



Food as Medicine

1. Music As Medicine

- a. “It’s fascinating and powerful to think that music, something that has been floating around in our environment forever- that this natural, omnipresent human activity has demonstrable benefit as treatment.”
Sara Hoover, D.M.A, co-director of the Center for Music and Medicine
- b. **Music is a universal healing mechanism.**
- c. Almost every culture dating back to ancient times has utilized music to promote healing.
- d. Most historians point to early flutes made from animal bones that are at least 37,000 years old.
- e. Oldest known written song dates back to 4,000 years and was written in ancient cuneiform.
- f. Hippocrates played music to help treat his patients
- g. Music therapy has been used as an adjunct to treatment for many differing disease processes. The Center for Music and Medicine is continuing to expand research on the effect of music on diseases such as:
 - a. Cerebral Vascular Disease post Stroke
 - b. Traumatic Brain Injury
 - c. Chronic Pain
 - d. Alzheimer’s/Dementia
 - e. Epilepsy
 - f. Anxiety
 - g. Depression
 - h. Parkinson’s disease
 - i. Premature Infants
- h. 2009 Cochrane Analysis of 23 clinical trial concluded that **music can have a beneficial effect on blood pressure, heart rate, respiration, anxiety, and pain in patients with heart disease.**
- i. 2011 review paper in the Harvard Review of Psychiatry revealed **the use of calming music improved anxiety and depression.**
- j. 2013 Meta-analysis of 400 studies found that **music improves the body’s immune system function and reduces stress.** Listen to music was also found to be **more effective than prescription drugs in reducing anxiety before surgery.** (Trends in Cognitive Science, April 2013)
- k. 2014 Study showed that playing more upbeat music led to improvements in processing speed while both upbeat and downbeat music led to benefits in [memory](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4197792/).
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4197792/>



- l. 2015 Review of research on the effects of music on pain management found that patients who listened to music before, during, or even after surgery experienced less pain and anxiety than those who did not listen to music.

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)60169-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60169-6/fulltext)

- m. **Think about your relationship with music:**
- n. Do you have a “go to” song?
- o. For MUSIC to serve as medicine for you, the music MUST be enjoyable and meaningful to you!
- p. Music can motivate & inspire, enhance exercise performance, improve mood, and increase working memory, and bring old memories to life.

2. **“Let food be thy medicine, and medicine be thy food.”-Hippocrates**

a. **13 Leading Causes of Death (CDC, 2017)**

- i. 1. Heart Disease *
- ii. 2. Cancer *
- iii. 3. Accidents (unintentional injuries)
- iv. 4. Chronic lower respiratory diseases – such as Emphysema
- v. 5. Cerebrovascular diseases (stroke) *
- vi. 6. Alzheimer’s disease *
- vii. 7. Diabetes *
- viii. 8. Influenza and pneumonia
- ix. 9. Nephritis, nephrotic syndrome and nephrosis (kidney disease) *
- x. 10. Suicide*
- xi. 11. Sepsis (infection*)
- xii. 12. Chronic liver disease and cirrhosis *
- xiii. 13. Essential hypertension & hypertensive renal disease (hypertension)*

3. **Food is Thy Medicine**

- b. Foods and beverages are **incredibly impactful** to your health and well-being.
- c. They have the power to **NURTURE the Mind and Body or HARM it.**
- d. Foods that affect the **GUT affect the BRAIN.**
- e. Difference lies in
 - i. **Type of food** (whole or minimally processed vs. highly processed)
 - ii. **Nutrient content** (macronutrients, micronutrients, phytochemicals)
 - iii. **Ingredients** (artificial flavors, dyes, and other unnatural additives)
 - iv. **Quantity** (insufficient, sufficient, excess)



- v. **Frequency** (how often a food/beverage is consumed)

- f. **Eating Healing Foods**
 - i. **Whole** or minimally processed
 - ii. High in **nutrients**
 - iii. Do not have **unnatural additives** (artificial chemicals/preservatives)
 - iv. Eaten in sufficient but **not excessive** amounts
 - v. Eaten within the context of a regular eating pattern that includes **intermittent fasting** (if medically appropriate)
 - vi. Avoided if there is a **food allergy or intolerance**
 - vii. May need to be avoided for a **period of time** (i.e. during acute illness or due to a specific medical condition)

- g. **Healing Food: Examples**
 - i. Nuts/Seeds
 - ii. Fermented Foods
 - iii. Eggs
 - iv. Non-starchy vegetables
 - v. Olives, avocado, and other healthy fats
 - vi. Meat, poultry, and fish

- h. **Healing Beverages: Examples**
 - i. Water
 - ii. Flavored water
 - iii. Collagen
 - iv. Unsweetened tea (especially green tea)
 - v. Fermented items (kefir, kombucha, apple cider vinegar)
 - vi. Beef, chicken, vegetable broth

4. **The Power of Phytonutrients**

- a. **Phytonutrients** are the chemicals in food that are **anti-mutagenic, free radical scavenging and immunity boosting**, which help promote and prevent diseases, apart from their nutritive value. **Phytonutrients are always helpful!**

Phytonutrients: Photo Chart: Carrots (Beta carotene), Spinach (Lutein), Strawberries (Ellagic Acid), Green Tea (Catechins), Kale (Flavonols), And Broccoli (Glucosinolates)



5. *The Power of Phytochemicals*

- a. **Phytochemicals** are chemical compounds produced by plants, generally to help them **thrive or combat competitors, predators, or pathogens. Phytochemicals can be helpful or harmful.**

6. *What is the difference between a Phytonutrient and a Phytochemical?*

- a. **Phytochemicals can be either helpful or harmful.**
Harmful: Ptaquiloside (Bracken fern). Toxic to humans and livestock- contains thiaminase, which causes the essential B1 vitamin (thiamine) to become inactive. Carcinogenic – leads to tumor development
- b. **All Phytonutrients are Phytochemicals, but not all Phytochemicals are Phytonutrients!**

7. *The Power of Antioxidants*

- a. **Antioxidants** are compounds that **inhibit oxidation**. Oxidation is a chemical reaction that can produce free radicals, thereby leading to chain reactions that may damage the cells of organisms.

8. *What is the difference between Antioxidants and Phytonutrients?*

- a. Both are naturally occurring families of **healthful substances**.
- b. 'Phyto' means plant derived.
- c. **Phytonutrients are present only in plant foods where Antioxidants may be derived from animal sources as well.**
- d. **Antioxidant** may be... Vitamins (C, E), Minerals (Selenium), Carotenoids (Lycopene)
- e. Antioxidants play a critical role in **metabolism**, protecting cells from unstable and potentially harmful free radicals.
- f. Phytonutrients have **antioxidant abilities plus additional benefits**.
- g. Phytonutrients produce **enzymes** that limit the ability of carcinogens to damage a cell's DNA.
- h. Phytonutrients **fight inflammation** and **limit the development of blood vessels that house tumors**.
- i. **Antioxidants and Phytochemicals work together SYNERGISTICALLY!**

True or False: **Phytonutrients are always beneficial.** _____

True or False: **Antioxidants are always derived from plant sources.** _____



Food Color Activity Notes:

9. Effects of a High-Carb & Poor Quality Diet

- a. Stimulates **high, frequent insulin secretion** (increases the risk of insulin resistance, pre-diabetes, metabolic syndrome, and Type 2 diabetes)
- b. **Stops fat release** and promotes fatty acid uptake, triglyceride synthesis, and fat storage (causes the body to store fat)
- c. **Increases inflammation** (increases the inflammatory cascade that promotes many conditions/diseases)
- d. **Increases insulin-like growth factor-1 (IGF-1)**. High serum concentrations of IGF-1 create an increased risk of breast, prostate, colorectal, and lung cancers
- e. **Increases the production of amyloid plaques** within the brain, which leads to Alzheimer's Dementia
- f. **Increases blood pressure**, which increases risk for heart disease, chronic kidney disease, and cerebrovascular disease
- g. **A low-carbohydrate diet improves ALL of these conditions.**

10. Natural Foods Resemble the Organs They Heal

- a. **Carrots:** Crosswise section mimics the radiating lines of the pupil and iris
Contain beta-carotene to reduce the risk for **Macular Degeneration**
- b. **Walnuts:** The folds and wrinkles of a walnut mimic the human brain
Excellent source of Omega-3 Fatty Acids to support **brain function and fetal development**
- c. **Celery:** Long and lean just like our bones
Contains silicon, which is part of the molecular structure that **gives bones their strength**
- d. **Avocados:** Its pear shape mirrors a woman's uterus
Excellent source of folic acid necessary for **fetal development** and has been shown to reduce the risk of **cervical dysplasia** (pre-cancer)



- e. **Clams:** Bears a resemblance to testicles. High in folic acid and zinc which can improve the quality of **semen** in men
- f. **Tomatoes:** Houses red chambers similar to the human heart. Contains high amounts of lycopene which has shown protection against **cardiovascular disease**. Pair with olives/olive oil to enhance absorption!
- g. **Flaxseeds:** In a cluster, they resemble the histology of the epithelial tissue they heal and protect. Contain Lignan, a potent **antioxidant**. Promotes **wound healing** and **collagen synthesis**. Reduces **insulin resistance**.
- h. **Mushrooms:** Slice it in half and you will recognize your external ear. One of the rare natural sources of Vitamin D necessary for the bony structure comprising the inner most portion of the ear **carrying sound** to your brain.

Which tree nut's appearance mimics the human brain and serves as a great source of Omega-3 Fatty Acids? _____

11. Origins and Evolution of the Western Diet

- a. The discordance of our **ancient genome** and our **current nutritional & physical patterns** may be the catalyst for many disease processes we see today
- b. When Environmental Conditions (diet) Change, **Evolutionary Discordance** develops between a Species' Genome and its Environment.
- c. **How long does it take our DNA to evolve?**
 - i. It takes **40,000 to 70,000 years** for our DNA to evolve!
 - ii. When did the Agricultural Revolution occur? **10,000 years ago**
 - iii. When did the Industrial Revolution occur? **240 years ago**
 - iv. Are these numbers anywhere near 40,000 to 70,000 years? **NO!!!!**
 - v. **Unfortunately, our DNA cannot keep up with the 'evolution' of our diet. Here we see a mismatch presenting in the form of disease.**
Reference: David Perlmutter, MD, Grain Brain
- d. **Food trends and food-processing during the Neolithic and Industrial Periods have altered:**
 - i. Glycemic Load (More Sugar)
 - ii. Fatty Acid Composition (More Hydrogenated Oils)
 - iii. Macronutrient Composition (Carbohydrates in Excess)
 - iv. Micronutrient Density (Less Vitamins, Minerals, Phytochemicals)
 - v. Acid-Base balance (Less Acidic Foods)
 - vi. Sodium-Potassium Ratio (More Salt less Potassium)



- vii. Fiber content (Far Less)
- e. **Our Universal Ancestral Diet: Minimally Processed, Wild Plant and Animal Foods**

How many years does it take our DNA to evolve? _____

How did food trends change our food? _____

12. The War against Omega-6 Fatty Acids. May the Omega-3 WIN!

- a. We are intended to consume **between a 1:1 to 4:1 ratio** of Omega-6 to Omega-3 fatty acids.
- b. Anti-Aging research suggests **closer to 1:1 ratio**. Anthropological data reveals our homo sapien ancestors thrived consuming **1:1 to 4:1**
- c. Our current westernized diet consumes closer to a **12:1 to 25:1 ratio** of Omega-6 to Omega-3 fatty acids. YIKES!!!!
- d. This promotes **inflammation** and **free radicalization**.
- e. Both Omega 6 and Omega 3 fatty acids are **polyunsaturated fats and are essential** – meaning we must consume them for normal growth, development, and survival.
- f. **Omega 3 fatty acids are found in wild fish (salmon, sardines, and anchovies), tree nuts (walnuts), seeds (chia and flaxseeds), pastured or omega-3 enriched eggs, and grass fed animals.**
- g. **Omega 6 fatty acids are found in soybean oil, safflower oil, cottonseed oil, sunflower oil, and canola oil.**
 - ****Soybean oil** is the most common emulsifying agent used in processed foods in the US. It comprises **20% of the calories** in the average American diet.
- h. Omega-6 oils are **unstable** because they are made of polyunsaturated fats susceptible to oxidation with cooking and aging.
- i. Cooking at high heats, microwaving, or frying will **oxidize the fats**.
- j. **Oxidized omega 6 damages DNA, contributes to heart disease, neurodegenerative diseases, and increases our risk for many forms of cancer.**
- k. **How much Omega-3 should we aim for?**
- l. The absolute best source is from small, wild, fatty fish.
 - i. **Two servings of salmon per week** to get optimal DHA and EPA.
 - ii. **A fish oil supplement is an alternative.**
- m. According to the Food and Nutrition Board of the US Institute of Medicine, the adequate intake of omega-3s per day is **1.6 grams for men and 1.1 grams for women**
 - i. **Salmon: 4 grams EPA and DHA**
 - ii. **Sardines: 2.2 grams EPA and DHA**



- iii. Walnuts: 2.5 grams of ALA

13. Gluten...The Anti-Medicine Food

- a. *Gluten – which is Latin for “glue” - is a **protein composite** that acts as an adhesive material, holding flour together to make products like bread, pasta, crackers, pretzels, and pizza dough.
- b. * Gluten is found in grains such as **wheat, barley, rye, spelt, bulgur and sometimes oats**
- c. *Gluten is the **most common food additive** often hiding as a stabilizing agent in products such as dressings, marinades, sauces, cheese products, tooth paste, lipstick, and even vitamin supplements.
- d. Gluten is NOT a single molecule. Gluten is made up of two main proteins: **Glutenins and Gliadins.**
- e. A person may be **sensitive** to either of these proteins or to one of the twelve different smaller units that make up Gliadin.
- f. We can be **intolerant** (Celiac Disease) or **sensitive** to Gluten.
- g. Either way leads to **inflammation.**
- h. What has changed?
 - i. Neolithic Ancestors consumed **minimal amounts** of wheat.
 - ii. Wheat was available only **seasonally in certain regions** of the world.
 - iii. The form of wheat we consumed as Hunters/Gatherers was of the **wild Einkorn variety.** Nothing like we eat today.
- i. How much wheat do we consume today?
 - i. **Today we consume **197 lbs. of wheat yearly** on average.
 - ii. **With modern hybridization and gene-modifying technology, **our current wheat has no genetic, structural or chemical likeness to what our previous ancestors may have stumbled upon as hunters/gatherers.**
 - iii. **Most cases of Celiac disease are clinically **SILENT.**
 - iv. **The prevalence of Celiac disease today is thought to be **20 x higher** than it was 20 years ago. We should ask ourselves WHY?
Reference: David Perlmutter, MD, Grain Brain
- j. What’s the big deal about Gluten?
 - i. Gluten’s protein, Gliadin, triggers production of another protein called **Zonulin.**
 - ii. Zonulin disrupts our gut lining and induces **permeability of the gut (leaky gut).**
 - iii. **Toxins and inflammatory products** can now penetrate though the gut and enter our bloodstream.



- iv. Most Autoimmune Diseases, including celiac disease, Type 1 diabetes, rheumatoid arthritis, MS, and Inflammatory Bowel Disease, share this common finding of **elevated levels of Zonulin and leaky gut.**
- v. **There is evidence we all can be sensitive to Gluten to some degree.**
- vi. In 2015, Harvard's Dr. Fasano published a landmark paper with a group of colleagues from other institutions.
- vii. In their study, led by Navy's Dr. Justin Hollan, they showed **how gliadin can be the etiology behind autoimmune disorders and cancer.**
- viii. When they exposed Zonulin to healthy animal and human guts, the intestinal linings became **permeable.**
- ix. Fasano's study concluded: **"Gliadin exposure induces an increase in intestinal permeability in all individuals, regardless of whether or not they have celiac disease."**
Reference: Justin Hollan, et al., "Effect of Gliadin on Permeability of Intestinal Biopsy Explants from Celiac Disease Patients and Patients with Non-Celiac Gluten Sensitivity", *Nutrients* 7, no.3 (2015): 1565-76.
- k. **What are symptoms of Gluten Sensitivity?**
 - i. ****Fatigue, Headaches, Abdominal Bloating, Abdominal Pain, Diarrhea, Constipation, Joint Pain, Cognitive Dysfunction/Brain Fog, Depression, Anxiety, Irritability, Reflux, Indigestion, Skin Rashes/Itching, Weight Loss, Vitamin Deficiencies, Iron Deficiencies, Bone Loss, Anemia.**
 - ii. **** We can have some, many, or all of the above.**
- l. **How can Gluten impact how we think and feel?**
 - a. ****Once our gut lining (aka mucosal barrier) becomes permeable, a cascade of inflammatory markers and antibodies cross the blood brain barrier.**
 - b. ****Once across the blood brain barrier, these antibodies and inflammatory markers, trigger a cascade of events leading to depression, anxiety, cognitive dysfunction, and neurodegenerative diseases.**
 - c. ****Gluten sensitivity can present as a neurological disorder without any gut involvement.**
Reference: Marios Hadjivassiliou, et al. "Gluten Sensitivity as a Neurological Illness," *Journal of Neurology, Neurosurgery, and Psychiatry* 72, no. 5 (May 2002): 560-63.
- m. **Should we avoid gluten? YES!**

How many pounds of wheat does the average American eat yearly? _____

What food products contain Gluten? _____



14. This week's COGNITIVE action plan:

- a. Choose to focus on the AMAZING, healthful benefits of the foods you choose to eat!
- b. Appreciate the changes in your palate! Notice how delicious and fresh REAL food tastes!
- c. Use Music as your detour!
- d. Practice Diaphragmatic Breathing. 15 mins 2x

15. This week's NUTRITIONAL action plan:

CHALLENGE: ADD A NEW HERB TO YOUR GARDEN AND RECIPIES

- a. Keep on your Keto or Low-Carb path!
- b. Weigh, Count, Measure, and Track!
- c. Fast minimum of 16 hours daily and push to 24 hours if you feel ready! (If you are diabetic and taking insulin, please do not exceed 12 hours of fasting without discussing with your physician)
- d. Drink 80 -100oz of water daily
- e. Supplement your Salt- 1 cup chicken or vegetable broth
- f. Supplement with Magnesium Citrate 400-800 mg daily!
- g. Make sure you are consuming foods high in Potassium (greens, avocado, and walnuts)!
- h. Low-Carb Path- Check your blood glucose levels fasting and non-fasting. Reference previous notes for optimal values.



Food as Medicine

1. Name 3 healing foods or beverages.

2. What foods are high in omega-3 fatty acids?

3. What are 3 symptoms of gluten sensitivity? Where is gluten found?
