



Holistic Nutritional Approaches for Autism Spectrum Disorder (ASD)

Prevention of ASD, and reduction in autistic conditions in children on the spectrum

- Common Nutritional approaches
- Lifestyle, genetics, and environmental factors
- prenatal tips for growing healthy babies

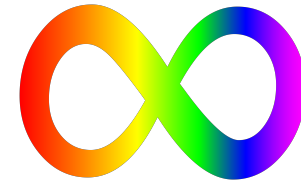
By Lisa Shelton, CHC, M.Ed.
lovingwellnessnow@gmail.com

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“When you know one person with ASD you know one person with ASD”. No two individuals are alike, and this holds true for nutrition and biomedical approaches in recognizing the individual and understanding what works for one person may not work for another person.

ASD is very complex and there are Many Causations of ASD

- Genetic causes
- Neurologic differences
- Gender differences
- Metabolism imbalances
- Infections
- Autoimmune disorders
- Environmental triggers



ASD is affecting nearly 2% of the population and the CDC announced 1:59 (April 2018)

- 3 in 10,000 children with ASD in 1970
- 66 in 10,000 children with ASD in 2002
- 14.7 in 1,000 children (age 8) with ASD, or 1:68 in 2014

(Rice et al., 2007, Deth, R. et al., 2008, Baio, J. et al 2014, Lyons, J. 2016)



Abstract

Background: Literature review suggests nutritional intake, proper folate utilization, clean environment without air pollution or toxic exposure, and minimizing stress levels in mothers are all contributing factors towards healthy pregnancy and normal child development. Nutritional intake of nutrient dense diets, avoidance of certain foods, and supplementation are important for children in general, and importance is especially true for children with ASD. Dietary elimination of food allergies and food sensitivities, including inflammatory foods, may help to reduce ASD conditions. Additionally, following a gluten free and casein free (GFCF) diet and avoiding food additives may further help to reduce ASD conditions in many children on the spectrum.

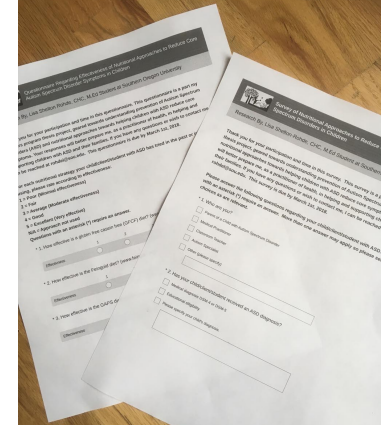
Objective: This study examines the pre-conception and prenatal strategies towards prevention of autism spectrum disorder (ASD) pregnancies as well as holistic nutritional practices for parenting the child with ASD.

Abstract

Methods: This study will be carried out in multiple phases. Phase I will study nutritional approaches used for children with ASD, and effectiveness of nutritional approaches in reducing core symptoms of ASD in children through survey/questionnaire and interview. Phase II will implement holistic health coaching and nutritional recommendations for future parents from pre-conception through pregnancy to support a normally developing child, as well as nutritional guidance for families with children on the autism spectrum. Families will be followed for many years. Pre and post questionnaires and surveys, interviews, chart notes and observations will be analyzed and compared. All analysis will be combined for interpretation of patterns, what patterns mean, conclusions, recommendations, and next steps.

This study and results are focusing on Phase I at this time.

- Phase I (results represented here): Study of nutritional approaches used for children with ASD, and effectiveness of nutritional approaches in reducing core symptoms of ASD in children through survey (13 respondents representing 15 case studies), questionnaire (8 respondents representing 9 case studies), and interview.
- Respondents are mostly parents of children with ASD, as well as practitioners, and teachers.
- Phase II (to be completed at a future time): Implement health coaching

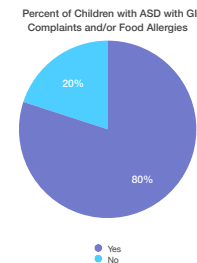


Supporting children with ASD through dietary nutrition.

It takes a team.



80% of Children with ASD had GI Complaints and/or Food Sensitivities/Allergies

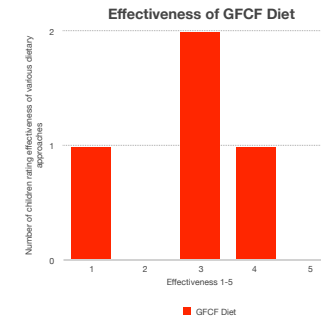


- 10 of 15 case studies following a specific dietary approach.
- 11 case studies report improvements or reductions of autistic conditions from diet including social reciprocity, nonverbal communication, relationships, restrictive/repetitive behaviors, sensory issues, gastrointestinal complaints, and more.

Various dietary approaches followed

- **Gluten Free Casein Free (GFCF) Diet**
- **Allergy Free Diet**
- **Feingold Diet**
- **Sugar Free Diet**
- **Gut and Psychology Syndrome (GAPS) Diet**
- **Other Dietary approaches reported included whole foods, no preservatives or food colors, low salicylate/phenols, low oxalate, vegetarian, ketogenic...**

Gluten Free Casein Free (GFCF) Diet and the Opiate Effect



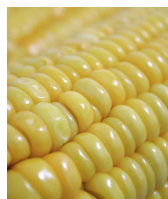
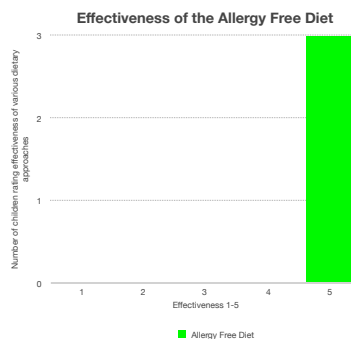
- A subset of children with ASD benefit from this diet.
- **Strictness** and **duration** of GFCF diet are important in behavior improvements
- GFCF ameliorating effects on communication, social function, reduced hyperactivity, imply improved attention, concentration, and capacity to learn (Whitely, P. et al, 2010).

Allergy Free Diet

- Food allergies in children with ASD may be a risk factor altering behavior and removal of certain foods in this study showed a decrease in autistic behaviors (Khakzad, M. R. 2012).

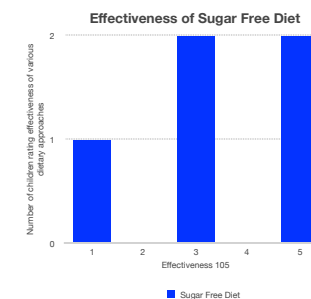
Common offending foods:

- **Gluten**
- **Casein**
- **Corn**
- **Soy**
- **Meat**



Sugar-Free Diet (anti-candida diet)

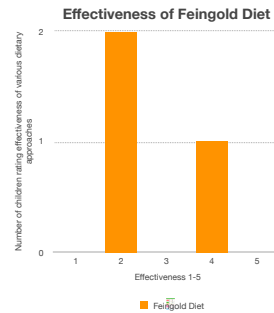
- Sugar is generally an offending food to all people, and can lead to increasing food sensitivities.
- A byproduct of candida is ethanol/ alcohol and often alcohol related behavior due to fermenting foods in the gut is observed: silly, goofy, giddy, inappropriate laughter, increased cravings for sugar and carbs, heightened sensory seeking behaviors, anxiety, emotional instability, strange behaviors such as seeking pressure, hanging upside down, (Woeller, K. 2018), in general GI discomfort.



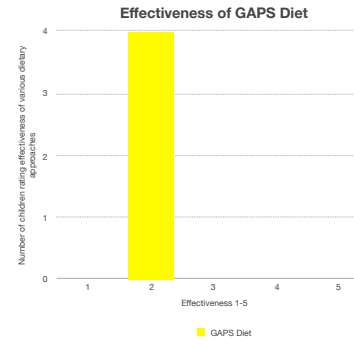
Feingold Diet reducing hyperactivity in 70% through elimination of artificial food colors, preservatives, and salicylate foods.



- Children finding relief from Feingold diet are able to go off their medications, find they are calmer, less frustrated, have fewer tantrums, they relate better socially to other children, the home environment is improved, they are more attentive, perform better in school, and are overall happier (Feingold, B. F. 1975).
- The McCann study (2007) indicates hyperactivity is associated with difficulties in school achievements in particular reading, and adverse effects of food additives from food additives are seen in the general population.



GAPS Diet



"Just like the soil unprotected by turf becomes eroded, the gut wall suffers if its protective bacteria 'turf' gets damaged" - (Campbell-McBride, 2010, p16)

Gut and Psychology Syndrome

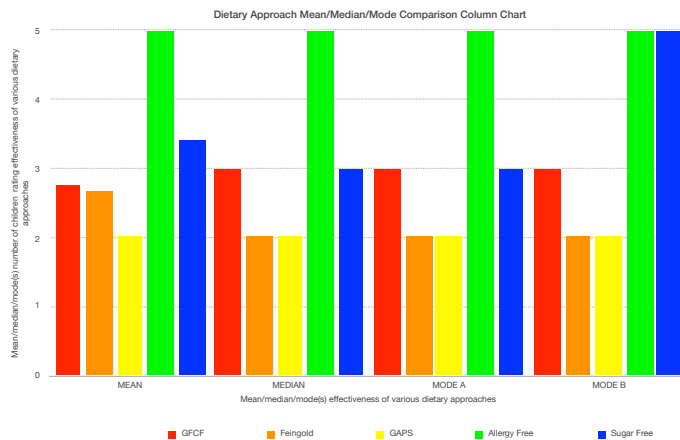
Natural treatment for



Revised and Expanded Edition

Dr. Natasha Campbell-McBride MD, MMedSci(neurology), MMedSci(nutrition)

Comparison of Dietary Approach based on mean, median, mode(s)



Environmental Influence

- ASD is increasingly capturing the attention of a perspective combining cumulative effects or interaction of genetics and environmental influences.
- Genetics may predispose a child's risk factor for ASD, while environmental triggers may determine the outcome.



"environmental insults initiate autism in genetically sensitive individuals by promoting cellular oxidative stress and initiating adaptive responses that include reduced methylation activity. Impaired methylation in turn leads to developmental delay and deficits in attention and neuronal synchronization that are hallmarks of autism" (Deth, R. et al, 2007).

Understanding Methylation

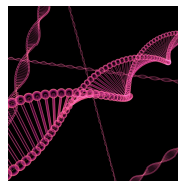


- Important cycle in our body involving B vitamins including folate
- Enables our bodies to detoxify, fight infections, make healthy cells and neurotransmitters (ie. serotonin, dopamine, norepinephrine all essential brain chemical important to mental health), and protects our body from chronic inflammatory response and oxidative stress (Stein, T. 2014).

Children with ASD have reduced methylation pathways and increased oxidative stress

- Environmental insults can increase oxidative stress.
- Oxidative damage and hypomethylation biomarkers are consistent in all case study children with autism and not their unaffected siblings (Melnik, S. et al 2012) IMAGE study.
- Three important and interdependent pathways involved with methylation and potentially affected are:
 1. folate pathway
 2. transsulfuration pathway with glutathione antioxidant synthesis.
 3. methathionine transmethylation cycle affecting dopamine levels

What about the MTHFR polymorphism (genetic mutation) and the folate methylation pathway?



- MTHFR is a genetic mutation and means ones body detoxifies less efficiently thus rendering the person more susceptible to environmental exposures and toxicities, therefore more vulnerable to allergies, certain cancer, cardiovascular disease
- MTHFR is a risk factor for ASD, and has likely links to other neurological disorders
- 79% of the ASD population is positive for MTHFR polymorphism.
- Furthermore, a person with MTHFR is unable to process synthetic folic acid found in many multi-vitamins, prenatal vitamins, and "enriched" foods. Thus a bioavailable or optimized form of methyl folate and methyl cobalamin (B12) is an important supplement.

Supporting children with ASD through supplements and individualized biomedical approaches.

It takes a team.



93% of Children with ASD utilize nutritional supplements

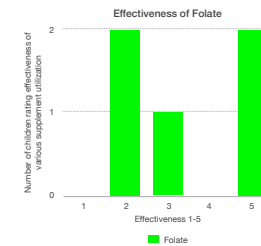
- B12, or methyl cobalamin
- methyl folate
- B6 or P-5-P
- magnesium
- sulforaphane
- zinc
- EPA/DHA omega fatty acids
- probiotics
- enzymes
- multivitamines
- other reported supplements included: DMG, TMG, CBD, GABA, nutrigenomics individualized supplements, Arizona University research supplements, prescription medications...

- 13 of 14 Children with ASD utilizing supplements were also experiencing improvements/reductions in core symptoms of ASD from supplement use including social reciprocity, nonverbal communication, relationships, restrictive/repetitive behaviors, sensory issues, gastrointestinal complaints, and more.

Effectiveness of B12 or methyl cobalamin

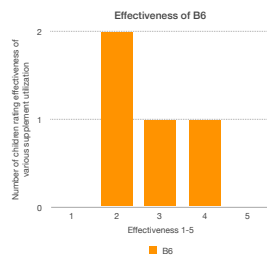


Effectiveness of folate or methyl folate

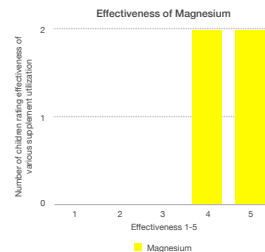


- Bioavailable forms of methyl B12 and methyl folate help support methylation detoxification pathways, with neurological improvements in behavior and cognition (Frye, R. E. & Rossignol, D. A. 2014).

Effectiveness of B6 or P-5-P

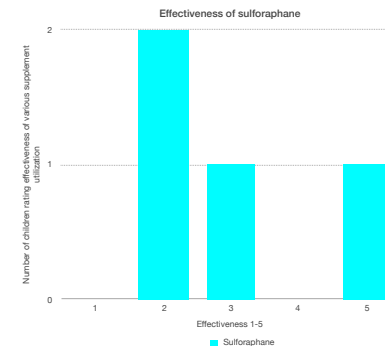


Effectiveness of magnesium



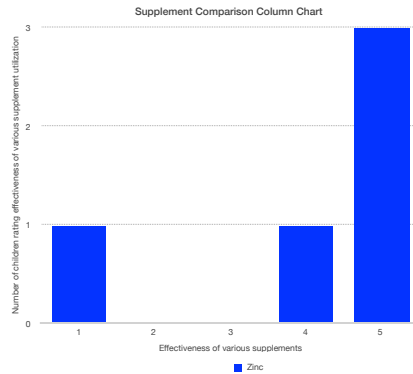
- Mousain-Bosc et al (2006) study showed significant decreased hyperactivity and aggressiveness in children with ADHD after two months of magnesium and B6, and hyperactivity is often a core condition of ASD.

Effectiveness of Sulforaphane



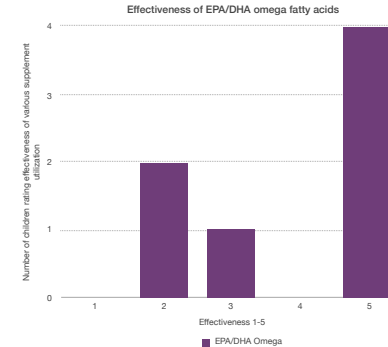
- Sulforaphane, as an environmental detoxicant, "it may therefore protect against both environmental and endogenous risk factors that affect brain development in ASD" (Singh, K. et al, 2014, p15552).
- Recent double-blind and randomized study by Singh et al (2014), examines ameliorating effects of sulforaphane treatment in 44 boys with moderate to severe ASD (Singh, K. et al, 2014).

Effectiveness of zinc



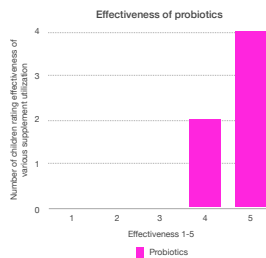
- Zinc plays an important roles in enzyme function and may help to increase food appreciation in picky eaters (Koblinar, V. 2012).
- Also important role in metabolism support, growth and cellular repair.

Effectiveness of EPA/ DHA omega fatty acids

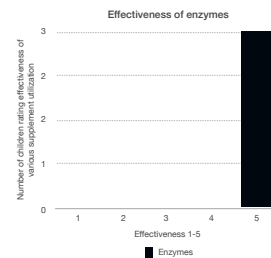


- Supports cognition, brain development, formation of neurotransmitters, speech and language, reduces inflammation, improves focus, attention, communication, motor function, mood, and behavior....

Effectiveness of probiotics

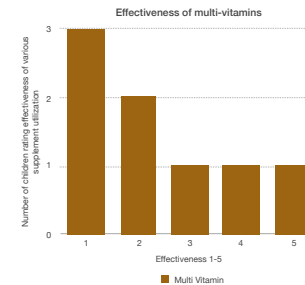


Effectiveness of enzymes



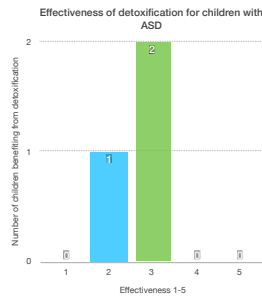
- Digestive enzymes help to break down and digest foods
- Probiotics supply beneficial microflora that help to keep your gut healthy, they help to send food through your GI system, and they support the immune system.

Effectiveness of multi- vitamins



- It can be difficult to find a multi-vitamin with the right combination of nutrients. Some nutrients may be beneficial while others may be connected to worsening symptoms.

Effectiveness of detoxification



- For a population with reduced methylation, supporting detoxification may be ideal.

Sources of Toxicity

- Air pollution
- Pesticides
- GMO Foods
- Mold and Mycotoxins
- Heavy Metals



Severity of ASD correlates with heavy metal toxicity suggesting methylation is likely more impaired in more severe cases of ASD.

- Vaccinations
- Silver amalgam mercury fillings
- CFL energy efficient light bulbs
- Water
- High food chain fish & farm raised fish
- Chicken, turkey, hog
- GMO foods
- Rice



MERCURY LEVELS IN FISH			
LOW	MED/LOW	MED/HIGH	HIGH
<ul style="list-style-type: none"> Bass Bluefish Clam Cod Crab Flounder Grouper Haddock Salmon Shrimp Sole Tilapia Trout Walleye 	<ul style="list-style-type: none"> Brook Trout Chinook Cod Crab Flounder Grouper Haddock Salmon Shrimp Sole Tilapia Trout Walleye 	<ul style="list-style-type: none"> Brook Trout Chinook Cod Crab Flounder Grouper Haddock Salmon Shrimp Sole Tilapia Trout Walleye 	<ul style="list-style-type: none"> Brook Trout Chinook Cod Crab Flounder Grouper Haddock Salmon Shrimp Sole Tilapia Trout Walleye

Boys are 4:1 times more likely than girls to develop ASD



- Boys because of higher testosterone levels tend to have decreased protective glutathione antioxidant, and are therefore more susceptible to oxidative stress and environmental insults.
- Girls have higher levels of protective glutathione antioxidant and lower levels of oxidative stress.

Children Bare the Brunt of Environmental Toxicity Body Burden



The bottom line

- Children with ASD often suffer from GI upset. When embraced fully and holistically, environmental considerations or avoidance of toxicities, individualized treatments in nutrition and supplementation, combined with other therapies, may have influential and ameliorating effects uplifting a child with ASD, improving one's home life and relationships, and strengthening ability to reach their full potential to succeed in school and life.
- Testing, (ie. genetic testing, organic acids test, urinary porphyrin, and blood lab work) can help pinpoint challenges and needs.



Discussion



- It is likely improvements in GI health and restoration of healthy gut microflora leads to reduced gut dysbiosis and associated toxicities from bad bugs (ie candida yeast, clostridia bacteria), less inflammation, more efficient nutrient intake, better intracellular balance and communication, and overall better life functioning.
- Environmental consideration, nutrition, and supplementation provide maternal insights into preventing or reducing the likelihood of a child with ASD.
- Findings in this phase I study are consistent with other research.

Future Studies



- Replication of this study and future studies should:
- Seek a larger sample sizes.
- Package all survey/questionnaire items into one survey link for better respondent consistency and great response.
- Include an effectiveness rating for worsening behaviors/conditions.
- Examine additional dietary approaches including specific carbohydrate diet (SCD), low oxalate diet, failsafe diet, Body Ecology Diet, and ketogenic diet.
- Examine additional supplements including DMG, TMG, CBD, L-carnatine, taurine, melatonin, and herbals (anti-biotic and anti-fungal), and identify supplement combinations including magnesium and B6, and folate and B12.
- Examine a combination of dietary and supplement approaches towards understanding the synergistic effects of cumulative approaches and ameliorating effects on ASD.



Abstract

Conclusion: Findings in this phase I study provide additional support for the use of nutritional dietary approaches and supplement utilization for subpopulation treatment of children with ASD recognizing each child's unique bio-individuality. Various dietary approaches and supplement utilization can have ameliorating effects on some individuals with ASD. The study indicates the importance of further investigation into nutritional approaches and the cumulative and synergistic effects between use of multiple dietary approaches combined with multiple supplements in light of bio individuality, in reducing core conditions of ASD, and potential towards prenatal prevention of ASD.



Acknowledgements

- This author is not a medical doctor or physician, and this author does not diagnose or treat illness. The author of this work is a parent of a child with ASD, and an Institute of Integrative Nutrition, Certified Health Coach (CHC). Furthermore, this work was produced in fulfillment of requirements for an M.S. in Education. This study is intended to share knowledge gathered from research and experience. The reader of this study is always encouraged to seek advice from a medical doctor or licensed health professional qualified to give medical advice.
- I offer consulting in the field of wellness for future parents, families and children, including children with ASD and other neurological and learning disorders.