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
- 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**

- 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!

Protein foods 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.

Carbohydrates and Serotonin

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

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

Brain and Fats
Omega-3 Fatty Acids

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

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


EPA and DHA

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

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


Depression and Omega-3 Fatty Acids

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


ADHD and Omega-3s

- 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

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Monounsaturated Fats

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

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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!

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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

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Coconut Oil

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

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Micronutrients
B Vitamins

- B12
- Folic acid
- B6
- Choline

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


**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
  - Fish

These contain more than 100% of your daily recommended intake in just 1 serving (6-8 nuts)
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 cumin 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

Bifidobacteria longum

- Lower anxiety
- More clinical trials needed

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

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

Questions?

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

~ Jean Anthelme Brillat-Savarin