Feeding the Autistic Child

Meredith Evans MS, RDN, LDN
Commission for Children with Special Health Care Needs
April 16, 2016
At the conclusion of this presentation

- Participants will understand common nutrition concerns with ASD.
- Participants will be able to identify nutritional interventions that are used in children with ASD.
- Participants will be able to discuss current evidence based research on the effectiveness of these nutrition interventions.
To be eligible for Commission programs a child must be:

- Resident of Kentucky
- Less than 21 years old
- Has a condition usually responsive to medical treatment that is covered by the Commission
- Meets financial guidelines based on income
Services provided by CCSHCN

(Progrmms vary by region)

- Autism
- Asthma (Severe)
- Burn
- Cerebral Palsy
- Cleft Lip & Palate
- Craniofacial
- Cystic Fibrosis
- Eye Hand
- Heart
- Hemophilia

- Neurology
- Orthopedic
- Rheumatology
- Otology
- Neurosurgery
- Plastic Surgery
- Scoliosis
- Seizure
- Spina Bifida
Our multidisciplinary treatment team approach includes:

- Child neurology
- Developmental pediatrics
- Psychiatry
- Nursing
- Social work
- Speech
- Nutrition
- Audiology
- Access to an education specialist
Autism and Feeding

- 46% to 89% of children with autism have feeding challenges

- Children with autism and feeding challenges are at risk for detrimental medical, developmental and social outcomes

- Underlying medical issues such as GI problems and/or food allergies have a higher prevalence in autism
Common Nutrition Related Issues

Medications
- Increase/decrease appetite
- Food and Drug Interactions

Low intake and Low Serum Vitamin D and/or Iron
- Limited Diet
- Decreased Absorption
- Lack of outdoor play

Weight Management
- Under due to limited diet; Over due to limited diet, physical activity, medications

Allergies

Gastrointestinal Issues
- Constipation, Diarrhea, delay emptying, abdominal pain
GI Related issues in ASD

- Reported in 23–91% of children with autism compared to typically developing children and to children with developmental disorders.

- May need medication
  - Treatment with medication may be needed if patient is not unable to make dietary changes like increasing fluids or eating more fiber rich fruits and vegetables.

- May need therapy to address
  - Constipation: Anxiety and withholding
  - Manage response to pain/discomfort
  - Introduce new foods
Complimentary and Alternative Therapies (CAM) is defined as a group of diverse medical and health care systems, practices and products that are not considered to be part of conventional medicine.

In recent studies, 50–75% of children with ASD were being treated with CAM.

Almost 1/3 of children referred for ASD evaluation were being treated with Dietary therapies.
## Diet Interventions and Autism

<table>
<thead>
<tr>
<th>Diet Types</th>
<th>Foods Restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additive Free</td>
<td>Food Dyes, food additives</td>
</tr>
<tr>
<td>Gluten Free/Casein Free</td>
<td>(Staged elimination) 1&lt;sup&gt;st&lt;/sup&gt; Dairy, 2&lt;sup&gt;nd&lt;/sup&gt; wheat, rye, barley. Often soy is restricted</td>
</tr>
<tr>
<td>Specific Carbohydrates (SCD), FODMAPS, Ketogenic</td>
<td>Fermentable oligo–di–monosaccharide's</td>
</tr>
<tr>
<td>Yeast Free</td>
<td>Yeast risen breads, fermented foods, cheeses</td>
</tr>
<tr>
<td>Evidence–Based/ Standard of Care: Eliminations Diets + elemental formula supplementation</td>
<td>Elimination of 8 major allergens</td>
</tr>
</tbody>
</table>
Gluten Free Casein Free Diet

Elimination of

Gluten– (grain protein) found in wheat, rye, barley, most oats and anything made from these grains.

Casein– protein found in dairy products
Gluten Free Casein Free Diet

Theory behind the diet:

- Gluten from the wheat and the casein from dairy products are improperly absorbed because of a “leaky gut”.

- This causes opioid peptides (gluteomorphine and casomorphine) to circulate in the bloodstream.

- Once circulating, they can cross into the brain disrupting neurotransmission and inhibiting the central nervous system. All of which is implicated in the symptoms/features of Autism.
What Does this diet look like?

- Lots of fruits and vegetables
- Limited Consumption from the grain group
- No milk products
- Non processed meats and meat alternatives
# Nutrient Needs on GFCF Diet

<table>
<thead>
<tr>
<th>Nutrient Needs</th>
<th>Alternative Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D</td>
<td>Fortified rice, soy, and almond milk; cod liver oil; tofu, eggs; short-term exposure to sunlight; supplements</td>
</tr>
<tr>
<td>Calcium</td>
<td>Fortified rice, soy, and almond milk; fortified orange juice; beans, broccoli, spinach, kale, tofu, tempeh; supplements</td>
</tr>
<tr>
<td>Iron</td>
<td>Red meats, pork, chicken (mainly in dark meat), shellfish, egg yolks, spinach, soybean nuts, prunes, raisins; supplements</td>
</tr>
<tr>
<td>Protein</td>
<td>Eggs, nuts and seeds, lean meats, beans, peanut butter</td>
</tr>
<tr>
<td>Fiber</td>
<td>Légumes, fruits, vegetables, nuts, seeds; supplements</td>
</tr>
</tbody>
</table>
Challenges of the diet

- Child’s current eating habits
- High Cost
- Increased preparation time
- Sourcing of food and medication
- Knowledge of food products and medications
- Lifestyle change
- Control outside the home

*This diet requires high compliance so it must be properly supplemented, monitored and documented*
Cochrane Review (updated in 2008) found poor evidence supporting its use and suggested large scale, randomized, controlled studies be undertaken.

Currently 2 additional clinical trials are being conducted.

The medical community has found that further studies are required before it can be recommended as primary treatment for children with ASD.
The specific carbohydrate diet (SCD) was originally developed by Dr. Sydney Haas for adults with inflammatory bowel disease.

A woman named Elaine Gottschall worked with Dr. Haas in an attempt to relieve GI problems in her daughter.

It is based on the theory that by eliminating most carbohydrates (CHO’s) (primarily grains, starches, dairy, and sugars) and allowing only specific carbs that require minimal digestion, it can reduce inflammation and make eating enjoyable for people with gastrointestinal (GI) disorders.
The goal of the diet is to restore health to the digestive system by correcting dysbiosis (imbalance of good and bad bacteria) and to decrease intestinal inflammation.
Specific Carbohydrate Diet

The diet works by:

- Allowed CHO’s have a molecular structure that is small enough to be transported across the surface of the small intestine.

- CHO’s to avoid include disaccharides (lactose, sucrose, and maltose) and polysaccharides.

- Starts with a limited number of foods and gradually adds foods as the intestinal tract heals.
Foods allowed in the SCD Diet

- Vegetables (except canned)
- Legumes (except those on the not allowed list)
- Unprocessed meats, poultry, fish, and eggs
- Natural cheeses (except those on the not allowed list)
- Homemade yogurt fermented at least 24 hours
- Most fruits and juices without additives
- Nuts, peanuts in the shell, natural peanut butter
- Oils: olive, coconut, soybean, and corn
- Weak tea and coffee
- Unflavored gelatin
- Mustard and vinegar
- Saccharin
Foods Not Allowed in the SCD Diet

- Sugars: lactose, sucrose, high-fructose corn syrup, fructose, molasses, maltose, isomaltose, fructooligosaccharides, and any processed sugar
- All canned vegetables
- All grains: anything made from corn, wheat, wheat germ, barley, oats, rye, rice, buckwheat, soy, spelt, and amaranth
- Some legumes: chickpeas, bean sprouts, soybeans, mung beans, fava beans, and garbanzo beans
- Starchy vegetables: potatoes, yam, parsnips, seaweed products, agar, and carrageenan
- Canned and processed meats
- Dairy: milk, milk products, ice cream, whey powder, commercial yogurt, heavy cream, buttermilk, sour cream, and the following cheeses: ricotta, mozzarella, cottage cheese, cream cheese, feta, processed cheeses, and cheese spreads
- Canola oil, commercial mayonnaise, commercial ketchup, margarine, baking powder, and balsamic vinegar
- Candy, chocolate, carob
The SCD has been around for years because for some people with GI diseases, it minimizes symptoms. But the diet, because of its severe restrictions and nutritional inadequacies, needs to be studied further and validated by the medical community.

There is no scientific evidence supporting the efficacy of this diet.
The FODMAP Diet

- Fermentable
- Oligosaccharides
- Disaccharides
- Monosaccharides
  And
- Polycols
<table>
<thead>
<tr>
<th>CARBOHYDRATE</th>
<th>WHY THEY MIGHT CAUSE AN ISSUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disaccharide</td>
<td>Found in milk. Lactose intolerance is caused by partial or complete lack of the enzyme lactase.</td>
</tr>
<tr>
<td>Monosaccharide</td>
<td>Found in fruit. Fructose intolerance is due to incomplete digestion in the GI track. The absorption of fructose is dependent on glucose. Monosaccharide's are poorly absorbed due to their low capacity transport across the epithelium.</td>
</tr>
<tr>
<td>Fructans Oligosaccharide</td>
<td>Fructans are completely malabsorbed because the intestine lacks an enzyme to break their fructose-fructose bond. Wheat accounts for the majority of peoples fructan intake.</td>
</tr>
<tr>
<td>Galactans Oligosaccharide</td>
<td>Found mostly in beans and lentils. Galactans are malabsorbed as the intestine does not have the enzyme needed to break down galactans</td>
</tr>
<tr>
<td>Polyols</td>
<td>Found naturally in some fruits and vegetables and added as sweetners to candy, gum, and meds. Polyols are too large for passive diffusion</td>
</tr>
</tbody>
</table>
FODMAP DIET

Food to eliminate:

Sweeteners – honey, agave nectar, malitol, sorbitol, mannitol, and xylitol

Dairy – that contains significant amounts of lactose, milk or soft cheeses, ice cream and cream.

Rye and Wheat Products – similar to a gluten free diet could improve because it removes wheat (fructan)

Beans and Legumes – high in Oligosaccharides
Watermelon, apples, pears, mushrooms, cauliflower, onions
### FODMAP foods to avoid or limit

<table>
<thead>
<tr>
<th>FRUIT</th>
<th>VEGETABLES</th>
<th>LEGUMES</th>
<th>LACTOSE-CONTAINING FOODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, apricots, cherries, mango, pears, nectarines, peaches, pears, plums, prunes, watermelon and high concentrations of fructose from canned fruit, dried fruit or fruit juice</td>
<td>Artichokes, asparagus, avocado, beets, broccoli, brussel sprouts, cabbage, cauliflower, garlic (in large quantity), fennel, leeks, mushrooms, okra, onions, peas, radicchio, lettuce, scallions (white parts), shallots, sugar snap peas, snow peas</td>
<td>Baked beans, chickpeas, lentils, kidney beans, soy beans</td>
<td>Custard, ice cream, margarine, milk (cow, goat, sheep), soft cheese (including cottage cheese and ricotta), yogurt</td>
</tr>
</tbody>
</table>

#### SWEETENERS
- Honey, fructose, high fructose corn syrup, isomalt, maltitol, mannitol, sorbitol, xylitol

#### GRAINS
- wheat or rye in large amounts, e.g., bread, crackers, cookies, couscous, pasta

### Suitable foods for a Low-FODMAP diet

<table>
<thead>
<tr>
<th>FRUIT</th>
<th>VEGETABLES</th>
<th>STAPLES</th>
<th>LACTOSE ALTERNATIVES</th>
<th>SWEETENERS</th>
<th>GRAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana, blueberry, grapefruit, grapes, honeydew melon, kiwi, lemon, lime, mandarin oranges, orange, raspberry, strawberry</td>
<td>Bell peppers, bok choy, carrots, celery, corn, eggplant, green beans, lettuce, parsnips, scallions (green parts only), spinach, sweet potato, white potato, tomato</td>
<td>Meats, fats, eggs</td>
<td>Artificial sweeteners that do not end in “ol,” glucose, maple syrup, sugar (sucrose)</td>
<td></td>
<td>Oats, gluten-free products &amp; spelt products</td>
</tr>
</tbody>
</table>

- Butter, hard cheese, brie and camembert, lactose-free products, such as lactose-free ice cream and yogurt, gelato, rice milk & sorbet
Two phases of FODMAP Diet

- The first phase generally involves a strict restriction of all high FODMAP foods. This phase should be followed for 6–8 weeks only, then an expert Registered Dietitian Nutritionist (RDN) should be consulted for a review appointment to learn the second phase.

- The second phase is where the diet is liberalized to suit each individual – where the type and amount of FODMAPs are identified so that the longer term diet can be established.

* It is recommended that you consult with an experienced RDN for both phases of the low FODMAP diet as each phase involves many dietary changes.
<table>
<thead>
<tr>
<th>Dietary Supplement</th>
<th>Purported Use in Autism</th>
<th>DRI (RDA or AI)</th>
<th>General Metabolic Function</th>
<th>Food Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin B6</td>
<td>Increased Speech</td>
<td>Males: 1.7 mg</td>
<td>Amino acid metabolism</td>
<td>Fish</td>
</tr>
<tr>
<td></td>
<td>Decreased aggression</td>
<td>Females 1.5 mg</td>
<td>neurotransmitter and</td>
<td>Chickpeas</td>
</tr>
<tr>
<td></td>
<td>Decrease stimulatory</td>
<td></td>
<td>hemoglobin synthesis</td>
<td>Liver</td>
</tr>
<tr>
<td></td>
<td>behavior</td>
<td></td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td>Improved Eye Contact</td>
<td></td>
<td></td>
<td>Bananas</td>
</tr>
<tr>
<td></td>
<td>Improved social</td>
<td></td>
<td></td>
<td>Fortified Foods</td>
</tr>
<tr>
<td></td>
<td>responsiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>Improved Social</td>
<td>Males: 420 mg</td>
<td>Regulation of steroid</td>
<td>Dairy Products</td>
</tr>
<tr>
<td></td>
<td>interaction</td>
<td>Females: 320 mg</td>
<td>hormone function</td>
<td>Chocolate</td>
</tr>
<tr>
<td></td>
<td>Improved communication</td>
<td></td>
<td>Involved in metabolism</td>
<td>Legumes</td>
</tr>
<tr>
<td></td>
<td>Decreased stereotypical</td>
<td></td>
<td>Provides structure to</td>
<td>Nuts</td>
</tr>
<tr>
<td></td>
<td>behavior</td>
<td></td>
<td>bones</td>
<td>Seafood</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Green leafy vegetables</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unprocessed rice</td>
</tr>
<tr>
<td>Omega 3 Fatty</td>
<td>Decreased Hyperactivity</td>
<td>Males: 1.6 g</td>
<td>Soybean Oil</td>
<td></td>
</tr>
<tr>
<td>acids</td>
<td>Stereotypical aggression</td>
<td>Females: 1.1 g</td>
<td>Canola Oil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved language</td>
<td></td>
<td>Flaxseed Oil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>learning skills</td>
<td></td>
<td>Fish Oils from fish</td>
<td></td>
</tr>
<tr>
<td>Melatonin</td>
<td>Improved Sleep</td>
<td>N/A</td>
<td>Dietary Supplements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decreased sleep latency</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Supplements

<table>
<thead>
<tr>
<th>Dietary Supplement</th>
<th>Purported Use in Autism</th>
<th>DRA (RDA or AI)</th>
<th>General Metabolic Function</th>
<th>Food Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folic Acid</td>
<td>Biochemical role in: Cellular methylation Antioxidant capacity/ oxidative stress/ inflammation</td>
<td>400 mcg</td>
<td>Involved in single carbon transfers for amino acid metabolism and DNA synthesis</td>
<td>Organ meats Okra Orange juice Legumes Fortified foods Enriched foods</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>Biochemical role in: Cellular methylation Antioxidant capacity/ oxidative stress/ inflammation</td>
<td>2.4 mcg</td>
<td>Energy metabolism Homocysteine metabolism</td>
<td>Mollusks Liver Cottage Cheese Meat Salmon Fortified Foods</td>
</tr>
<tr>
<td>DMG</td>
<td>N/A</td>
<td></td>
<td></td>
<td>Dietary supplements</td>
</tr>
<tr>
<td>TMG</td>
<td>N/A</td>
<td></td>
<td></td>
<td>Dietary supplements</td>
</tr>
<tr>
<td>Probiotics</td>
<td>Improvement of intestinal microflora</td>
<td>N/A</td>
<td></td>
<td>Yogurt Functional foods with probiotics Dietary supplements</td>
</tr>
</tbody>
</table>
What does the research say?

- The dosages recommended for Vitamin B6 are nearly 500 times the DRI and toxicity at this level can cause ataxia, loss of fine motor control, changes in gait and peripheral neuropathy.

- Vitamin B6 combined with Magnesium supplementation can not be supported.

Approximately 1 out of 4 parents give their child Omega 3 fatty acid supplements.
- Alpha-linoleic acid (ALA) – found in nut and plant oils
- Eicosopentaenoic acid (EPA) – found in fish oil
- Docosahexaenoic acid (DHA) – found in fish oil

Research is lacking in studies of children. In children on 3 g of fish oil, parents inquire about excessive bruising in the child.

Some parents give cod liver oil which has high levels of Vitamin A which can cause the child to exceed the required needs.

Several clinical trials have been conducted with the dietary supplement melatonin with promising results regarding safety and efficacy in children.

Work closely with the Pediatrician to determine appropriate dosing for your child.


What does the research say?

- Limited data to support Folic Acid and Vitamin B12 supplementation

- Dimethlglycine (DMG) or Trimethylglycine (TMG) have no clinical trials to support its efficacy.

- Specific research has targeted the mechanism behind the use of Probiotics but not specifically in children with autism. Diet should include adequate fiber and fluid to meet child’s needs.
Carefully Make Dietary Changes

- Work closely with your child's medical team and a Registered Dietitian Nutritionist

- If you take a food out of the regular diet, you might now be able to add it back in

- If a child is already a “picky eater” limiting the diet more increases the risk of
  - Malnutrition
  - Social Isolation
For detailed information regarding eligibility for services please contact the Autism Coordinator at a CCSHCN office.

West (Medical):

Owensboro:
Peggy Tichenor
270–687–7038

Bowling Green:
Janet Harper
270–746–7816

Paducah:
Debbie Davidson
270–443–3651

East (Medical and Diagnostic):

Somerset:
Devenna Bales
606–677–4120

Lexington:
Sherria Robinson
859–252–3170

Insurance:
Medicaid, Medicaid MCOs and most private insurance accepted
References


