Functional Medicine and the Management of Attention Deficit Hyperactivity Disorder

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Austin, Texas
What is Functional Medicine?

A biological systems based approach to treating the root cause of illness by looking at the interactions between the genetic, environmental, and lifestyle factors of an individual. By shifting the traditional disease-centered focus of medical practice to a more patient-centered approach, functional medicine addresses the whole person, not just an isolated set of symptoms.
Functional Medicine Approach

- Systems based approach - treating the whole body
- Goal is to discover the root cause of symptoms
- Investigation of the gut
- Incorporation of genetics
- Strong focus on nutrition
- Natural agents first

Functional medicine puts the whole body back in balance.
Attention Deficit Hyperactivity Disorder

**Prevalence:** 10% of children, starting at age 4

**Symptoms:** Inattention, hyperactivity, impulsivity (symptoms in >2 settings)

**Comorbidities:** Depression, Anxiety, OCD, ODD

**Common Means of Diagnosis:** Vanderbilt Questionnaires, Neuropsychiatric Evaluation

**Doctor’s Objective Diagnosis, DSM-5**

**Allopathic treatment:** Cognitive/behavioral training, stimulant medications, non-stimulant medications

American Academy of Pediatrics, 2016
ADHD & Functional Medicine
Training the brain is imperative for learning... but that is *not* the whole story. The brain is connected to the body, and one does not operate optimally without the other.
Psychiatric and mental health disorders (such as ADHD, depression, anxiety, OCD, sensory processing disorder, and learning disabilities) originated primarily from “the neck up”.

What we used to believe....
Psychiatric and mental health disorders often have underlying physiologic pathologies that are creating the symptoms by which these diagnosis are made.
Physiologic root causes of ADHD

Trauma
Immunological
Genetic
Hormonal
Endocrine
Nutritional
Mitochondrial
Gastrointestinal
Things that appear like ADHD, but are not:

- Thyroid Disorders
  - TSH is not a sufficient method
- Anemia
  - Iron Deficiency - most common
  - Signs - pallor, fatigue, loves milk, picky eater, asymptomatic
- Sleep Disorders -
  - Daytime sleepiness
  - Falls asleep anytime still (car, watching TV)
  - Snoring - Not “normal” in childhood
 Thyroid Antibodies

Factors that inhibit proper production of thyroid hormones
- Stress
- Infection, trauma, radiation, medications
- Fluoride (antagonist to iodine)
- Toxins: pesticides, mercury, cadmium, lead
- Autoimmune disease: Celiac

Factors that contribute to proper production of thyroid hormones
- Nutrients: iron, iodine, tyrosine, zinc, selenium
  - Vitamin E, B2, B3, B6, C, D

Factors that increase conversion of T4 to RT3
- Stress
- Trauma
- Low-calorie diet
- Inflammation (cytokines, etc.)
- Toxins
- Infections
- Liver/kidney dysfunction
- Certain medications

Factors that increase conversion of T4 to T3
- Selenium
- Zinc

Factors that improve cellular sensitivity to thyroid hormones
- Vitamin A
- Exercise
- Zinc

RT3 and T3 compete for binding sites

Nucleus/ Mitochondria

CELL
Things that appear like ADHD, but are not:

- Uncontrolled Allergies
- Food
- Environmental
- Gut pathology
- Irritable bowels; gas, bloating, loose stools, constipation, stomach aches, eczema

Boris, Marvin, Goldblatt, 2004
"The enteric nervous system, known as the “second brain”, is in constant contact with the first brain, affecting your mood and mental function." Leo Galland, MD
Things that appear like ADHD, but are not:

Nutritional deficiencies:
- Phosphatidylserine
- Choline
- B6
- Zinc
- Magnesium,
- Folate
- Vitamin D
- Omega 3 fatty acids (4:1 EPA/DHA)

Nutrient repletion takes 3-6 months
Nutrient absorption can be affected by your genes
<table>
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<th>Authors</th>
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<th>Nutrient Studied (with dosages)</th>
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Increased intestinal permeability (otherwise known as leaky gut) will prevent full efficacy of oral nutrition-

YOU MUST TREAT THE GUT & FOCUS ON THE DIET
Things that appear like ADHD, but are not:

Methylation Disorders (Science of Nutrigenomics)

**Nutrigenomics is the study of how individual genes affect the way a person responds to and absorbs their nutrients.**
Decreased production of MTHFR leading to decreased conversion of folate to methyl folate

Risks include depression, autism, decrease in dopamine, norepinephrine, serotonin synthesis

Folate Cycle

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- tryptophan
- Tyrosine
- BH4
- BH2
- Serotonin
- Dopamine
- MAO A
- MAO B

- THF
- dUMP
- Thymidine synthesis
- 5 Methyl THF
- Cobalamin Cycle
- B6, P5P
- Cystathionine
- Ammonia

- Methionine
- MAT
- DMG
- TMG
- BHMT
- MS
- MSR
- CBS
- SAHH

Tr
• COMT is an enzyme responsible for breakdown of dopamine in the frontal lobes of the brain
• Dopamine levels are critical for memory, attention, judgment, and other executive functions
• Symptoms of mood disturbances and ADHD can be pronounced after concussion, especially in those with COMT SNPs

Side Effects and Nutrient Depletions from ADHD Meds

Drugs for ADHD have their place, but they do not come without a cost

- Common Side Effects: insomnia, anorexia, irritability, anxiety
- Nutrient Depletions: Stimulant drugs; B6, Zinc Antidepressants; melatonin, folate
Safer Tools for Management?
"If we can control and decrease inflammation, we can silence and turn off expression of some genes"
What can you do at home?

Controlling inflammation is KEY

• Avoid top allergens- (gluten, dairy, soy, eggs, nuts)
• 21 day elimination diet
• Diversity in diet, eat fermented and prebiotic foods
• Empiric trial of essential fatty acids (4:1)
• Assess your environment for toxins (endocrine disruptors)- avoid water bottles, test water in home, hepa filter

You are **not** responsible for what your child eats, but you **are** responsible for what you *provide your child to eat.*
Good Manufacturing Practice Law

- Poor Compliance
- Poor Clinician Confidence
- Look for Certification

(Fabricant, 2013)
All supplements are *not* created equal

- **Contamination**
  Unidentified herbs, pesticides, metals, and prescription medicines

- **Serving Sizes**
  Absent, ambiguous, or exceed RDA’s

- **Numerous Ingredients**
  Synergistic effects with herbs or Rx’s

(American Society of Health Pharmacists, 2004)
Third Party Product Evaluators

- NIH Dietary Supplement Label Database
- National Sanitation Foundation
- Consumerlab.com
- US Pharmacopeia
When to seek help:

- Value functional medical approach first
- Symptoms don’t resolve with traditional treatment
- Side effects with medications
- Genetic inquiry
- Developmental delays- Do not wait!
An ounce of prevention is worth a pound of cure.

-Benjamin Franklin-
Questions?

Neuronutrition Associates
512-599-8850
www.neuronutritionassociates.com
National Resources

1. The Institute of Functional Medicine
2. The Medical Academy of Pediatric Special Needs
3. The National Institute of Health Human Microbiome Project
4. The Environmental Working Group
5. Healing the New Childhood Epidemic by Kenneth Bock, MD
6. The Autism Revolution, by Martha Herbert, MD, PhD
7. Dr. David Perlmutter, MD (The Grain Brain & The Brain Maker)
8. Dr. Gerard Mullin, MD (The Gut Balance Revolution)

Local Austin Resources

1. Neuronutrition Associates- Dr. Emily Gutierrez and Jana Roso, NP
2. Nourish Medicine- Dr. Alex Carrasco, MD
3. Integrative Family Medicine- Dr. Julie Reardon, MD
4. Optimal Health and Wellness- Julie Long, NP


Pollen Exposure as a Cause for the Deterioration of Neurobehavioral Function in Children with Autism and Attention Deficit Hyperactive Disorder: Nasal Pollen Challenge Authors: Boris, Marvin; Goldblatt, Allan Source: Journal of Nutritional & Environmental Medicine, Volume 14, Number 1, March 2004, pp. 47-54(8)
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<td>Arnold &amp; DiSilvestro</td>
<td>2005</td>
<td>Zinc</td>
<td>Systematic Review</td>
<td>Zinc levels are typically lower in ADHD children. Zinc may be an effective adjunct treatment to stimulants for ADHD or as a monotherapy. More research is needed.</td>
<td>Level 1</td>
<td>A</td>
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<td>Ghanizadeh &amp; Berk</td>
<td>2013</td>
<td>Zinc</td>
<td>Systematic Review</td>
<td>There is a lack of clear evidence to support zinc as a mono or adjunct therapy for ADHD</td>
<td>Level 1</td>
<td>A</td>
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<td>Belanger, et al.</td>
<td>2009</td>
<td>1 tab contained; EPA=250mg DHA=100mg PL=25mg Vit E=3.75U 16-25kg=2 tabs 26-35kg=3tabs</td>
<td>Double blind, one-way crossover RCT; 16 weeks with 8 week cross-over</td>
<td>Statistical significance was found with improvement in ADHD sx</td>
<td>Level 1</td>
<td>A</td>
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<td>Bloch &amp; Qawasmi</td>
<td>2011</td>
<td>Omega 3 Fatty Acids</td>
<td>Systematic Review and Meta-Analysis</td>
<td>Omega 3 fatty acids have statistically significant improvement in control of ADHD sx</td>
<td>Level 1</td>
<td>A</td>
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<td>Milte, et al.</td>
<td>2013</td>
<td>Group 1=1109mg EPA, 108mg DHA Group 2=264mg EPA, 1032mg DHA</td>
<td>RCT with 3-way cross over; 4 months for each supplementation period, 12 months total</td>
<td>Both DHA and EPA may be beneficial for those with ADHD and comorbid learning disabilitie s</td>
<td>Level 1</td>
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<td>Name</td>
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<td>Intervention</td>
<td>Study Design</td>
<td>Conclusion</td>
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<td>Richards on &amp; Montgomery</td>
<td>2005</td>
<td>558 EPA 174 DHA Omega 6= 60mg Vitamin E 9.6mg</td>
<td>RCT with supplementation duration of 3 months with a 3 month crossover; total 6 months</td>
<td>Fatty acid supplementation may be beneficial for improvement in learning and attention</td>
<td>Level 1</td>
<td>A</td>
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<td>Vaisman, et al.</td>
<td>2008</td>
<td>Group 1; EPA= 153mg DHA= 96mg PS= 300mg Group 2; EPA= 153mg DHA= 96mg Group 3; placebo group</td>
<td>Randomized double blind placebo controlled trial; 3 month duration</td>
<td>Improvement seen with attention in Groups 1 &amp; 2 (greater in group 1)</td>
<td>Level 1</td>
<td>B</td>
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<td>Fresham, et al.</td>
<td>2010</td>
<td>Micronutrients s&amp; omega 3 supplementati on</td>
<td>Literature Review</td>
<td>Micronutrients and omega-3’s positively influence cognition</td>
<td>Level 4?</td>
<td>A</td>
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