

Nutrition, Cognition and the Brain

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Nutrition

- *Food for thought: An apple a day keeps the doctor away (and maybe dementia too)*
- 20% of the calories you consume go to fueling your 3 pound brain!

“Good Fat”

- Omega-3 fatty acids or “good fat” has been linked to improved cognitive functioning in older adults.
- Fish, nuts, olive oil, canola oil, and green leafy vegetables are high in Omega-3 fatty lipids.

Bad Fat: Good Fat Ratios

- The average person in North America has a bad fat (omega 6 and 9) to good fat (omega 3) ratio of approximately 10:1, and nutrition experts recommend having a 4:1 ratio.
- This is problematic because fatty lipids are absolutely necessary for proper functioning of our cells, particularly our neurons.
- Moreover, our bodies may not be able to efficiently utilize as much of the good fat it consumes if there are also high levels of bad fat in our diet.

Research

- Research has found a positive correlation between Omega-3 fatty acids levels (e.g., DHA) and cognitive functioning in older adults.
- Individuals with dementia often have lower levels of DHA than non-demented controls.
- The more fish people eat, the less likely they are to show signs of Alzheimer's Disease.

Research

- Recent research has also shown that fish oil tablets can decrease the number of depressive symptoms in people diagnosed with major depression. Some studies have found that fish oil tablets are as effective as modern antidepressants.

Fish Oil Tablets

- 1200 mg
 - ~280mg of DHA
 - ~280mg of EPA
- Don't take more than one capsule unless recommended by your medical provider
- Avoid taking with with blood thinners
- Refrigerate fish oil tablets

What if you don't like seafood?

- We can get DHA, the type of Omega 3 fatty acid found in fish, in marine algae. It is often sold as a vegan omega-3 supplement.

A Large Study Measuring Fish Consumption and Dementia

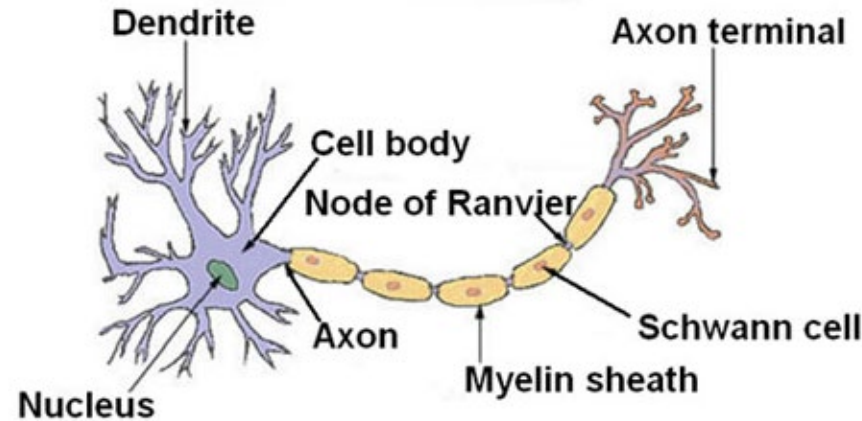
Albanese et al., studied 15,000 people in Latin America and Asia found that those who ate fish nearly every day were 20% less likely to get dementia as compared to those who ate it only a few times a week. Those that ate fish a few times per week were 20% less likely to get dementia than those who rarely ate fish.

Can Omega-3 supplements improve cognition in older adults?

- The results have been mixed on some other populations but when researchers added omega 3 supplements for several years, it was associated with improved executive functioning, if the participants had low omega 3 levels before the study, relative to a control group.

It may be that myelination of axons is affected by our dietary intake of fat.

Structure of a Typical Neuron



Public domain image from: <https://commons.wikimedia.org/wiki/Neuron#/media/File:Neuron.jpg>

Myelination

- Analogy of the electrical wiring in your home.
- It may be that myelination of the axon is affected by our dietary intake of fat.
 - Processing speed
 - Demyelination with aging, Multiple Sclerosis
 - Myelination during development

Good Fats (High in Omega-3)

- Fish - **probably the best because it has DHA**
- Nuts
- Canola Oil
- Flax Seed Oil
- Green Leafy Vegetables
- Olive Oil

Safest (in terms of mercury and PCP levels)

- farmed and wild salmon
- oysters
- shrimp
- farm-raised channel catfish
- farm-raised rainbow trout
- flounder
- perch
- tialpia
- clams
- scallops
- red swamp crayfish.

Safe (in terms of mercury and PCP levels)

- canned tuna
- crab,
- cod
- mahi-mahi
- haddock
- whitefish
- herring
- spiny lobster

Least safe (in terms of mercury and PCP levels)

- tuna steaks
- red snapper
- orange roughy
- Pollack
- Halibut
- northern lobster
- marlin, moonfish
- saltwater bass
- wild trout
- bluefish
- grouper
- Croaker
- Sablefish

For more information go to:

<http://fn.cfs.purdue.edu/anglingindiana/>

Why should you eat your fruit and vegetables?



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Antioxidants

- Over time, our brain cells experience wear and tear from various oxidants known as free radicals (as well as cell division).
- Our bodies use antioxidants to combat the effects of free radicals.

Antioxidants

- Free radicals are any substance that are missing electrons. This matters to use because that free radical could take an electron from your body (leading to cellular damage) or it can come from your food.
- We can limit the effects of free radical damage by eating foods high in antioxidants.
- The good news is it is never too late to start eating more fruits and vegetable and neutralize free radicals.

The Top Antioxidant Fruits and Vegetables

• Food	Antioxidant Power**
• Prunes	5770
• Raisins	2830
• Blueberries	2400
• Blackberries	2040
• Cranberries	1750
• Strawberries	1540
• Spinach	1260
• Raspberries	1230
• Brussels Sprouts	980
• Plums	950

The Top Antioxidant Fruits and Vegetables

Food	Antioxidant Power*
• Broccoli Florets	890
• Beets	840
• Avocados	780
• Oranges	750
• Red Grapes	740
• Red Bell Peppers	710
• Cherries	670
• Kiwis	600
• * - Oxygen Radical Absorbency Capacity (ORAC) per 3.5 ounces	

Diabetes and Cognition

- Diabetes leads to much faster cognitive decline and dramatically increased risk of developing dementia.
- Even pre-diabetes or insulin resistance has been shown to impair attention and concentration, which can affect many aspects of cognition and function.
- Clearly, physical exercise plays a key role in preventing and controlling diabetes and its effects.

Diabetes and Cognition

- Older adults with type 2 diabetes who experience cognitive deficits have a much harder time managing their diabetes.
- Cognitive assessment of older adults with diabetes is important.
- Treatment of diabetes with metformin has been shown to slow cognitive decline and decrease the chance of developing dementia.

Summary

- Omega 3 Fatty Acids
- Antioxidants
- Avoid foods high in sugar
- Avoid diabetes

Up Next

Next, we will discuss *Sleep, Cognition and the Brain*