

Wednesday, 1:00 – 2:30, E7

Nutrition for your Noggin: Foods and Brain Health


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Objective:

Identify advances in clinical assessment and management of selected healthcare issues related to persons with developmental disabilities


Notes:



THE FOOD BRAIN CONNECTION


Is Food Determining Your Mood?

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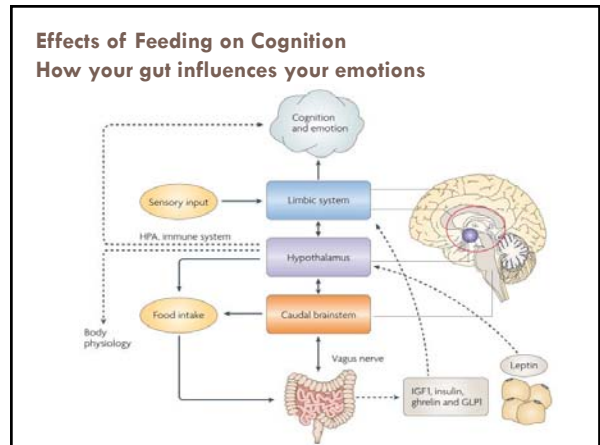
Topics

- Brain and gut connection
- Serotonin
- Fats
- B vitamins
- Vitamin D
- Antioxidants
- Caffeine/sugar
- Probiotics
- MIND/Mediterranean diet





Your Brain

- Metabolically active organ
- Mood, motivation, and mental performance are powerfully influenced by diet







Serotonin, A feel good hormone


Serotonin

- A neurotransmitter
- Maintains mood balance
- Low level may contribute to depression
- Diet can alter this hormone's level


How do I Increase Serotonin?


Protein



VS



Carbohydrate






Protein foods and Serotonin

- Tryptophan is serotonin's essential amino acid precursor
- When a high protein meal is consumed, the amount of tryptophan in the blood is less than that of other amino acids
- Competition!



Carbohydrates and Serotonin

- Carbohydrates raise plasma tryptophan ratio
 - ▣ Insulin reduces amino acids that compete with tryptophan
 - ▣ Tryptophan attaches to albumin
 - ▣ Can cross the blood brain barrier
 - ▣ Conversion to serotonin can occur





Serotonin Friendly Foods

- A complex carbohydrate meal can increase the amount of these amino acids that can cross the blood-brain barrier
- Choose **healthy** carbohydrate options
 - ▣ beans
 - ▣ Whole grain products
 - ▣ Starchy vegetables






Eating for optimal brain health



Brain and Fats

- Our brains are composed of 60% fat
 - ▣ These fats must be obtained through the diet

Omega-3 Fatty Acids


- Type of Polyunsaturated fat
 - ▣ Components of the phospholipids that form the cell membranes
 - ▣ Alpha-linolenic acid (ALA)
 - ▣ Eicosapentaenoic acid (EPA)
 - ▣ Docosahexaenoic acid (DHA)

Omega-3 Fatty Acids

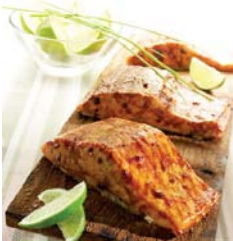
- Anti-inflammatory
- DHA decreases risk of Alzheimer’s disease and dementia
- Lessens cognitive decline with age
- Increases the release of serotonin and mood

□ Framingham Study: Arch Neurol. 2006;63:1545-1550, 1527-1528.




EPA and DHA

- Dietary intake of fatty acids and fish in relation to cognitive performance at middle age




□ S. Kalmijn, MD PhD, M. P.J. van Boxtel, MD PhD, M. Ocké, PhD, W. M.M. Verschuren, PhD, D. Kromhout, PhD and L. J. Launer, PhD *Neurology* January 27, 2004 vol. 62 no. 2 275-280




ADHD and Omega-3s

- ▣ The study included ADHD or related neurodevelopmental disorders
- ▣ EPA and/or DHA significantly improve parent-rated emotional lability and oppositional behavior.




Cooper RE, Tye C, Kuntsi J, Vassos E, Asherson P. The effect of omega-3 polyunsaturated fatty acid supplementation on emotional dysregulation, oppositional behaviour and conduct problems in ADHD: A systematic review and meta-analysis. *J Affect Disord* 2016;190:474-82.




Depression and Omega-3 Fatty Acids

- A 2016 meta-analysis of 26 studies found a 17% lower risk of depression with higher fish intake




Li F, Liu X, Zhang D. Fish consumption and risk of depression: a meta-analysis. *J Epidemiol Community Health* 2016;70:299-304



Dietary Sources of Omega-3 Fatty Acids

- Fish, plants, and nut oils
- EPA and DHA are found in cold-water fish such as salmon, mackerel, halibut, sardines, tuna, and herring.
- ALA is found in flax seeds, flaxseed oil, canola (rapeseed) oil, soybeans, soybean oil, pumpkin seeds, pumpkin seed oil, walnuts, and walnut oil.



Omega-3 Fatty Acids

Good Sources:

- Fish (2-3 weekly servings of salmon, tuna, mackerel, sardines), walnuts, flaxseeds, canola oil



Monounsaturated Fats

- Help to maintain a healthy blood flow
- May lower blood pressure which promotes brain function



Fats to Avoid

- Trans and saturated fats may impair learning and memory
- May impair blood flow and lead to atherosclerosis
- Avoid fatty animal products and fried foods.
- Read your food labels!



The Coconut Oil Theory

- The brain starts to lose its ability to use glucose early on in diseases like Alzheimer's and Parkinson's
- This leads to starvation of the brain
- Ketones can still be used
- It is thought that MCTs in coconut oil may provide an alternative fuel and produce ketones

Finzifst L.E. Coconut Oil and the Heart, Evidence Paper. New Zealand Heart Foundation. 2014



Coconut Oil

- Not enough scientific evidence
- Remember: it is still a saturated fat
 - ▣ May be a healthier one, but use in moderation



Micronutrients



B Vitamins

- B12
- Folic acid
- B6
- Choline





Vitamin B Rich Foods

Vitamin B 6			
			
Boiled Eggs	Avocado	Peanuts	Wheat Bread
Vitamin B 12			
			
Tofu	grill meat	oatmeal	salmon





B12

- Prevents brain shrinkage and saves memory
- High in lean animal products and fortified cereals




Folate

- Crucial for proper brain function and plays an important role in mental and emotional health
- Low levels may lead to forgetfulness and mental sluggishness
- Low levels may be related to depression
- Spinach, dark leafy greens, and fortified grains



Vitamin B6

- Helps your body make serotonin
- May help with symptoms of depression



Vitamin B6

- Fortified ready-to-eat cereal
- Chicken, Turkey
- Tuna
- Salmon
- Beef liver
- Potatoes
- Lentils
- Chickpeas
- Bananas

Choline




- Fat-like B vitamin
- May enhance memory, reaction time, and decrease fatigue
- Intake may decrease with age
 - ▣ Adults 71+ consume 1/2 adequate intake


Choline

Good Sources:

- Eggs (yolk)
- Wheat germ
- Beans
- Cauliflower, peas, Spinach
- Nuts
- Meat and fish






Vitamin D





- May also increase levels of serotonin
- May improve depression
- Aim for at least 600 IU vitamin D daily from fatty fish, milk, fortified cereal and juice, eggs
- Link between low levels and ASD
 - 109 children showed improvement in symptoms with supplement

Khaled Soad, Ahmed A. Abdel-Rahman, Yasser M. Eserogy, et al. Randomized controlled trial of vitamin D supplementation in children with autism spectrum disorder. *Journal of Child Psychology and Psychiatry*, 2016





Antioxidants

- Aid in learning and memory performance
- Protect brain cells from everyday damage
- Good Sources: berries, dark green and orange vegetables, nuts





Vitamin E

- Fat soluble antioxidant
- Improves cognitive performance and inhibits decline
- Maintains memory function
- Nuts and seeds are a great source
 - Also: green leafy vegetables and fortified cereals






Be Careful: Avoid high dose supplements due to bleeding and death





Blueberries

- A powerful antioxidant
- Blueberries can decrease symptoms of depression
- Can also enhance memory and learning
 - May be able to fight Alzheimer's and Parkinson's

Selenium

- Important antioxidant
- Improves cognition and mood
- A low intake has been linked with depression
- Good Sources:
 - Brazil nuts
 - These contain more than 100% of your daily recommended intake in just 1 serving (6-8 nuts)
 - Fish

Curcumin

- Important antioxidant
- Traditional Indian preservative and medicinal herb
- Lowers memory deficit, Alzheimer's, and brain trauma
- Lower prevalence of Alzheimer's in India
- Use curcumin as a spice in your favorite recipes



Dark Chocolate

- Potent antioxidant
- Has been shown to increase mood
- Choose portions that are less than one ounce and contain >60% cacao



Excess Calories and Sugar

- Excess Calories
 - ▣ Increased cell damage
 - ▣ Decline in learning ability
- Excess Sugar
 - ▣ Dull spatial learning
 - ▣ Impaired memory skills
 - ▣ Depressive symptoms in teenagers
 - ▣ Pro-inflammatory



Caffeine



- Can enhance alertness and reaction time
- But...can also increase anxiety
- If you're kept up at night, you won't be happy the next day
 - ▣ When you go to bed still may have 25% of the morning's caffeine in you.
- Use in moderation
 - ▣ Goal 1 cup coffee/day or 3 cups of green tea
 - ▣ Maximum is 3 cups of coffee daily (300 mg)



Food Additives and ASD

- Many artificial dyes and preservatives could aggravate behavioral symptoms in those with autism spectrum disorders (ASD)
 - ▣ High fructose corn syrup
 - ▣ Artificial flavors such as MSG
 - ▣ Artificial sweeteners - aspartame, acesulfame-K, neotame, and saccharin can cause mood changes





Probiotics




Microbial Imbalance

- Dysbiosis of gut microbial function has been associated with behavioral and neurophysical deficits



Gut Dysbiosis

- Both dietary and environmental influences
- Overgrowth of potentially pathogenic organisms
- Can lead to leaky gut and then inflammation
- Possible altered brain function
- Mediterranean diet and vegetarian diets show a reduction in pathobionts




Probiotic Interventions and Behavioral Outcomes

- Studies are new
- Need more human clinical trials





Lactobacillus casei

- Increased mood
- Lower anxiety




Food for thought. The role of nutrition in the microbiota-gut-brain axis. Oriach, et al. Clinical Nutrition Experimental. 2016




Bifidobacteria longum

- Lower anxiety
- More clinical trials needed





Food for thought. The role of nutrition in the microbiota-gut-brain axis. Oriach, et al. Clinical Nutrition Experimental. 2016





Probiotic Foods

- Yogurt
- Kefir
- Sauerkraut
- Miso soup
- Kimchi

Eating Breakfast



- Helps enhance focus, learning, memory, energy, and calmness
- Skipping breakfast can cause over eating at lunch, in addition fatigue and anxiety
- Choose fiber (oatmeal, fruit), lean protein (eggs, Greek yogurt), whole grains

Exercise




Brain benefits

- Stress and anxiety relief
- Increases endorphins
- Improves self esteem
- Prevents cognitive decline
- Helps control addiction
- Improves memory and brain power
- Aim for: 30 minutes per day



Sleep Schedule and Mood

- Early Birds:
 - ▣ Focus on afternoon meals for maintaining energy levels
- Night Owls:
 - ▣ Eat a balanced breakfast to kick start cognitive performance



Mediterranean Diet

Green Leafy Vegetables	Fish
Fruits	Whole Grains
Nuts	Legumes
Monounsaturated Oils	


Mediterranean Diet

- Lower rates of depression
 - ▣ May be related to the high B12 and folate
- Less blood vessel damage to the brain
- Reduced risk of developing mild cognitive impairment
- Can help reduce the risk of Alzheimer's disease

MIND Diet

- If followed closely may reduce chance of developing Alzheimer's by 53%
- If followed moderately, may still decrease risk by 35%
- High in vitamin E (potent antioxidant)
 - ▣ Nuts, plant oils, seeds, leafy greens
- High in DHA



MIND Diet

- Incorporates elements of the Mediterranean diet and the DASH diet



A Typical Day on the MIND Diet

- 3 servings of whole grains
- A salad + additional vegetable
- Glass of wine
- Nuts as snacks
- Blueberries or strawberries
- Chicken or fish
- Beans (every other day)
- Olive oil as primary cooking oil



“Tell me what you eat, and I will tell you who you are”

~ Jean Anthelme Brillat-Savarin



Questions?

