

Creating Health: Applying the Science of Lifestyle Medicine

Mark Pettus MD

- Week 1: Epigenetics and Health: How well do you fit into your genes?
- Week 2: **Inflammation and Health: Are you playing with fire?**
- Week 3: Metabolic Health: How to become a member of this exclusive club.
- Week 4: Circadian Rhythms and Health: Riding the rhythms of life



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Inflammation and Health: Are you playing with fire?



Mark Pettus MD

Associate Professor of Medicine
University of Massachusetts
Medical School

September 30, 2022

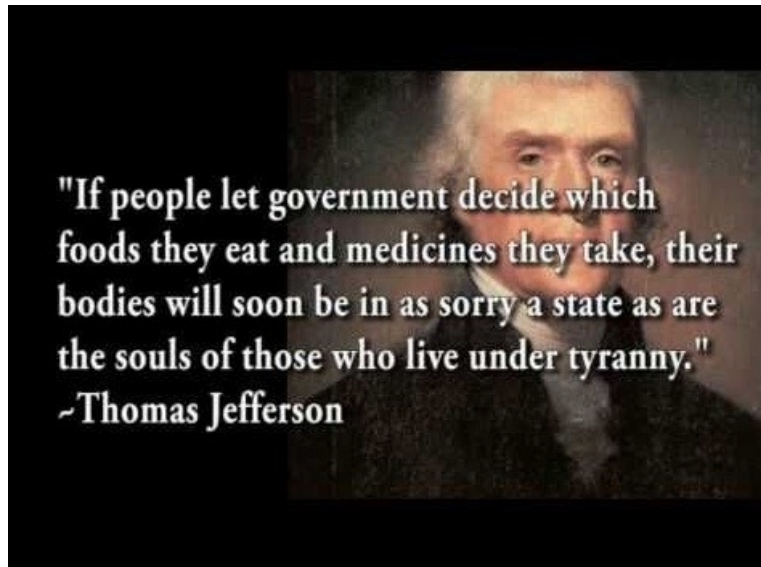
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Learning Objectives



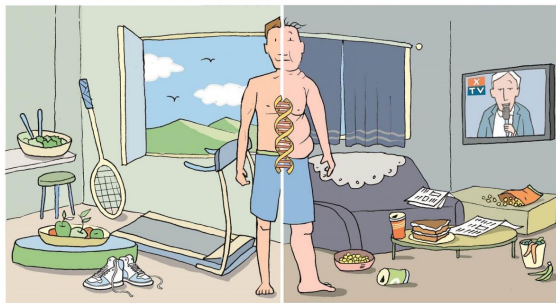
- Participant will understand the link between inflammation and health, health span and longevity.
- Participant will understand the changes in our modern food supply and how they contribute to chronic inflammation.
- Participant will acquire actionable lifestyle medicine interventions that will both reduce inflammation and improve quality of life.

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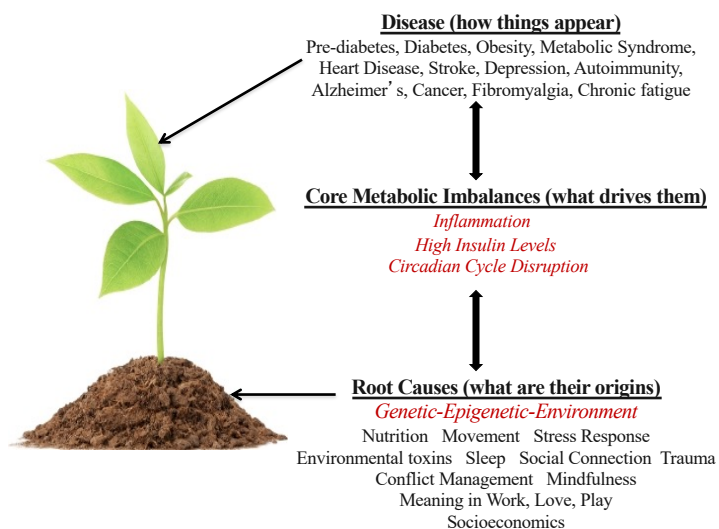


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Epigenetics:
A life with many possibilities.



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“The Cause of Everything?”

“Inflammaging”

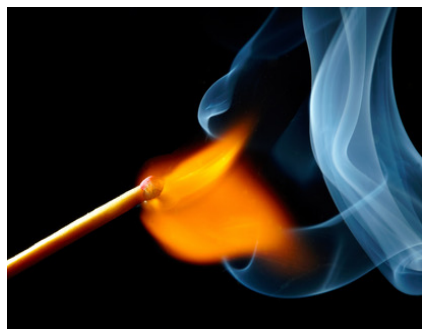
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Inflammation is a highly evolved response of our immune systems that protects us after injury, from pathogens and is essential for survival. A system well-designed for acute events can become maladaptive when chronically turned-on.

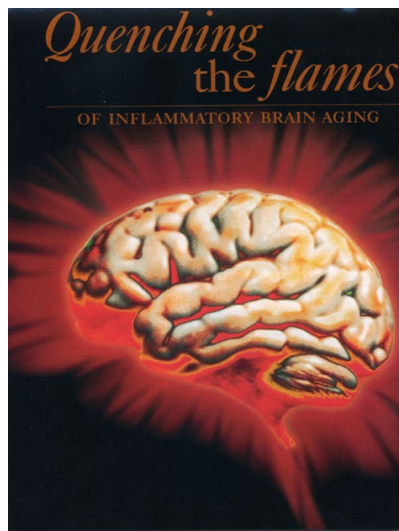
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Causes of Inflammation



1. Standard American Diet
2. Lack of Movement
3. Chronic stress i.e., allostatic load
4. Waistline 36+” in women
40+” in men
5. Imbalanced Gut ecosystem-barrier
6. Disrupted sleep (circadian rhythm)
7. Social isolation
8. Environmental toxins e.g. mold,
plastics, glyphosate
9. ? Low vitamin D
10. Infections e.g. Lyme, covid-19;
periodontal disease

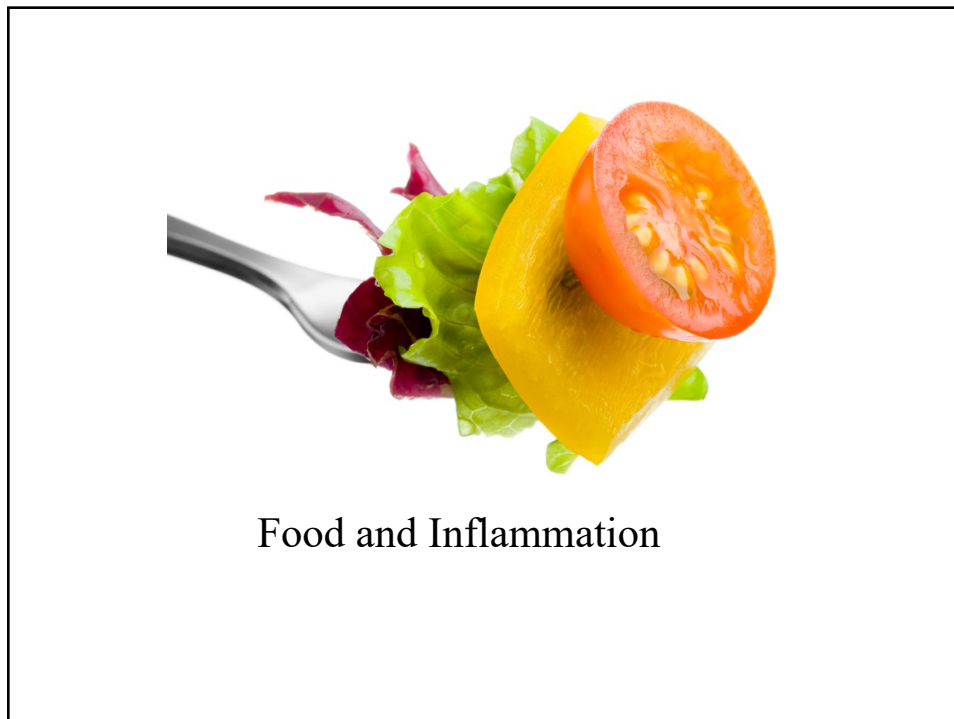
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Evidence for increased inflammation in:

- Alzheimer’s disease
- Depression
- Chronic Pain
- Parkinson’s Disease
- Multiple Sclerosis
- ADD and ADDHD
- Anxiety and Panic
- Autism spectrum

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Most interesting and meaningful attributes
of any food

- Nutrient density
- Impact on glucose and insulin
- Impact on the gut microbiome
- Macronutrient quality
- Phytonutrient complexity
- Impact on our immune system

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CHANGES IN HUMAN DIETS WITH INTENSIFIED AGRICULTURE, COOKING, AND FOOD PROCESSING



- **Glycemic Load: More sugar, fructose, flour**
- **Fatty Acid Composition: Omega 3/6 ratio**
- **Macronutrient Composition**
- **Micronutrient Density: Processed foods remove**
- **Sodium-Potassium Ratio: Much too high**
- **Fiber Content: very low- gut microbiome**

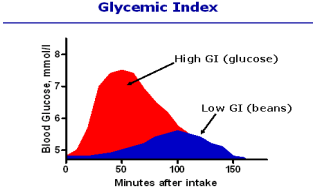
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Different carbohydrates produce unique genomic responses!



High Glycemic Carbs

62 genes regulating
Inflammation, stress,
insulin signaling
gene responses activated.



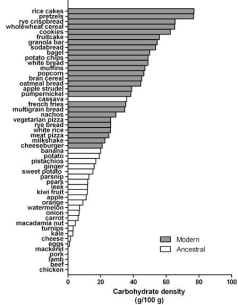
Low Glycemic Carbs

Same genes turned off;
Genes regulating same
production turned off.


Kalle et al. Am J Clin Nutr;2007;851:1417-27


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Sugar, Fructose and Carbohydrate-Dense Grains



High-Quality Plant-Based Carbs





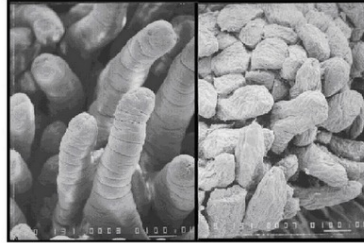
Oral and Gut Microbiome

Inflammation
Altered neurotransmitters
Insulin Resistance
Weight and Metabolism
Mitochondria-Oxidative stress
HPA axis –Stress Response

Protection from:
Inflammation
Diabetes
Cancer
Obesity

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Wheat: Health Considerations



Modern cultivars:

- High-Glycemic amylopectin
- Changes in Gliadin
- Anti-nutrients e.g. lectins wheat germ agglutinin (WGA)
- Glyphosate “Round Up” browning – desiccation
- Effects on microbiome
- Deception of “whole grain” labeling

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GLYPHOSATES & GLUTEN: THE PERFECT STORM



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Ideal:

Waist/Hip ratio < 0.9

%Body fat < 25-30%

Waist circumference < 40" or < 36"

NEWS AND VIEWS

Inflamed about obesity

Michael Lehrke & Michael A Lazar

Two studies find that adipocytes and macrophages have more in common than previously thought. The work bolsters the notion that the inflammatory response might link obesity to afflictions such as diabetes.

The epidemic of obesity stems from a clash between genes that allowed our ancestors to survive stressful periods in nature and the caloric excess and sedentary lifestyle of our modern environment. Obesity is a major risk factor for diabetes and atherosclerosis, afflictions associated with a constellation of insulin resistance, hypertension and lipid abnormalities that is now defined as metabolic syndrome.

The recent studies in the *Journal of Clinical Investigation* report that macrophages, usually viewed as immune cells that protect mammals from environmental dangers, indicate adipose tissue in states of obesity. These observations add to the growing impression that inflammatory factors may underlie metabolic disease.

Obesity is the result of increases in adipocyte number and size. In recent years, one view of adipose tissue has transformed from that of a fat store to a complex, endocrine organ¹. This concept is evolving further to include a role for the tissue as inflammatory pathway, largely because adipocytes also secrete cytokines (chemically considered to be produced by macrophages, such as tumor necrosis factor- α (TNF- α) and interleukin-6 (IL-6))².

Macrophages and adipocytes have long been considered quite distinct cell types, with good reason. Although both cell types develop from monocytes, macrophages and adipocytes separate relatively early in embryogenesis along the hematopoietic and mesodermal cell lineage, respectively³. Malignant processes in the bone marrow differentiate macrophages but have no direct target toward adipose tissue (the bone marrow stroma). In contrast, adipocytes develop from preadipocytes only present in fat tissue⁴. Macrophages phagocytose foreign invaders and secrete cytokines govern-

ing the immune response⁵, whereas adipocytes store energy in the form of triglycerides and regulate energy metabolism by secreting hormones such as leptin⁶. Weidung *et al.* and Lazar *et al.* set out to identify obesity-related differences in gene expression in adipose tissue. Surprisingly, fat tissue from obese individuals had a gene expression profile reminiscent of that of macrophages. Moreover, 30–10% (dependent on the study) of the genes that correlated with obesity were related to macrophage biology.

Recent purified populations of adipocytes express cytokine genes⁷; these increases in macrophage-related gene

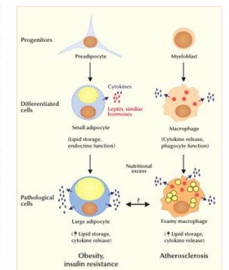


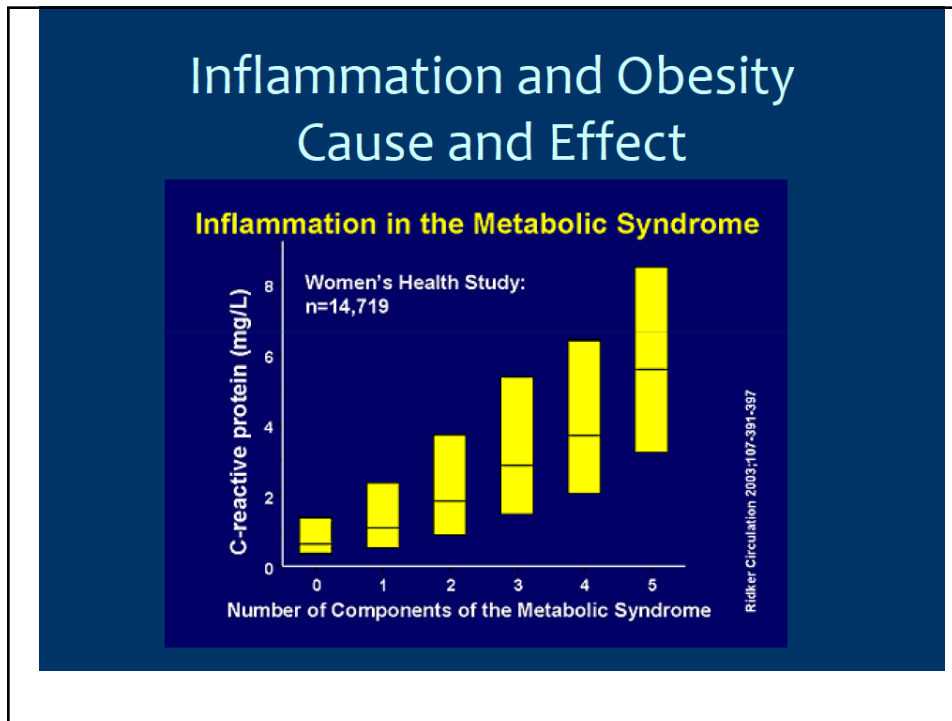
Figure 1. Convergence of macrophage and adipocyte functions in obesity and metabolic syndrome. Adipocytes and macrophages share key biological properties and have different progenitor origins. In the presence of obesity, macrophages and adipocytes, both cell types engage in lipid storage and cytokine secretion. In this setting, Fu *et al.* and Lazar *et al.* show that macrophages also become adipocyte-like⁸. Adipocytes and macrophages may even be interchangeable⁹.

The Tape Test

Waist to Hip Ratio

- < 0.8 in women
- < 0.9 in men


Waist to Height?



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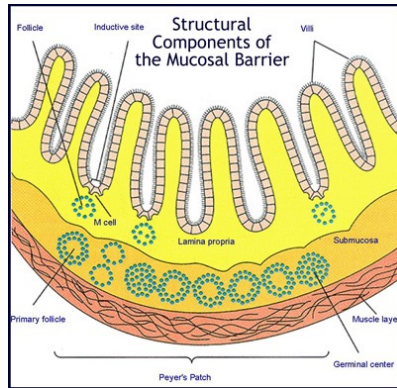
More quality fat sources

- Pasture-raised eggs
- Fatty fish e.g. salmon, sardines, anchovies, mackerel, trout
- Ghee
- Grass-fed butter
- Whole fat dairy, yogurt
- Extra virgin olive oil
- Extra virgin coconut oil
- Avocados, olives
- Nuts - almonds, macadamia, walnuts
- Pasture-raised and uncured meats

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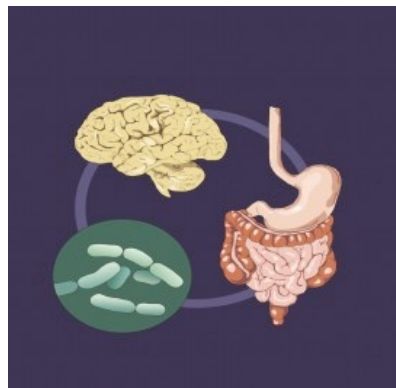
When the barrier breaks down, disease risk increases



- Small intestine surface area could cover a doubles tennis court
- It is only 1 cell layer thick
- Damage can lead to increased permeability of toxins, referred to as “leaky gut” that fuels inflammation

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Intestinal Permeability
Uncontrolled Trafficking of Molecules



- Food sensitivities
- Lectins
- Dysbiosis
- SIBO
- Acid suppression
- Chronic stress
- Environmental toxins
- Medications e.g. NSAIDs

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Mold - Biotoxins




Mold Exposure Risk

- 25 % people with genetic susceptibility
- 3-5 % at high risk for illness
- 50% homes and office buildings with water damage
- An overlooked cause of chronic systemic inflammation

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Home Page > Diagnosis > Visual Contrast Sensitivity (VCS)

The VCS Test - Visual Contrast Sensitivity

The online VCS Test is a measure of one of the neurologic functions of vision called **contrast**. In order to take this test, your corrected visual acuity must be better than 20:50.


There must be adequate illumination. We use a light meter to confirm 70 foot-lamberts or more. Light from both the illuminated computer screen and an overhead light is usually sufficient. The test is taken with one eye covered and one open at a distance of 18" from the computer screen. You will do the test first with the left eye and then with the right eye. You need to make sure the distance from the screen stays constant at 18". Some people have found that cutting a string to an 18" length helps keep the distance correct. Your score is recorded according to published criteria for VCS testing. It is a "Pass/Fail," though how well you do can be used to assess your improvement over time or worsening with re-exposure/repeat illness.

You need to know that the computer version of the VCS test is a screening test and is not used to diagnose any condition. If you are concerned about the possibility of a biotoxin associated illness you will need to be examined by a physician experienced in the field. We recommend your VCS testing results be validated for you by use of a hand held VCS test.



Additional Links

- NeuroQuant
- Common Misdiagnoses
- Visual Contrast Sensitivity (VCS)
- ERMI Testing
- The Biotoxin Pathway
- Frequently Asked Questions
- Lab Tests
- Lab Orders
- HERTSMI-2

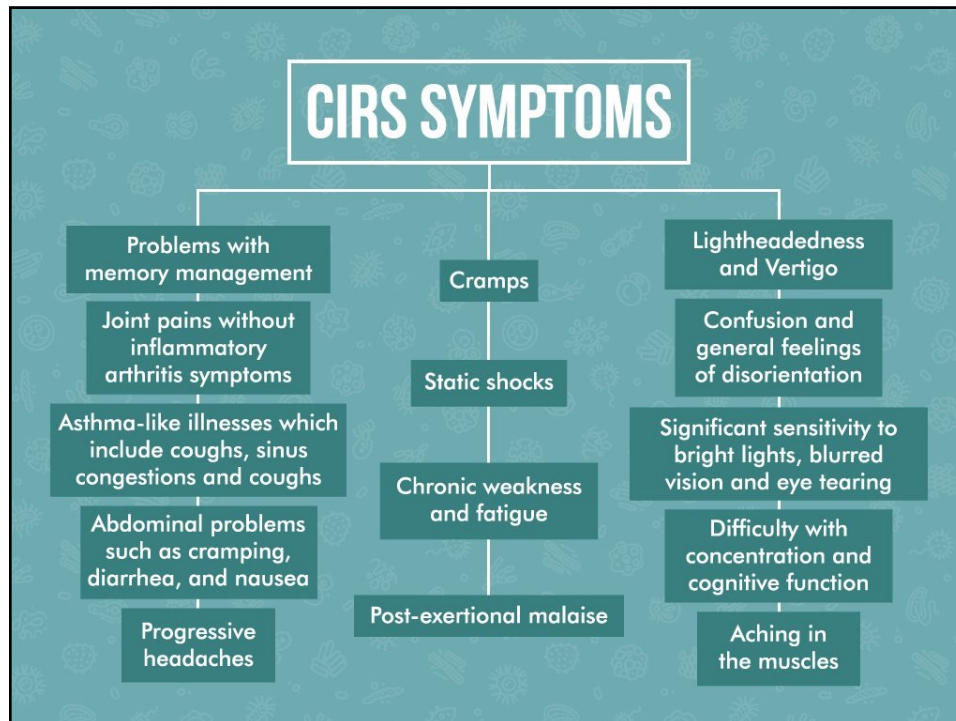


The online screening test is one of the neurologic functions of vision called contrast. [Begin the online test now](#)

<http://www.survivingmold.com/>

Dr. Ritchie Shoemaker

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hsC-REACTIVE PROTEIN



- Detects hidden inflammation though says nothing of the source(s)
- Inflammation is connected to every modern disease not just obvious ones such as asthma, arthritis, or infections
- It is associated with heart disease, cancer, dementia, diabetes, obesity, and more.
- There is a “range” of normal (ideal < 1)
- CV risk factor stratification
- Useful to monitor as a biomarker of inflammation in response to lifestyle changes so tracking over time is most helpful

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Turmeric



Ginger

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Cloves



Sage



Cayenne Pepper

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Rosemary



Cinnamon

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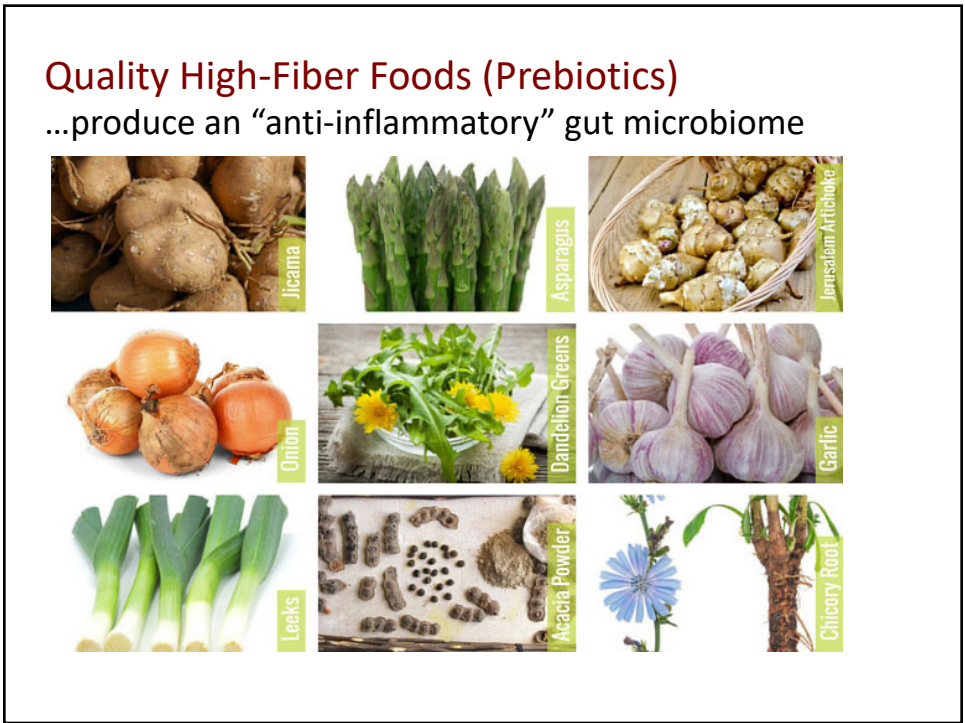


Coffee



Green tea- Matcha

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Daily Nutrition Nibble: *Prebiotic Foods for Gut Health*

Prebiotics are a special form of non-digestible carbohydrates that feed the probiotics (aka, good bacteria). When prebiotics and probiotics are combined, they work together to create a healthy environment inside of your gut while promoting proper digestion. Here are some foods that contain prebiotics:

- ❖ Artichokes
- ❖ Onions
- ❖ Garlic
- ❖ Chicory
- ❖ Dandelion greens
- ❖ Asparagus
- ❖ Leeks
- ❖ Berries
- ❖ Bananas
- ❖ Flax seed
- ❖ Beans
- ❖ Lentils

The image shows a collection of seven different prebiotic foods arranged in two rows. The top row includes a banana, a small glass bowl of blueberries, and a bunch of asparagus. The bottom row includes a pile of lentils, two heads of garlic, and two artichokes.

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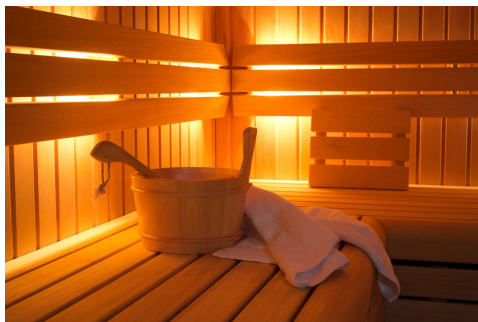
Stress Reduction and Inflammation



- Many randomized controlled trials demonstrating alterations in gene expression of inflammation markers e.g. NFkB, IL-6, and C-reactive protein with meditation compared to controls (Benson et al)
- Increased expression of telomerase and maintenance of telomere length (Blackburn and Ornish)
- Treatment group scored better on emotional wellness, resiliency

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Saunas



- Strong data on health promotion and disease prevention
- 30" minutes 3-4x/week
- Steam or infrared
- Stimulates our bodies defense mechanisms

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Activity and Movement



- Motion is the lotion
- Aerobic, resistance, dance
- Muscle as a metabolic engine
- Decreased insulin resistance, decreased cortisol, increased endorphins, dopamine, and oxytocin
- Enhanced strength, resilience, balance, concentration, mood
- Decreased cardiovascular, diabetes, cancer risk
- Longevity and quality of life profoundly enhanced

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An Anti-Inflammatory Lifestyle Script



- Whole foods with reductions in sugar, refined grain-based flour, acellular carbohydrate dense foods
- More healthy fats e.g. ghee, olive oil, coconut oil, nuts, avocados, butter, fatty fish, eggs (yolks are best)
- Plant-based fermentable fiber for the microbiome and nutrient density
- Cruciferous, allium, berries great for detoxification
- Elimination trial e.g. gluten, refined grains, sugar, casein
- Intermittent fasting or time-restricted feeding
- Liberal outdoor, full-spectrum light exposure
- Sauna
- Motion is the lotion!
- Stress management e.g. yoga, tai chi, music, breath, meditation
- Connection with others: we are born to bond !
- Consider evaluation for mold in environment

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