foods such as onions, leeks, whole grains and bananas that support the growth of the natural GI bacterial flora. We do know antibiotics change gut flora and probiotics are helpful in children with diarrhea caused by antibiotic use. They may also be useful to prevent infant colic; however, there is little research information on use of probiotics and no research on prebiotics in children with ASD.

I recommend a healthy balanced diet which should give adequate pre- and probiotics. A good source of probiotics is yogurt that contains a live or active culture (check the label). If your child has chronic loose stools, discuss the issue with your child's health care provider. Supplementation with probiotics may be considered as part of the evaluation and treatment. In general, probiotics are well tolerated. Also see my discussion of the Gluten Free Casein Free (GFCF) diet below.

*Gluten Free Casein Free (GFCF) diet.* The GFCF diet is based on the theory that sensitivity to gluten and dairy results in GI inflammation, a "leaky" gut and absorption of biologically active opioid peptides that affect brain function. Carefully designed research studies have not confirmed the presence of biologically active peptides and have not shown definite benefit for the GFCF diet. There have been a number of anecdotal reports of the diet benefiting individual children but only one small double-blind RCT which did **not** show benefit. Other studies with less rigorous design have reported limited benefit on some outcome measures but no benefit on others.

Some individuals are sensitive to dairy due to milk protein allergy or lactose intolerance (they lack the enzyme to break down the sugar in milk, lactose). GI symptoms are usually experienced within hours of ingestion. Testing for dairy sensitivity is usually by food challenge. There is a genetic contribution to milk protein allergy and lactose intolerance. Ingestion of wheat (gluten) also can cause significant health problems for some individuals. Celiac disease is caused by sensitivity to gluten in wheat and some other grains and is present in as many as 1 in 100 individuals in the US. There is a genetic predisposition and testing is available to diagnose Celiac disease. It is not more common in children with ASD compared to children without ASD. Non-celiac gluten sensitivity has recently been reported but limited information is available of this condition in children and no information on this condition for children with ASD. It is reported to be associated with abdominal pain, bloating, diarrhea and fatigue. These are symptoms similar to classic Celiac disease but currently there are no biomarkers or tests for non-celiac gluten sensitivity. Currently this concept should be considered unproven.

Does your child need a special diet? If your child has chronic GI symptoms and/or your family has a history of dairy or wheat sensitivity discuss a trial of a special diet with your child's health care provider. Some children with ASD especially children who also have Down syndrome should be tested for Celiac disease. This needs to be done while the child is on a regular diet containing wheat. If you do decide to proceed with a special diet, I recommend starting with dairy elimination. Wait 3-4 weeks to see the results before eliminating gluten. This way you will know whether dairy

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elimination or gluten elimination was helpful. The cost of the GFCF diet basically relates to the time and effort needed to support the special diet. Children who are on the GFCF diet usually will need to be supplemented with calcium and vitamin D.

*Food colors/additives (the Feingold diet).* The Feingold diet or program is an elimination diet based on the theory that certain food additives contribute to a child's hyperactivity and related behaviors. It was initially developed as a diagnostic diet to look for food-related causes of asthma and allergies. It has been used in children with ADHD and in children with ASD. The diet eliminates most food colors, flavors, preservatives and other additives. It also eliminates salicylate containing foods at least initially. Others have recommended also eliminating processed sugars although this is not a specific component of the Feingold program. There continues to be controversy over the research studies that have examined the effectiveness of the diet in children with ADHD. Studies have reported variable results from few children responding to more than 50% responding. Effect sizes (amount of change in behavior) have been small. The author of a commentary for the American Academy of Pediatrics (AAP) Grand Rounds (2008) stated, "... For the child without a medical, emotional, or environmental etiology of ADHD behaviors, a trial of a preservative-free, food coloring-free diet is a reasonable intervention." No research information is available on the use of the diet in children with ASD.

*Overall Recommendations to families.* Get the information you need to make an informed decision. Discuss your interest in CAM treatments with your child's health care provider. If you choose to start a new treatment, make only one change at a time so you can tell the benefits or side effects of that treatment. Get help to monitor your child during the treatment. Your child's health care provider, therapist or teacher can help you decide which behaviors to follow and how to measure them so you can tell as clearly as possible whether the treatment "worked."

*Further information for families:* Autism Speaks website,  
<http://www.autismspeaks.org/what-autism/treatment/complementary-treatments-autism>

Robert Nickel MD  
Developmental Pediatrician  
Oregon Health & Science University  
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