FUNCTIONAL MEDICINE
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Pain & Inflammation: Dispensing the Dietary Prescription

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Disclosures

- Lara Zakaria does not report any actual or potential conflicts of interest in relation to this continuing pharmacy education course.

Objectives

1. Recommend appropriate dietary interventions to address pain and inflammation.
2. Determine when to incorporate nutrient supplementation alongside dietary approaches.

Today's Outline

- Macronutrients
- Micronutrients
- Phytonutrients
- Anti-inflammatory diets and nutraceutical considerations
- Building the prescription (Food + Supplements)

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Functional Medicine Prescription

Patient Name_____ Date of Birth _____

Functional Nutrition Prescription

Functional Nutrition
- ☐ Phytonutrient Spectrum
- ☐ Core Food Plan (CFP)
- ☐ CFP, modified: _____

First Step Interventions
- ☐ Elimination Diet
- ☐ Food Reintroduction
- ☐ Cardiometabolic Food Plan

Advanced Interventions
- ☐ GI Specific Food Plans
- ☐ Detox Food Plan
- ☐ Mito Food Plan

Personal Dietary Recommendations

Macronutrient Distribution: ☐ 45/25/30 ☐ 40/30/30 ☐ Mild/Strict Keto ☐ Intermittent Fasting _____ days/wk

Target Calories: ☐ 600 ☐ 1000–1200 ☐ 1200–1400 ☐ 1400–1800 ☐ 1800–2200 ☐ 2200–2500

Lifestyle Prescription

☐ **Sleep:**_____

☐ **Exercise:** Risk Assessment: ☐ Low Risk ☐ Medium Risk ☐ High Risk
Clearance: ☐ Yes ☐ No _____

Exercise Prescription:	Cardio/Aerobic	Strength/Resistance	Flexibility/Stretching	Balance
F - Frequency times per week				
I - Intensity (e.g., low, moderate, vigorous)				
T - Time/duration minutes each day				
T - Type (e.g., walking, jogging, swimming)				

☐ **Stress management:** _____

Supplements/Medications Prescription

Supplement/ Medication	On rising	Breakfast	Mid-morning	Lunch	Mid-afternoon	Dinner	Mid-evening	Before bed

Additional Comments _____

Prescribed by _____ Date _____

Follow-up Appointment _____

Version 8

VS

State of New Jersey

PRESCRIPTION BLANK

NAME AND TITLE
STREET
CITY STATE ZIP
PHONE

NPI # _____

CERTIFICATION # 11111 DEA # 11111

COLLABORATING PHYSICIAN

NAME NAME LICENSE # 00000000

(Enter Address and Phone Number only if different from above)

ADDRESS STREET ADRESS

CITY, STATE ZIP CODE PHONE # (000) 000-0000

PATIENT_____ D.O.B. _____

ADDRESS _____ DATE _____

Rx

TRIAL
PRA01041400001

SUBSTITUTION PERMISSIBLE _____ DO NOT SUBSTITUTE _____

DO NOT REFILL _____

REFILL _____ TIMES

SIGNATURE OF PRESCRIBER

Use a separate form for each controlled substance prescription

THEFT, UNAUTHORIZED POSSESSION AND/OR USE OF THIS FORM INCLUDING ALTERATIONS OR FORGERY, ARE CRIMES PUNISHABLE BY LAW

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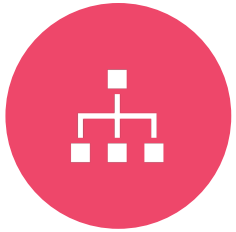
Let’s test our foundational knowledge

Autoimmunity: The Functional Medicine Window



SY*STEM'S* BASED APPROACH

UPSTREAM MEDICINE

VS

"SY*MPTOM*-BASED" APPROACH

DOWNSTREAM MEDICINE

Macronutrients, Micronutrients, and Phytonutrients

Foundations of the Nutrition Prescription

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Macronutrients

Fats (provide 9 calories per gram)

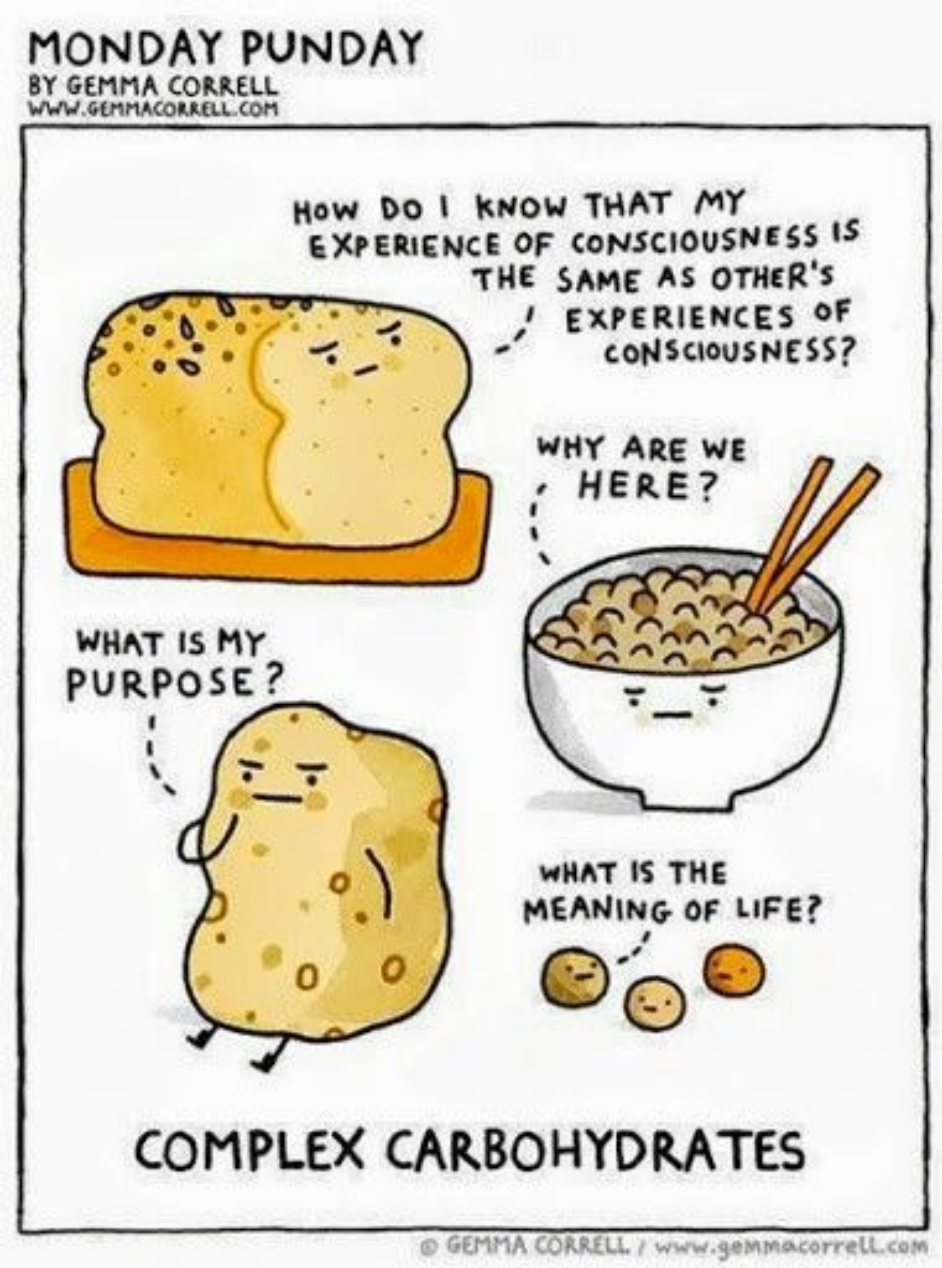
Protein (provide 4 calories per gram)

Carbohydrates (provide 4 calories per gram)

Contribute to energy balance, ***but*** there's more to it than thermodynamics	Saturated and unsaturated fats, SCFA, Essential fatty acids
	Amino acids – BCAA, essential AA
	Simple carbohydrates and fiber

Not all Carbs are Created Equal

- Glucose, fructose
- Fiber
  - Goal 30g/day or more (not enough, but still really hard!)
  - Encourage water consumption
- Glycemic index (GI) and Glycemic Load (GL)
  - Measure of the glycemic burden of food Glycemic impact



Improve Glycemic impact & Nutrient Density:

- Reduce or avoid sugar, sweetened beverages, or white flour products
- Eat unprocessed foods in natural state
- Increase overall consumption from:
  - Vegetables
  - Fruit
  - Whole grains
  - Legumes
- Couple with protein and healthy fat sources (avocado, nuts, seeds, etc…)

The Importance of Fiber

Non-starch plant polysaccharides and lignans

- Cellulose, gums, pectin, mucilage
- Found in fruits, vegetables, nuts, seeds, legumes, and grains

Blood sugar balance is essential in pain management

- Fiber helps promote improved glycemic control, reducing inflammation

Benefits don’t stop at glycemic impact:

- Promotes weight loss and improved body composition
- Bowel motility and stool consistency (detoxification)
- Essential function as prebiotics (role of microbiome and inflammation)
- Positive impact on digestive enzymes (proteolytic enzymes help to reduce inflammation)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6472268/

Advanced Glycation End Products (AGEs)

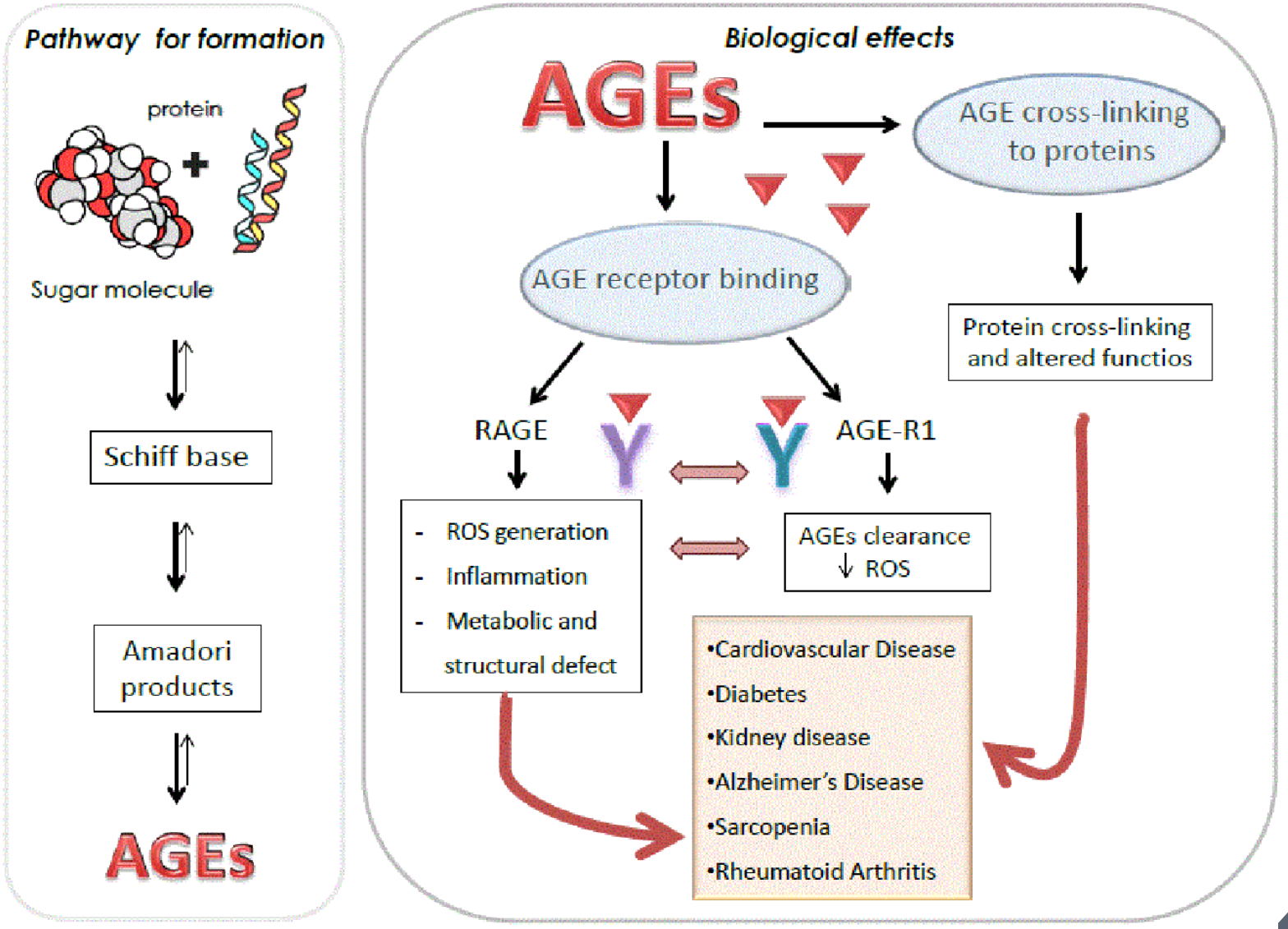


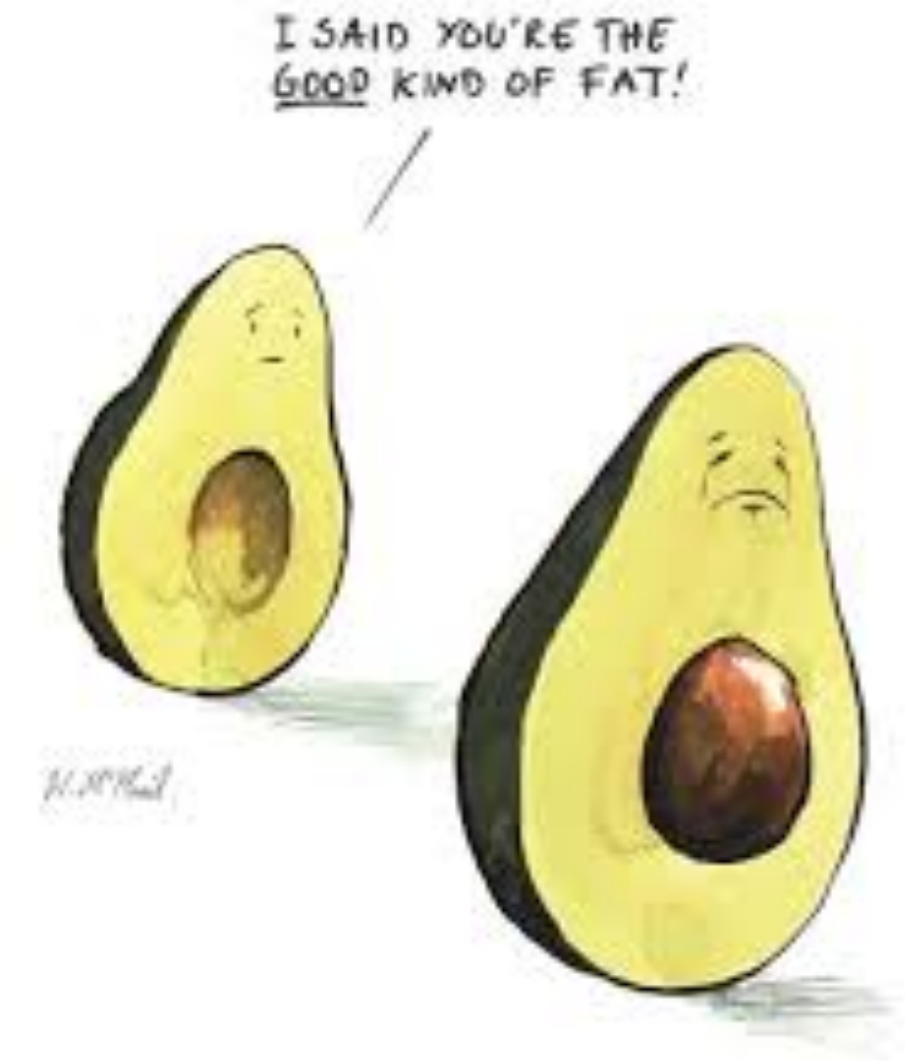
Figure 1: Schematic representation of AGEs formation and of their biological effects.

Abate, Giulia et al. "Advanced Glycation End Products (Ages) in Food: Focusing on Mediterranean Pasta." (2015). J Diabetes. 2020 Feb;12(2):102-104. doi: 10.1111/1753-0407.12970. Epub 2019 Aug 14. https://www.ncbi.nlm.nih.gov/pubmed/31411812

The Forgotten Macronutrient

- ½ body weight (lbs) (the “pee test”)
- Drink clean filtered water, free of contaminants
- Other sources include veggies, fruit, soup, herbal teas, carbonated water (not tonic)
- Caffeine and alcohol are dehydrating
- Hydrate more when physical demands are higher, exercise, or the weather is hot

Not all fats are created equal



Fats

Triglycerides – most consumed fatty acid

- Saturated
- Monounsaturated (MUFA)
- Polyunsaturated (PUFA)

Essential Fatty Acids (EFA) – omega-3 and omega-6

- Linoleic and α-linolenic acid (LA & ALA)
- Easily oxidized when exposed to heat, light, and oxygen

Trans fats and cholesterol*

Lipase enzymes and bile needed to digest

Can part of the benefit be ketosis?

Being in a state of induced ketosis:

- Improve metabolic and inflammatory markers, directly and indirectly including improvements in
  - Lipids
  - HbA1c, fasting insulin, and glucose levels
  - high-sensitivity CRP
  - Body composition and supporting weight loss

Curr Nutr Rep. 2018;7(3):97–106. doi:10.1007/s13668-018-0235-0
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6472268/

Anti-inflammatory fats

Proinflammatory PUFAs

- Omega-6 fats
- Arachidonic acid (AA) (egg, meat, dairy*)
- Linoleic acid (corn, sunflower, and safflower oils)

Anti-inflammatory PUFAs

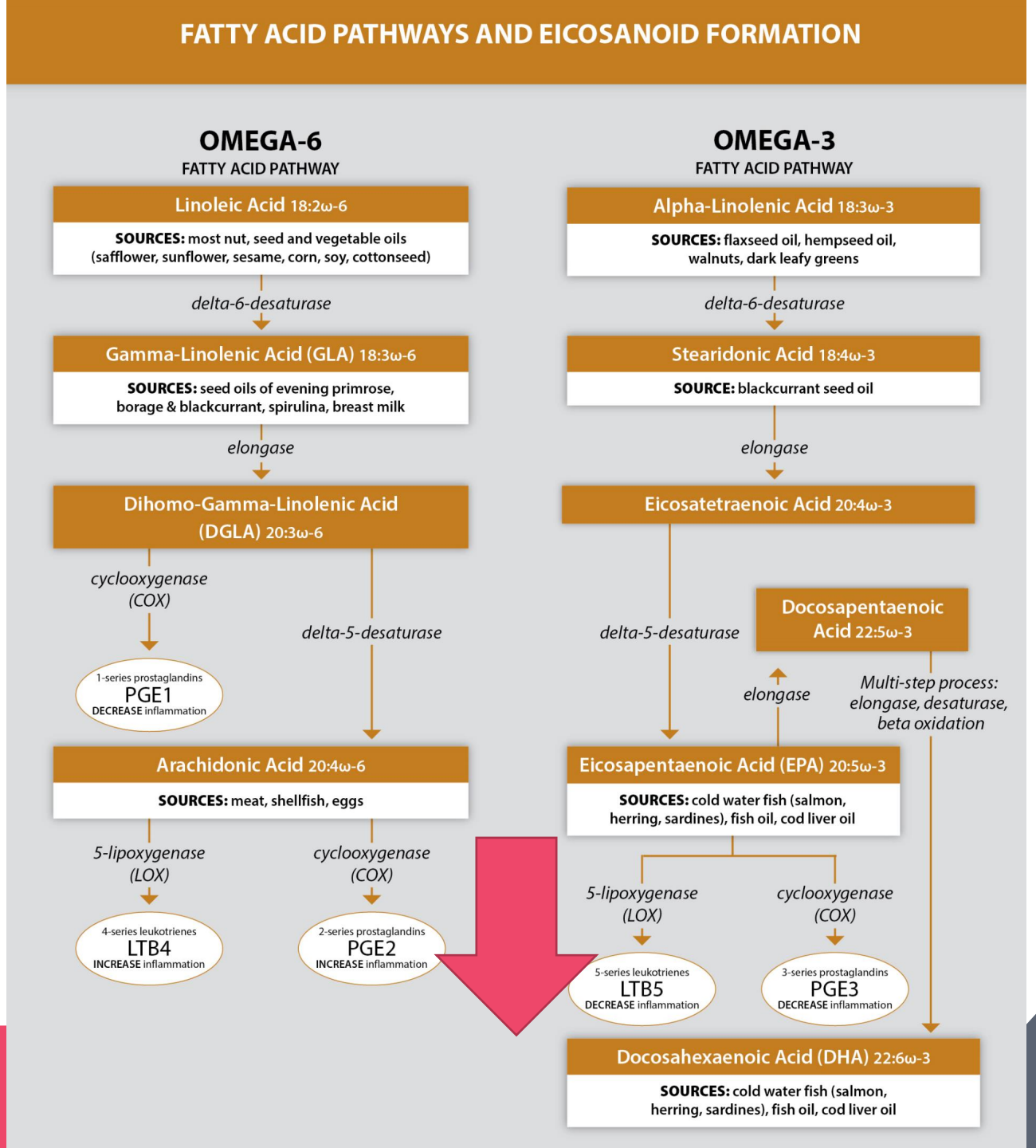
- Omega-3 fats (fatty fish, fish oil)
- Alpha linoleic acid (ALA)

Ratio of Omega-6/omega 3 in SAD ~ 15-20:1

**grass-fed and organic sources have been found to have reduced AA compared to conventional sources*

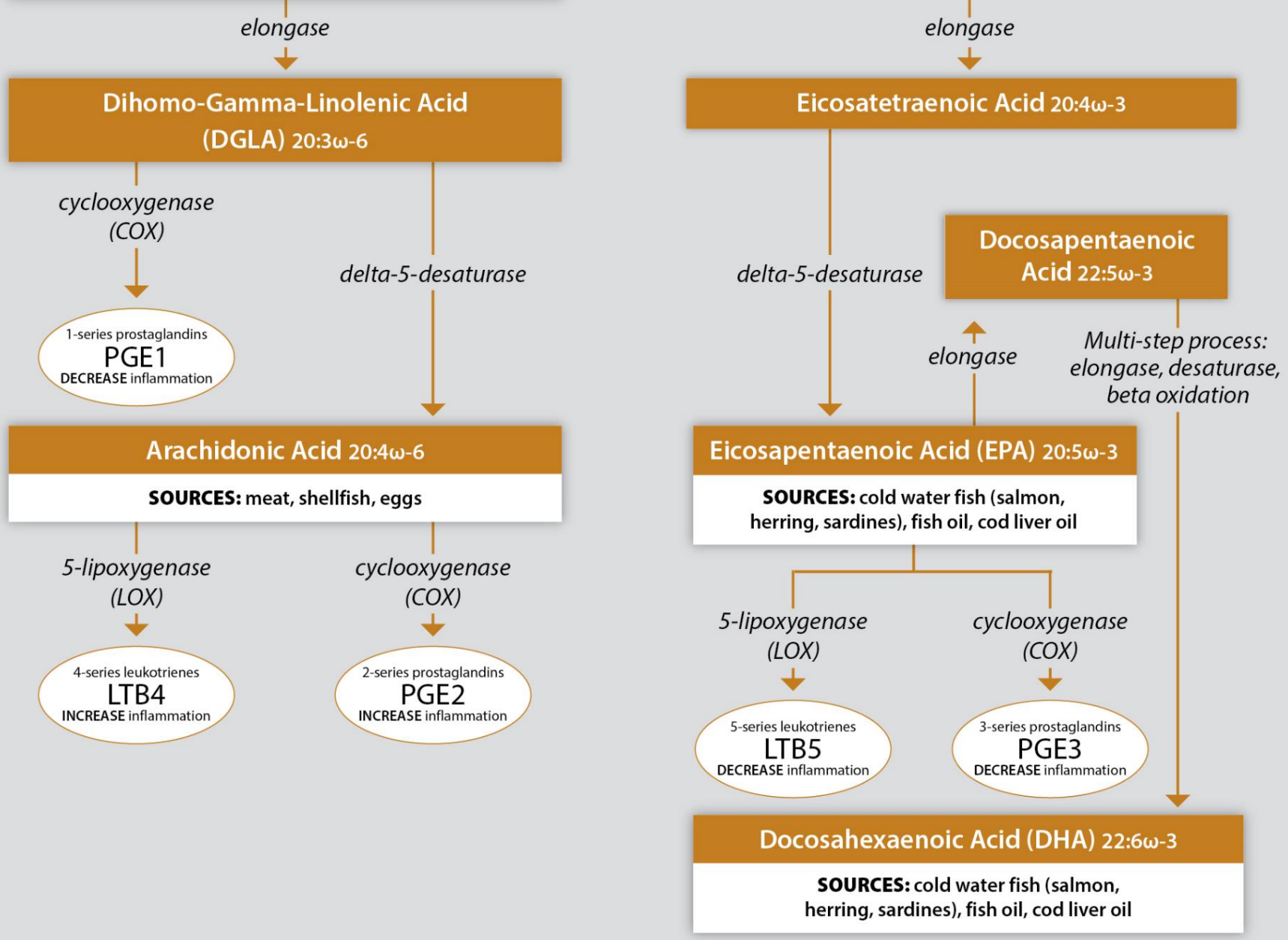
FA Pathways & Eicosanoid Formation

- Both sides are converted with the same enzymes
- Which products are produced is dependent on competitive saturation
- When you supplement with ALA sources and EFA supplements you favor the production of the EPA/DHA and inhibit the production of DGLA and AA



Guilliams TG. Supporting Immune Function: A Lifestyle and Nutrient Approach. 2014 p78

FA Pathways & Eicosanoid Formation



Guilliams TG. Supporting Immune Function: A Lifestyle and Nutrient Approach. 2014 p78

Protein

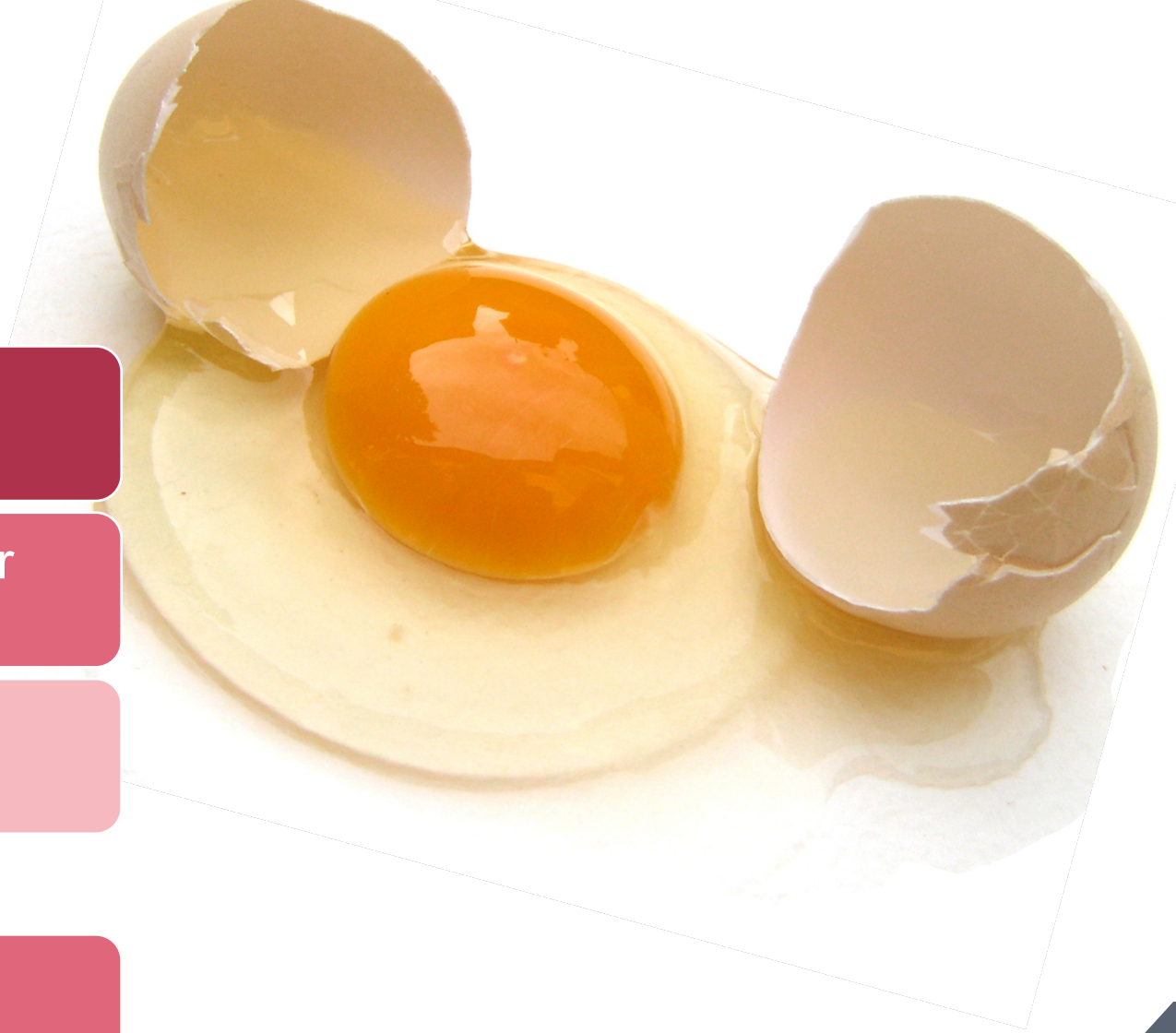
Recommendations DRI ~3.5g per pound

Ideal intake for most individuals up to 0.5 g per pounds or 20-30% of total calories

Amino acids

- Complete protein
- Incomplete protein

Inadequate protein vs AA imbalance



www.nature.com/scientificreports

SCIENTIFIC REPORTS

OPEN

Integrated metabolomic and transcriptome analyses reveal finishing forage affects metabolic pathways related to beef quality and animal welfare

Received: 14 September 2015
Accepted: 18 April 2016
Published: 17 May 2016

José A. Carrillo[1], Yanghua He[1], Yaokun Li[2], Jianan Liu[1], Richard A. Erdman[1], Tad S. Sonstegard[3] & Jiuzhou Song[1]

Sci Rep. 2016;6:25948. Published 2016 May 17. doi:10.1038/srep25948
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4869019/

Grass-Fed and Finished

Grass-fed and finished beef:

- Omega-3 FA are higher
- Produce tender beef with lower total fat and a higher omega3/omega6 (favorable) ratio than grain-fed ones
- Reduction in direct markers of inflammation as well as indirect benefit health

Grain finished/conventionally raised animals

- Omega-6 FA in are higher and may promote inflammation and oxidative stress.

Bonus: Reduce blood cortisol levels in the animal strongly indicate that grass-fed animals may experience less stress than the grain-fed ones.

Some evidence also suggests improved CO_2 gas emission (less methane production)

Sci Rep. 2016;6:25948. Published 2016 May 17. doi:10.1038/srep25948
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4869019/

Micronutrients

- Vitamins
- Minerals
- Functionally Essential Nutrients
- Antioxidants

Micronutrients involved in immune balance

- Vitamin A and beta-carotene
- Vitamin C
- Vitamin D
- Zinc
- Vitamin E and selenium
- Detoxification and antioxidant support, including methylation, sulfation, glutathione production co-factors
  - Lipoic acid
  - NAC
  - Glutathione
- Mitochondrial support/Oxidative stress
  - CoQ10
  - Carnitine

Nrf2: Detoxification & Antioxidant

The Nrf2-mediated signaling pathway protection against environmental insults and endogenous stressors.

Nrf2 coordinates inducible expression of antioxidant responsive element (ARE) and phase II detoxification enzymes to adapt to different stress conditions

J Nutr Biochem. 2015;26(12):1401–1413. doi:10.1016/j.jnutbio.2015.08.001
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4785809/
Sheng Li Xue Bao. 2015 Feb 25;67(1):1-18 https://www.ncbi.nlm.nih.gov/pubmed/25672622

Promoting Nrf2

Nutrients that promote Nrf2:

- Phenolic antioxidants
- Vitamin E (gamma- and delta-tocopherols and tocotrienols)
- Omega-3 FA (DHA and EPA)
- Vitamin A (Carotenoids, lycopene)
- Isothiocyanates from cruciferous vegetables
- Sulfur compounds from allium vegetables
- Terpenoids.

Other Nrf2 promoting factors:

- Low level oxidative stress (hormesis)
- Exercise
- Caloric restriction.(IF, FMD, fasting)

J Nutr Biochem. 2015;26(12):1401–1413. doi:10.1016/j.jnutbio.2015.08.001
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4785809/
Sheng Li Xue Bao. 2015 Feb 25;67(1):1-18 https://www.ncbi.nlm.nih.gov/pubmed/25672622

Phytonutrients

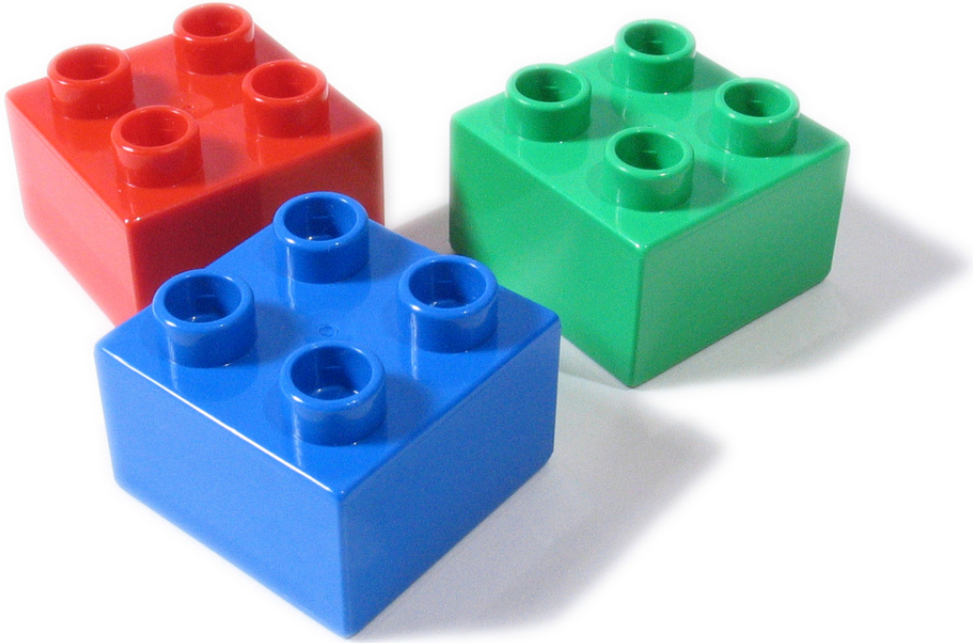
- Hundreds of phytochemicals found in food, responsible for the color in plants
- Modulate inflammation through a variety of mechanisms including modulation of:
  - Oxidative stress (ROS)
  - COX
  - LOX
  - NFkB
  - TNF-alpha
  - iNOS
  - NrF2 (ARE)

Examples of Phytochemicals and Their Food Source

Class (Subclass)	Phytochemical	Food Source
Carotenoids (Carotenes)	Beta-Carotene, Lycopene	Carrots, dark leafy greens (spinach), tomatoes
Carotenoids (Triterpenoid)	Saponins	Soybeans, beans, other legumes, corn, alfalfa
Polyphenols (Curcuminoids)	Curcumin	Turmeric, mustard
Polyphenols (Flavonoids)	Quercetin	Cranberries, apples, red and yellow onions, beans
Polyphenols (Isoflavonoid)	Isoflavones (phytoestrogens)	Soybeans, alfalfa sprouts, chickpeas, peanuts
Polyphenols (Stilbenoids)	Resveratrol	Grape skins and seeds, nuts, peanuts

https://ucdintegrativemedicine.com/2015/06/why-phytochemicals-are-important/

Building the Dietary and Nutraceutical Prescription



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Case Study: Anna

- 72 y/o woman with history of OA (knees), fatigue, HTN, A. Fib. Some sleep apnea, Hx of asthma.
- Medications: Sacubitril/valsartan, chlorthalidone, apixaban, Metoprolol ER, rosuvastatin, montelukast, Premarin, medroxyprogesterone, thyroid (T3/T4 compound), progesterone (every 3 months x 13 days), conjugated estrogen (2 days on, 1 day off)
- MSQ total score = 38
  - MSK category = 11

Current Diet

Low appetite, eats irregularly

Breakfast

- Coffee, fruit, water, cheese, ham, salami
- Lox and cream cheese on a bagel

Lunch

- Tomato or pepper multigrain English muffin

Dinner

- Brown rice, carrots, greens, red meat
- Tortilla, sour cream and chicken

Other

- Coffee once a day
- Soda
- Some candy/chocolate
- Some alcohol occasionally

Social History

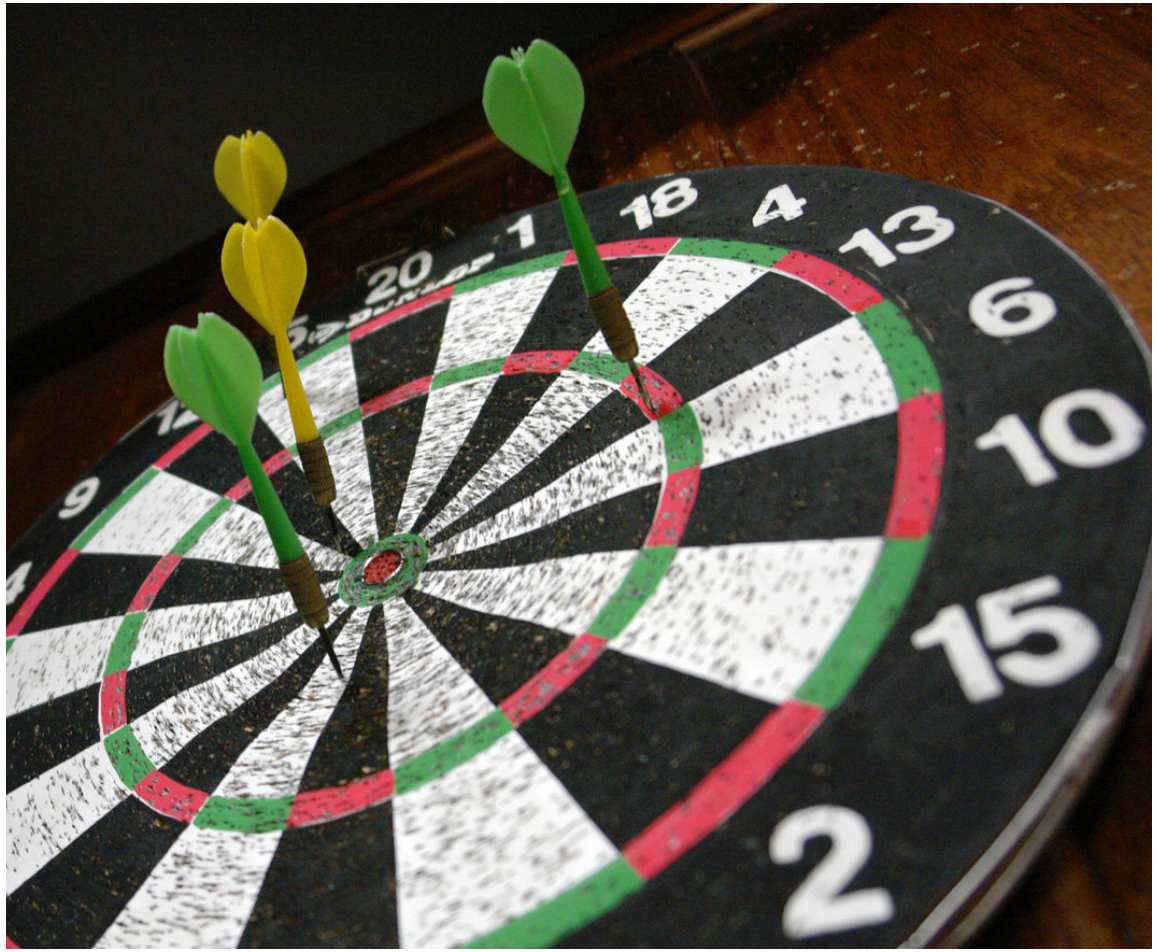
Sleep isn’t great

- Bedtime around midnight
- Gets up 2-3x/night to use the bathroom (diuretic)
- Wakes up at 9AM, not always feeling rested

No exercise

Quit smoking in 1968

#Goals



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Goals

- Improve energy and strength
- Improve joint pain
- Optimize gut health (reduce diarrhea, nausea and appetite)
- Address respiratory disease, HTM, and thyroid

Laboratory Findings: Nutrient needs

Amino acids

- Lys, tryp, leu, val, threo, arg, serine , hist, iso, phe, taur, glycine

Minerals

- Zn, Se, Mg, K, Ca, Cu

Vitamins

- B12, folate, B6, Vitamin D (33), Vitamin CEFAs
- ALA

Ox stress

- lipid peroxides OK but 8OH2dG indicates ROS activity

Homocysteine 18.5

Metals

- Elevations in Pb, Al, As, Cd

Dietary recommendations

General Dietary Summary

Increase/Emphasize

- Increased plant-based dietary diversity, especially non-starchy vegetables and fruit especially those that support detoxification.
- Increase fiber intake, balance blood sugar and support microbiome diversity.
- Increase intake of antiinflammatory fats, especially omega-3.
- High nutrient density sources of protein, including grass-fed and organic red meat, poultry, and clean fish.
- Maintain proper hydration: ½ the person's body weight (in pounds) in fluid ounces

Remove/Avoid

- Avoid inflammatory foods: processed foods, starchy foods, high glycemic foods, hydrogenated oils - **soda**
- Avoid known allergens or food triggers that might increase allergenic response
- Reduce toxic burden

Considerations

Pain in her knees, can't stand a long time and prepare a lot

- Batch cooking
- Consider ready-made meals
- Hire someone or ask for help from children or neighbor
- Slow cooker, pressure cooker

Refer to a nutritionist or health coach!!

- Nutritionist can tailor a plan to the patient's needs
- Health coaches = transformation guides

Summary of dietary Recommendations

Foundations emphasis on:

- Fiber-dense foods and lower carbohydrate diet
- Anti-inflammatory fats
- Anti-inflammatory and antioxidant properties of micronutrients an phytonutrients

Elimination diet and careful challenge (gold standard)

- Basic elimination may include gluten, dairy (casein), egg, soy, corn, peanuts, shellfish

Paleo

- Might be due to reduced carbohydrates, avoidance of processed foods, and possibly avoidance of lectin and phytic acid in grains and legumes.

Keto and Intermittent Fasting

- Benefit may be similar to paleo in addition to that from added anti-inflammatory effect of ketosis state
- Consider Fasting Mimicking Diet (FMD)

Removal of IgG/IgA and cross-reactive foods (always with goal of safe expansion)

- IgE/IgG/IgA foods
- Environmental cross-reactive foods
- Other considerations: Nightshades, low histamine, low FODMAP.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705319/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6448398/
https://www.ncbi.nlm.nih.gov/pubmed/23375693

Therapeutic Foods to Include

Healthy fats

- Extra-virgin olive oil (EVOO), nuts and seeds
- Omega-3 fat sources from food (and supplement sources 2 to 4 grams per day)

Antioxidants

- Green tea (EGCG), resveratrol, carotenoids

Fiber sources such as whole Grains and legumes (limit processing)

Focus on color

- Organic, colorful mix of low glycemic veggies & fruit as well as traditionally fermented foods

Herbs

- Cinnamon, turmeric, ginger, rosemary (and others)

Foods to Avoid or Minimize

Sources of toxins

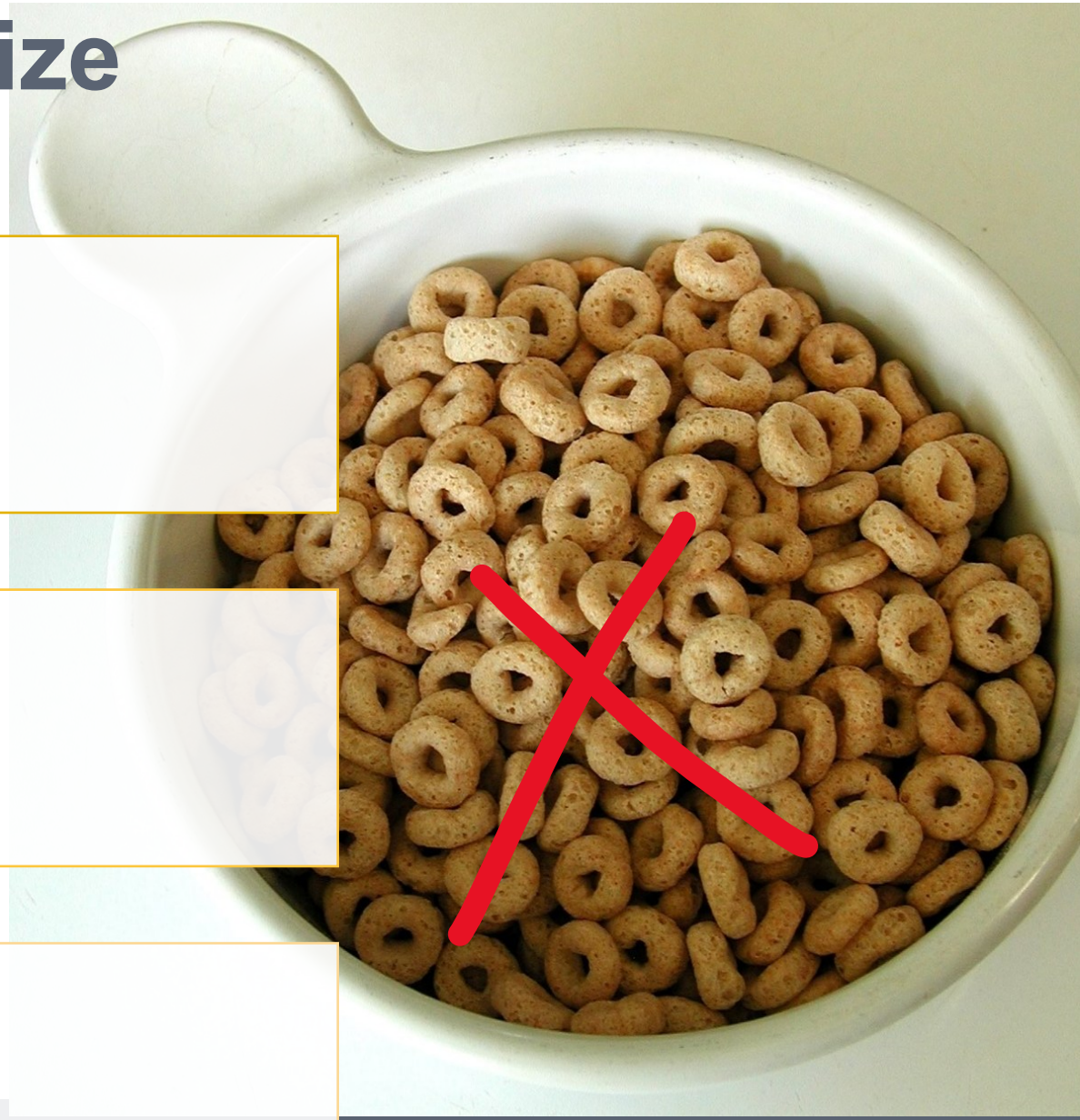
- Pesticide exposed foods
- Conventionally raised animal products
- Food or drink in plastic containers

Processed foods & refined carbohydrates

- Soda, fruit juices, sucrose, and fructose
- Artificial sweeteners
- Fast foods

AGEs

- Over-cooking foods
- Fried foods



Dietary Considerations:

- Plant-based
- Paleo
- Ketogenic
- Fasting
  - Intermittent Fasting
  - Fast Mimicking Diet (FMD)
  - Fast/modified fast

Dietary Considerations (cont.):

Elimination Diet

- Top antigenic foods and molecular mimicry (gluten, dairy, egg, corn, soy, peanut, shellfish)
- Cross-reactive (environmental cross reactions with grass and trees)
- AGEs (Advanced Glycation Products)
- FODMAPs
- Low Histamine
- Nightshades
- Sources of contamination (heavy metals, glyphosate, plastic, water contamination)

Good, Better, Best
(don’t make assumptions)

Mediterranean Diet

Paleo

Keto

Considerations for Keto:

- Compliance
- Low fiber, modulates microbiome
- Endotoxins and Intestinal permeability

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Published in final edited form as:
Mol Cell Endocrinol. 2017 November 05; 455: 4–12. doi:10.1016/j.mce.2017.01.042.

Nutrition and fasting mimicking diets in the prevention and treatment of autoimmune diseases and immunosenescence

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Abstract

Complex and coordinated signals are necessary to initiate and sustain
and differentiation of lymphocytes. These signals, which are known t
function, also depend on the metabolic state of the organism. Recent stu
type and levels of nutrients can influence the generation, survival and function of lymphocytes and therefore can affect several autoimmune diseases. Here, we review the dysregulation of lymphocytes during autoimmunity and aging, the mechanisms associated with loss of immune function, and how fasting mimicking diets and other dietary interventions affect autoimmunity and immunosenescence.

…periodic IF/FMD combines a period of severe restriction sufficiently long to promote the death of a significant portion of damaged cells with a period of high nourishment re-feeding able to promote the opposite effect on growth and other factors leading to multi-system regeneration

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6053098/

Let’s test our foundational knowledge

Other Inflammatory Considerations

Top antigenic foods and molecular mimicry

- Gluten, dairy, egg, corn, soy, peanut, shellfish

Cross-reactive

- Environmental cross reactions with grass and trees

AGEs (Advanced Glycation Products)

Dysbiosis

- SIBO, pathogens, candida, etc

Other

- Nightshades, nickel, latex, oxalates etc…

Sources of contamination

- Heavy metals, glyphosate, plastic, water contamination

Foundational Elimination Diet

- Gluten
- Dairy
- Egg
- Corn
- Soy
- Peanut
- Shellfish

Avoiding Sources of Toxins

Sources of Heavy Metals

- Mercury
- Lead
- Arsenic
- Cadmium
- Aluminum

Pesticides

Plastics

Pesticides and Herbicides

- Most conventionally grown foods are sprayed with pesticides and herbicides.
- Assess history for exposure from lawn chemicals, golf-courses, other commercially landscaped areas (driveways, roads), “grew up on a farm”.
- Chose organic, local sources
- Consider a more comprehensive detoxification program

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5007474/

Plastics

Sources

- Utensils, water bottles, food containers, can linings, coffee pods (among other)

Plastics are often endocrine disruptors

- Hormone issues, obesity, diabetes
- Drivers of inflammation

Gut dysbiosis with many downstream effects.

https://www.ncbi.nlm.nih.gov/pubmed/27490770
https://www.ncbi.nlm.nih.gov/pubmed/28936425

Laboratory Findings: Food Sensitivities (IgG4)

3+ none
2+ chia
1+ cheese/dairy egg yolk, coffee, yeast, peanut, soy, sesame, barley/gluten/rye/wheat, cantaloupe, cabbage, sweet potato

Intestinal Permeability

Consider initiating a 5R protocol

- Stool testing

Dysbiosis associated with inflammation

- Multiple factors impact microbial balance
- SIBO/SIFO
- Other pathogens
- (not to mention comorbidities)

Malabsorption

- May impact nutrient status (ability to absorb nutrients)

Maldigestion

- Contributes to endotoxemia and worsening dysbiosis

May include additional layers like

- low FODMAP
- Anti-candida plan, etc…

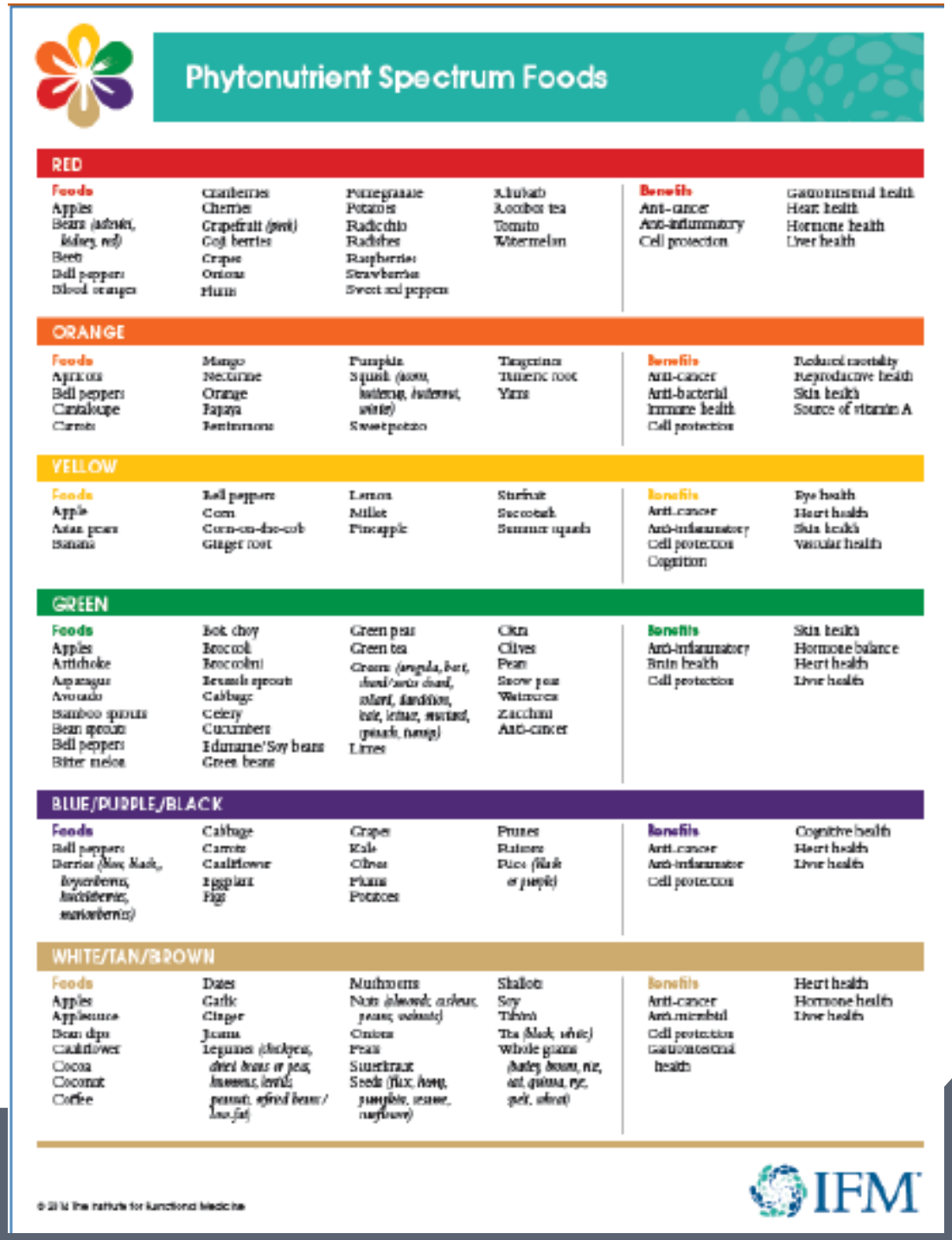
Nightshades

- White potatoes (not sweet potatoes)
- Tomatoes
- Okra
- Eggplants
- Peppers
- Goji berries

Strength of Evidence: Low

Reminder: *Eat the Rainbow*

- Color and variety
- 8 or more servings of veggies a day
- High fiber, low glycemic fruits & veggies
- LOTS of water (1/2 lbs body weight in oz)
- Minimize caffeine and alcohol
- Avoid cigarettes *(duh!)*
- Exercise
- Meditate



Phytonutrient Spectrum Foods

RED

Foods				Benefits	
Apples	Cranberries	Pomegranate	Rhubarb	Anti-cancer	Gastrointestinal health
Beans (adzuki, kidney, red)	Cherries	Potatoes	Rooibos tea	Anti-inflammatory	Heart health
Beets	Grapefruit (pink)	Radicchio	Tomato	Cell protection	Hormone health
Bell peppers	Goji berries	Radishes	Watermelon		Liver health
Blood oranges	Grapes	Raspberries			
	Onions	Strawberries			
	Plums	Sweet red peppers			

ORANGE

Foods				Benefits	
Apricots	Mango	Pumpkin	Tangerines	Anti-cancer	Reduced mortality
Bell peppers	Nectarine	Squash (acorn, butternut, buttercup, hubbard, white)	Turmeric root	Anti-bacterial	Reproductive health
Cantaloupe	Orange		Yams	Immune health	Skin health
Carrots	Papaya	Sweet potato		Cell protection	Source of vitamin A
	Persimmons				

YELLOW

Foods				Benefits	
Apple	Bell peppers	Lemons	Starfruit	Anti-cancer	Eye health
Asian pears	Corn	Millet	Succotash	Anti-inflammatory	Heart health
Bananas	Corn-on-the-cob	Pineapple	Summer squash	Cell protection	Skin health
	Ginger root			Cognition	Vascular health

GREEN

Foods				Benefits	
Apples	Bok choy	Green peas	Okra	Anti-inflammatory	Skin health
Artichoke	Broccoli	Green tea	Olives	Brain health	Hormone balance
Asparagus	Broccolini	Greens (arugula, beet, chard/swiss chard, collard, dandelion, kale, lettuce, mustard, spinach, turnip)	Pears	Cell protection	Heart health
Avocado	Brussels sprouts		Snow peas		Liver health
Bamboo sprouts	Cabbage		Watercress		
Bean sprouts	Celery		Zucchini		
Bell peppers	Cucumbers	Limes	Anti-cancer		
Bitter melon	Edamame/Soy beans				
	Green beans				

BLUE/PURPLE/BLACK

Foods				Benefits	
Bell peppers	Cabbage	Grapes	Prunes	Anti-cancer	Cognitive health
Berries (blue, black, boysenberries, huckleberries, marionberries)	Carrots	Kale	Raisins	Anti-inflammatory	Heart health
	Cauliflower	Olives	Plum (black or purple)	Cell protection	Liver health
	Eggplant	Plums			
	Figs	Potatoes			

WHITE/TAN/BROWN

Foods				Benefits	
Apples	Dates	Mushrooms	Shallots	Anti-cancer	Heart health
Applesauce	Garlic	Nuts (almonds, cashews, pecans, walnuts)	Soy	Anti-microbial	Hormone health
Bean dips	Ginger		Tofu/tempeh	Cell protection	Liver health
Cauliflower	Jicama	Onions	Tea (black, white)	Gastrointestinal health	
Cocoa	Legumes (chickpeas, dried beans or peas, hummus, lentils, peanuts, refried beans/low-fat)	Pears	Whole grains (barley, bulgur, rice, oat, quinoa, rye, spelt, wheat)		
Coconut		Sauerkraut			
Coffee		Seeds (flax, hemp, pumpkin, sesame, sunflower)			

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FUNCTIONAL MEDICINE
Continuing Education

Role of supplements

Nutraceuticals

- Vitamin A and beta-carotene
- Vitamin C
- Vitamin D
- Vitamin E (mixed tocopherols)
- Fish oil
- Specialized proresolving mediators (SPMs)
- Papain and Bromelain

Botanicals

- Turmeric/curcumin
- Ginger (Zinigiber officinale)
- Quercetin and related bioflavonoids
  - Catechins
  - Rutin
  - Luteolin
- Resveratrol
- Boswellia
- Caffeic acid (CAPE)
- Chinese skullcap (*Scutellaria baicalensis*)
- Devil's claw
- Cat's claw

Other considerations

Detoxification Support

- B-complex (methylated)
- NAC
- Glutathione and precursors

GI support

- 5R protocol
- Probiotics
- Prebiotics

Hormone balance

- Sex hormones
- Cortisol
- Insulin (berberine)

Nature’s Immune Modulators: Nrf2 inducers

Polyphenols, flavonoids, organosulfur

- Sulforaphane
- Garlic
- Curcumin
- Ginger
- Trans-resveratrol
- Carnosol (rosemary)
- Quercitin
- ALA
- Coffee & EGCG
- Cinnamon
- Ginko biloba

Nature’s Immune Modulators: NF-kB

Phytonutrients	Micro/macronutrients
• Resveratrol • Curcumin • Ginger • EGCG • Lycopene • Allicin (garlic) • Quercitin	• Vitamin C • Vitamin D3 • Vitamin E • Vitamin B6 • Folate • B12 • B5 • Mg • ALA • CoQ10 • EPA/DHA • Carnosine

Arachidonic Cascade Modulators: COX1 + COX2 Inhibitors

Phytonutrients/components

- Bromelain
- Ginger*
- Quercetin*
- Allicin (garlic)
- Curcumin
- EGCG

Herbals

- Willow bark
- Barberry/berberine
- Licorice
- Wild yam
- Chamomile
- Romarinic acid (rosemary)
- Chinese Skullcap
- Thyme
- Clove

Macronutrients

- EPA/DHA*

**both COX1+ COX2 activity*

Arachidonic Cascade Modulators: 5-LOX Inhibitors

Phytonutrients

- Quercetin
- Boswellia
- Curcumin
- Ginger
- EGCG

Herbals

- Chinse skullcap
- Licorice
- Thyme

Macronutrients

- EPA

Let’s test our foundational knowledge

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- Search
- Interaction Checker
- Effectiveness Checker
- Nutrient Depletion
- Pregnancy & Lactation
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apix Add

Food, Herbs, Supplements
Commercial Products
Health & Wellness
Drugs

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

Clear Print

Search Matches (Click to Add)

- Apixaban
- Aplenzin (Bupropion)
- Apo-Flurazepam (Flurazepam)
- APO-go (Apomorphine)
- APO-go Pen (Apomorphine)
- APO-go PFS (Apomorphine)
- Apo-Nitrazepam (Nitrazepam)

Selected Agents (Click to Remove)

- BOSWELLIA
- Apixaban

Results Summary (Click for Details)

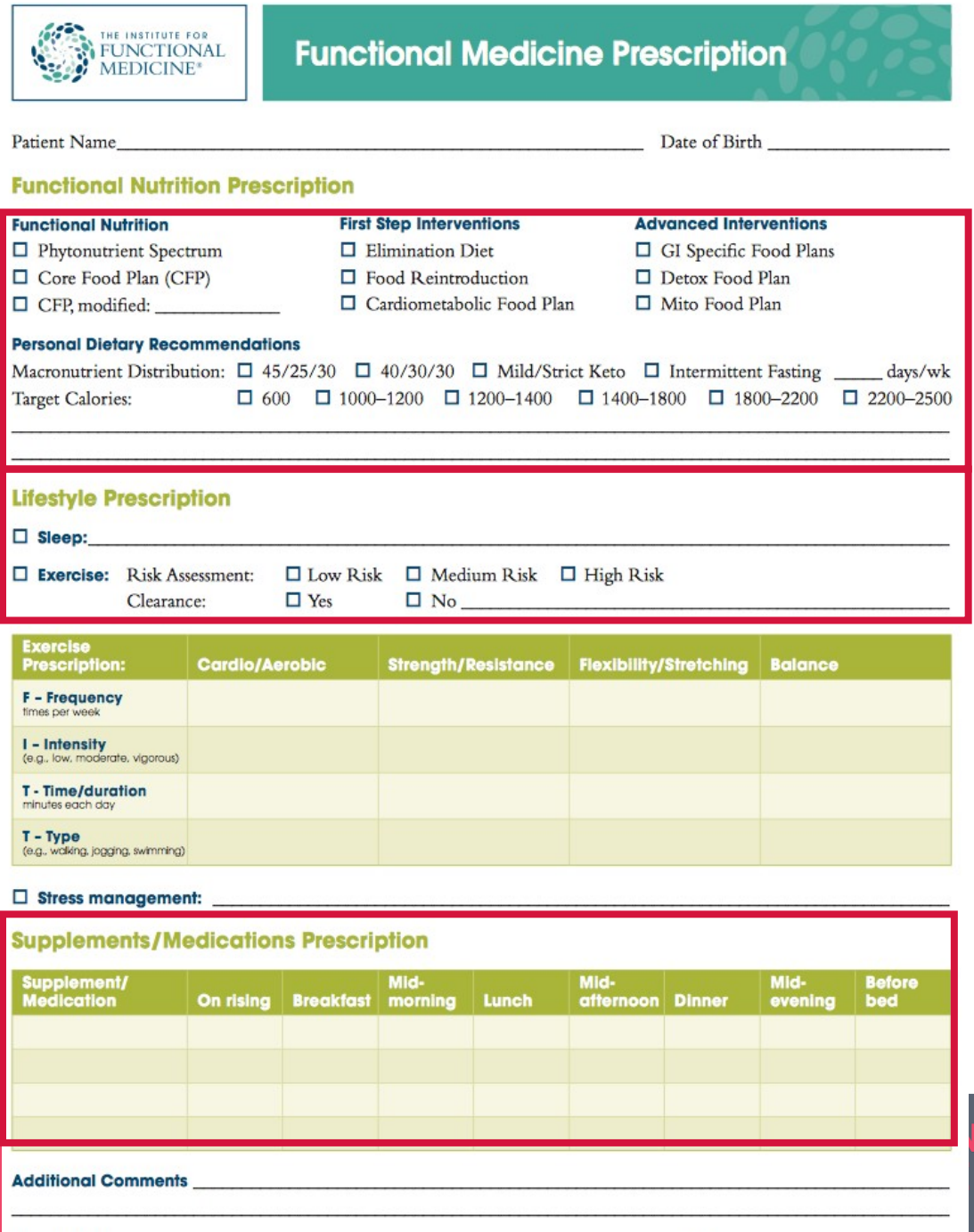
Interactions found!

Click on any interaction below for more information.

Apixaban <<interacts with>> BOSWELLIA View Details
Interaction Rating = Moderate Be cautious with this combination.

Disclaimer: Currently this does not check for drug-drug or supplement-supplement interactions. This is not an all-inclusive comprehensive list of potential interactions and is for informational purposes only. Not all interactions are known or well reported in the scientific literature, and new interactions are continually being reported. Input is needed from a qualified healthcare provider including a pharmacist before starting any therapy. Application of clinical judgement is necessary.

The Nutrition & Lifestyle Prescription



THE INSTITUTE FOR FUNCTIONAL MEDICINE®

Functional Medicine Prescription

Patient Name_____ Date of Birth _____

Functional Nutrition Prescription

Functional Nutrition
- ☐ Phytonutrient Spectrum
- ☐ Core Food Plan (CFP)
- ☐ CFP, modified: _____

First Step Interventions
- ☐ Elimination Diet
- ☐ Food Reintroduction
- ☐ Cardiometabolic Food Plan

Advanced Interventions
- ☐ GI Specific Food Plans
- ☐ Detox Food Plan
- ☐ Mito Food Plan

Personal Dietary Recommendations

Macronutrient Distribution: ☐ 45/25/30 ☐ 40/30/30 ☐ Mild/Strict Keto ☐ Intermittent Fasting _____ days/wk

Target Calories: ☐ 600 ☐ 1000–1200 ☐ 1200–1400 ☐ 1400–1800 ☐ 1800–2200 ☐ 2200–2500

_____

_____

Lifestyle Prescription

☐ **Sleep:** _____

☐ **Exercise:** Risk Assessment: ☐ Low Risk ☐ Medium Risk ☐ High Risk

Clearance: ☐ Yes ☐ No _____

Exercise Prescription:	Cardio/Aerobic	Strength/Resistance	Flexibility/Stretching	Balance
F – Frequency times per week				
I – Intensity (e.g., low, moderate, vigorous)				
T - Time/duration minutes each day				
T – Type (e.g., walking, jogging, swimming)				

☐ **Stress management:** _____

Supplements/Medications Prescription

Supplement/ Medication	On rising	Breakfast	Mid-morning	Lunch	Mid-afternoon	Dinner	Mid-evening	Before bed

Additional Comments _____

_____

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Summary

Dietary interventions to address pain and inflammation should focus on:

- Phytonutrient diversity, low-glycemic, healthy fats
- Support detoxification
- Avoid potential inflammatory triggers

Determine when to incorporate nutrient supplementation alongside dietary approaches.

- Include foundational micronutrient support for immune balance
- Don’t shy away from herbals, but use best clinical judgement when dealing with polypharmacy

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Questions?

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