



RhAPP

RHEUMATOLOGY ADVANCED
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Anti-inflammatory diet and Nine tips for staying healthy

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Books to Read

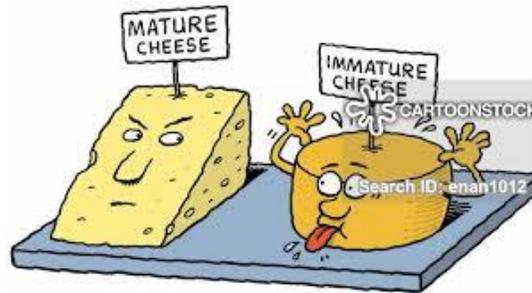


Diet and Rheumatic Diseases

- Diet modifies the clinical course of RMDs by several mechanisms¹
- Patients engage in unorthodox diets hoping to improve their symptoms
 - Results often disappointing → expertise on dietary conduct to complement modern pharmacological treatment
- Evidence often discordant: difficulty in clinical trial design and compliance issues
 - Most research focuses on RA
- General consensus: fruits, vegetables and whole grains may prevent several chronic diseases
- Red and processed meats, refined grains and sugars increase risk

Do dietary interventions improve disease control?

- Diet modifies circulating pro/anti-inflammatory cytokines affecting pain/inflammation
- “Westernization” of diet: ↑ incidence/prevalence several autoimmune diseases
 - Pro-inflammatory: refined carbohydrates, gluten, trans/saturated fatty acids (FA), dairy (milk/cheeses), red meat



- Omega 6/3 polyunsaturated FA (PUFA) ratio increased 16/1
- Long chain omega-3 PUFA (chia seeds, flaxseeds, fatty fish), monounsaturated FA (MUFA) (avocado, sesame, nuts), antioxidants, phytochemicals, flavonoids, present in vegetables/fruits (minimal in Western diet)

5 Pillars of Disease Prevention

- **Angiogenesis:** growing new blood cells
- **Regeneration:** growing new stem cells
- **Microbiome:** maintaining balance preventing dysbiosis
- **DNA protection:** maintaining health of self
- **Immunity:** protecting our host defense system

Eat to Beat Disease, New science of how your body can heal itself, William W. Li, MD

#1 Excessive Angiogenesis vs Insufficient Angiogenesis

- Rheumatoid arthritis
- Psoriasis
- Obesity
- Cancers
- Macular degeneration
- Alopecia
- Erectile dysfunction
- Neuropathy
- Poor wound healing

Eat to Beat Disease, New science of how your body can heal itself, William W. Li, MD, Page 15

#2 Regeneration and stem cell diseases vs causes

- Osteoarthritis
- Osteoporosis
- Cancers
- Aging
- Athrosclerosis
- Scleroderma
- Kidney disease *
- Toxic chemical exposure
- U/V light
- Tobacco
- Excessive ETOH

Disease of Dysbiosis

Mental illness

IBD

Psoriasis

Rheumatoid arthritis

Asthma

GI cancers

#4 breakdown of DNA

Disease of
breakdown of
DNA protection:
your telomeres
are shrinking

Systemic Lupus

Alzheimer's disease

Atherosclerosis

Cancers

Celiac disease

Diabetes

#5 Disease due to immune dysfunction

Diseases due to breakdown of balanced Immunity

AIDS

COV19?

Asthma

Allergies

Crohn's Disease

MS

Rheumatoid Arthritis

Eat to Beat Disease, New science of how your body can heal itself, William W. Li, MD, pages 74-92.

Radical Remission: Surviving Cancer Against all Odds by Kelly A Turner PhD

9 survival tips: what did they have in common?

Radically changing your diet

Taking control of your health

Following your intuition

Using herbs and supplements

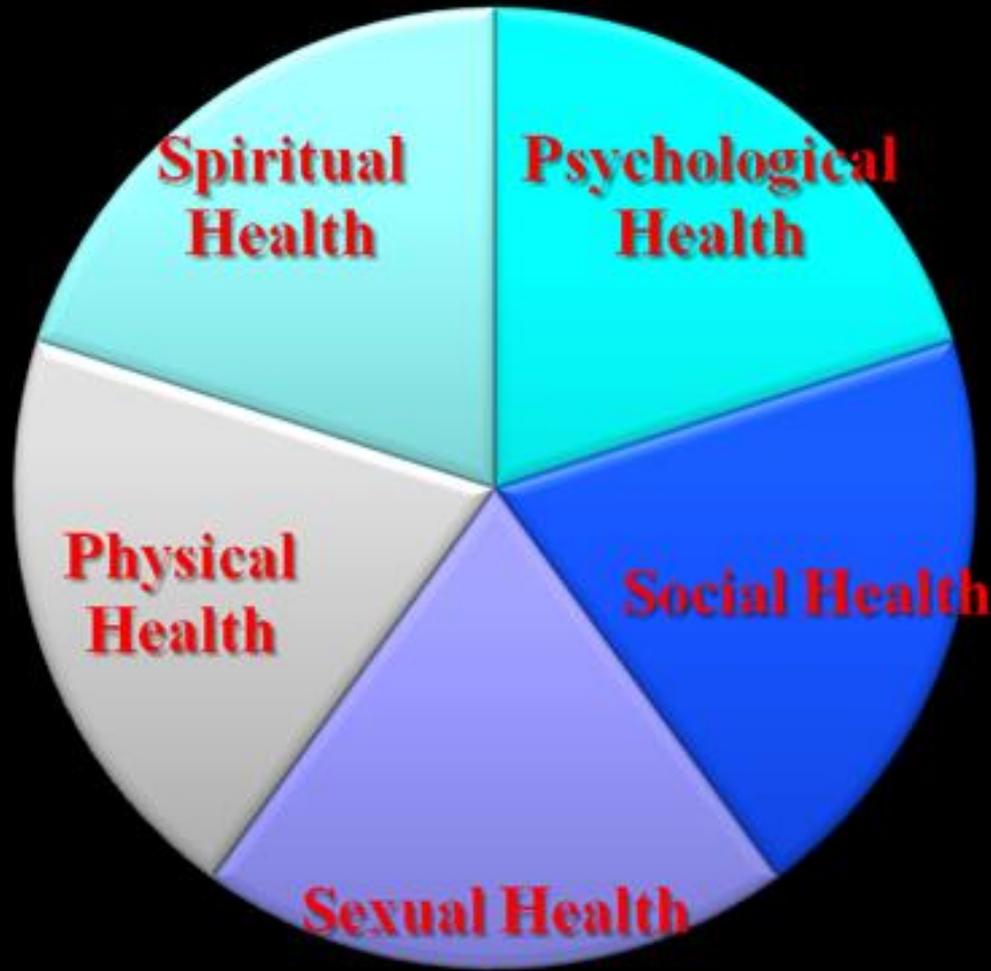
Releasing suppressed emotions

Increasing positive emotions

Deepening your spiritual connection (whatever that means to you)

Having a purpose or strong reason to live

American Pie



- Psychological Health
- Social Health
- Sexual Health
- Physical Health
- Spiritual Health

How to fix your guts

- **Microbiome Good vs Bad gut bacteria.** If normal gut bacteria are NOT present then the chemicals in the brain that regulate your nervous system, prevent depression and help with energy do not function well. 90 % of your Serotonin (happy hormone) comes from your gut bacteria. Probiotics can help.
- 2 hours of psychological stress can completely change your gut bacteria.
- Prebiotics: leeks, onion, garlic, apples, asparagus, bananas, cabbage, broccoli, greens, oats, Quinoa, walnuts and Papaya.
- Probiotics: Apple cider vinegar, fermented foods like sauerkraut, kimchi, kombucha, miso, olives, kefir, plain greek yogurt.
-
- Reduce or eliminate sugar
- 2 cans of any soda/pop increases the risk of depression by 25%.
- **NO artificial sweeteners.** Many of them are toxic to the nervous system, they cause suppression in chemical messengers.
- **Reduce fried food intake.**
- **Avoid Nitrates** such as lunch meat, salami and sausage as they can worsen bipolar depression.
- Stop the PPI's!!
- **Foods to fight heartburn**: aloe vera, apple cider vinegar, pears, bananas, brown rice, celery and celery juice, ginger root, pineapple.

The above information was sourced from: *Superlife* by Darin Olie, *Radical Remissions* by Kelly Turner and *This is your Brain on Food* by Uma Naidoo, MD

Benefits of Omegas

- **Omega 3 vs 6.** Omega 6 is okay in small amounts. If you have too much omega 6 (bad fats) and too little omega 3 then your inflammation can be worse in BOTH joints and brain. Individuals who Eat from a Mediterranean Diet/lifestyle have 4 times lower risk of depression.
- Examples are fatty fish such as salmon, tuna, herring, sardines, mackerel, avocado, walnuts, olive oil, dark leafy vegetables, edamame, chia seeds, nut butter like almond or cashew butter.
- Recommend 2,000mg daily.

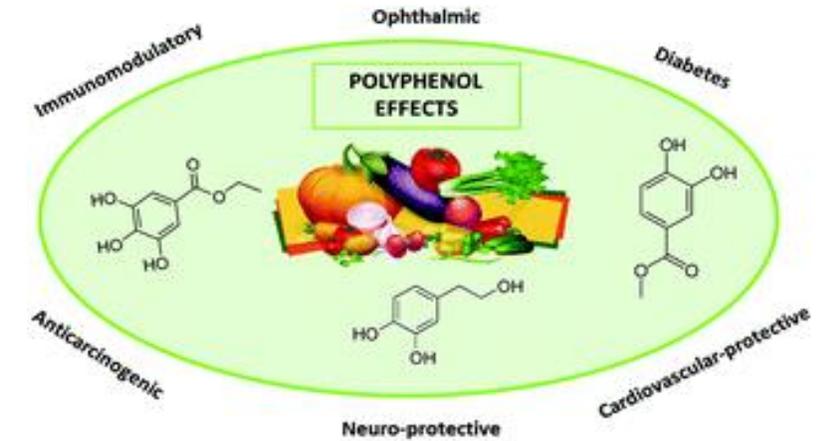
- .Omega 3 is very important for:
 - Metabolism
 - Cell membranes
 - To make healthy hormones
 - Regulate blood clotting
 - Contraction and relaxation of muscles and blood vessels
 - Inflammation (especially decreased IL6 which is increased in RA)
 - Decreasing anxiety



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- Polyphenols (i.e., epigallocatechin 3-gallate (EGCG)), most abundant catechin in tea, interferes with NF- κ B pathway.

- In RA, EGCG downregulates anti-apoptotic proteins (Mcl-1* in synovial fibroblasts), \uparrow apoptosis and \downarrow MMP-3 production \rightarrow beneficial effects on bone/cartilage



- Omega-3 PUFAs inhibit oxygen free radical production and redox-sensitive transcription factors (NF- κ B), involved in pro-inflammatory pathways¹
- Diet-derived PUFAs \downarrow prostaglandins and leukotrienes.
- Inverse correlation: fish consumption and RA incidence².
 - Long-term fish consumption (> 0.21 g/day, ≥ 1 portion/week fatty fish (salmon), or ≥ 4 portions/week lean fish (cod)) \rightarrow 52% \downarrow RA risk



*Mcl-1: antiapoptotic molecule critical for T and B lymphocytes and macrophage survival

1. Gioxari A, et al. Nutrition. 2018;45:114–124.e4. 2. Matsumoto Y, et al. Clin Nutr. 2018;37(2):675–80., from: Orrin

M. Troum, MD

Keck School of Medicine

University of Southern California RWCS 2021 talk



Vitamins and Why?

- B9 = folate deficiency can cause poor neonatal growth, mental sluggishness and gingivitis. Recommend 1-4mg daily.
- B12 deficiency: causes folate deficiency and loss of brain cells and depression.
- Eat more: legumes (peas, chickpeas, beans, peanuts and asparagus), citrus fruits, bananas, nuts, seeds, fish shellfish, avocado and leafy green and cruciferous vegetables like broccoli and cauliflower. Recommend 1000mcg daily.
- B1 and B6 deficiency can cause depression and mood swings. Recommend 50-100mg daily.
- Eat more whole grains like Quinoa, brown rice or Oats and fermented foods such as kimchi, sauerkraut, brazil nuts etc.
- Vitamin A deficiency can cause shrinkage in certain brain areas. Getting enough vitamin A helps how the brain responds to stress, fatigue and depression. Recommend 700-900mcg daily)
- Foods: sweet potato, carrots, spinach, black eye peas
- Vitamin C deficiency can cause depression. Eat more cantaloupe, strawberries, broccoli, cauliflower, brussels sprouts. Recommend 1000mg daily.
- Vitamin D important for bone, immune system and thyroid health This is the #1 ingredient in regulation of cancers. Low D has been found to increase risk of anxiety and depression. Recommend 5000 IU daily or keeping level > 40.
- Vitamin E decreases free radicals, decreases cellular stress and decreases cancer risk, inflammation in the body and heart disease risk. Foods high in vitamin E include: sunflower seeds, roasted almonds, hazelnut, peanut butter, spinach, broccoli, tomato.
- Iron deficiency can lead to issues with the covering on the neurotransmitters (communication highway of the brain) Eat more Shellfish, lean red meat, legumes, pumpkin seeds, broccoli and dark chocolate, coconut, macadamia nuts, raisins, Swiss chard. Recommend 300 mg twice daily.
- Magnesium. Increased intake of Mg can help with rapid recovery of depression. May also decrease anxiety, and help with muscle tightness and spasms. Eat more: avocado, nuts and seeds, legumes, whole grains, edamame, and Omega rich fish. Works fast and can help depression as soon as 1 week. Recommend 125 mg to 300mg daily.
- Zinc can help to protect your immune system and help with brain inflammation. Eat more seafood, lean beef, poultry, beans, nuts, asparagus, green peas, prunes, pumpkin seeds, spinach and whole grains. Recommend 50mg-100mg daily.

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Spices

Spices:

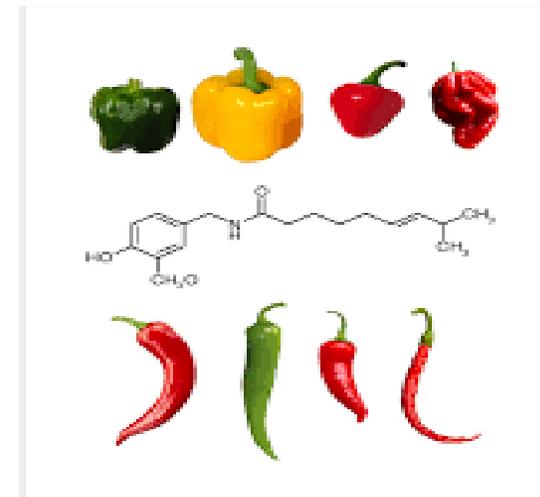
- 1.Saffron: 15mg of saffron is equivalent to 20mg of prozac in a study. Best to use as a seasoning in food.
- 2.Turmeric (Curcumin) helps with inflammation in joints, and protects the brain from toxins. Best if it also has black pepper in it or if you season your food with black pepper to increase absorption. Recommend 500mg to 2000mg daily.
- 3.Oregano (carvacal) protects the brain and helps with depression in animals.
- 4.Ginger naturally fights inflammation and reduces joint pain.
- 5.Lavender, passionflower, and camomile help with anxiety and best if from teas.
- 6.Green Tea is especially great for weight loss and inflammation. It contains antioxidants which can decrease risk of some types of cancer. Contains polyphenols EGCG

- Curcumin and capsaicin exert regulatory effects on oxidative stress and inflammation
- Turmeric root: Ayurvedic and Chinese medicine (2500 BCE), recently received scientific attention for its powerful antioxidant and anti-inflammatory properties¹
 - Curcumin ↓ inflammation by blocking NF-κB pathway and COX-2²
 - In vitro, curcumin blocks IL-1 and IL-6 expression in RA synoviocytes.

Curcumin



Capsaicin



Best foods for Joint pain

Avocado

Black Pepper

Chili Peppers

Olive Oil

Ginger

Nuts (Almonds,
Brazil, Walnuts
and Pecans)

Pineapple

The above information was sourced from: *Superlife* by Darin Olie, *Radical Remissions* by Kelly Turner and *This is your Brain on Food* by Uma Naidoo, MD

Best Foods for Muscle Pain

Nuts

Eggs (organic free range)

Garlic

Leafy Greens (Kale and Spinach)

Pumpkin Seeds

Quinoa

The above information was sourced from: *Superlife* by Darin Olie, *Radical Remissions* by Kelly Turner and *This is your Brain on Food* by Uma Naidoo, MD



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- **Let's talk about MOOD and MEMORY**

- High blood sugar affects the ability of the hippocampus to react to stress. Consuming sugary drinks and soda exacerbates PTSD and anxiety.
- Many studies have shown that the B complex can reduce anxiety by reducing inflammation in the brain.
- Multivitamins have been shown to reduce stress and anxiety after one month.
- Foods to Avoid: Red Meat, fried foods, white bread, white rice, white potato, gluten (some people are sensitive but not allergic) artificial sweeteners. Sugar such as baked goods, candy, soda or anything sweetened with sugar or high fructose corn syrup. MSG, an additive in many foods can also make anxiety and depression worse.
- Foods to Reduce: Alcohol: recommend no more than one drink per day. Caffeine: recommend no more than 400mg/day = one Grande starbucks. High Fat foods such as fast foods. .

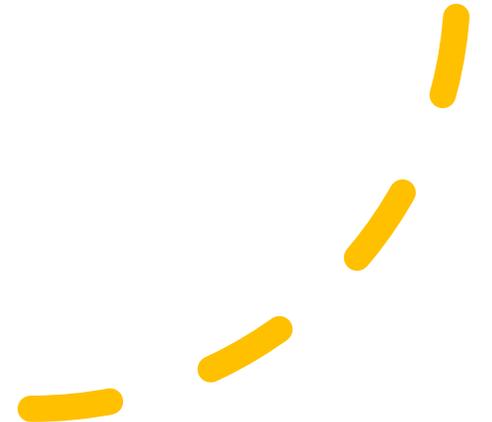
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Best Foods for PTSD

- Blueberries
- Omega 3 foods
- Flaxseed oil
- Sunflower seeds
- Roasted almonds
- Hazelnut
- Peanut butter
- Spinach
- Broccoli
- Raw tomato
- Ginkgo Biloba

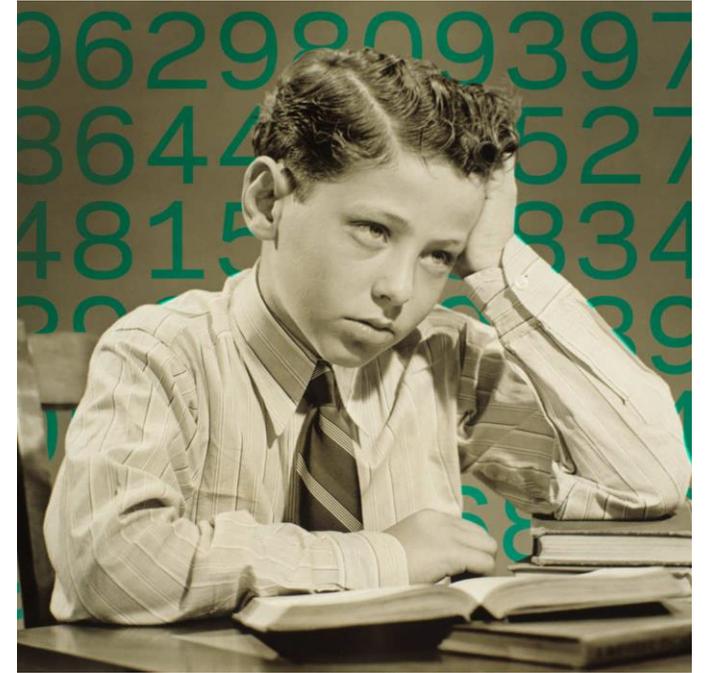


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Best Foods for Anxiety

- Beans
- Brown Rice
- Berries
- Bran
- Pears
- Apples
- Bananas
- Broccoli
- Brussel Sprouts
- Carrots
- Artichokes
- Almonds, walnuts
- Oats

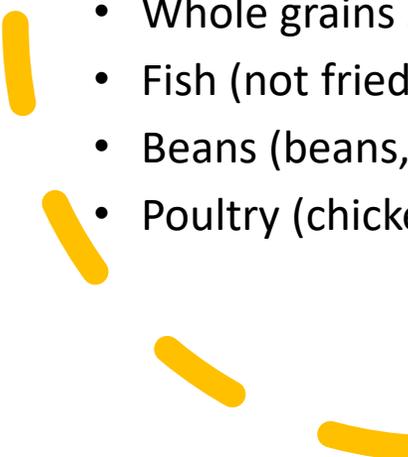


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- **Mind Diet Foods for Brain Fog and Ideal Serving Sizes**

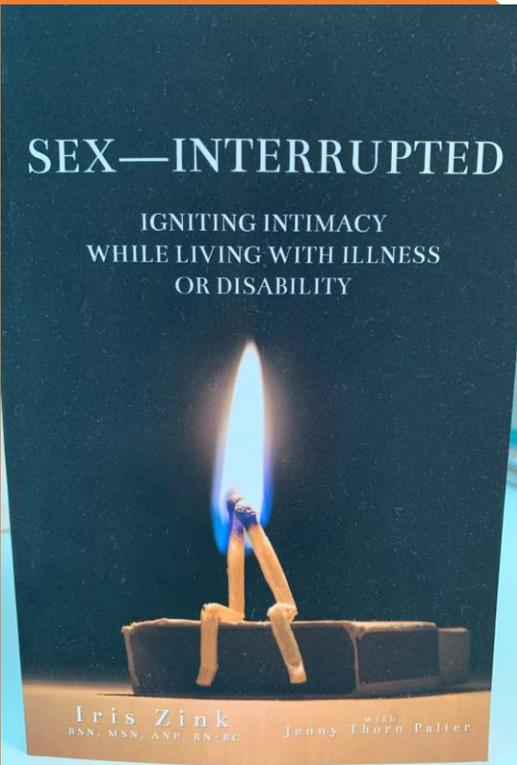
- Green leafy vegetables (kale, collards, greens, spinach, lettuce) 6 servings per week.
 - Green/red peppers, squash, carrots, broccoli, celery, potatoes, peas, or lima beans, tomatoes, string beans, beets, corn, zucchini/summer squash, eggplant. 1+ serving per day.
 - Berries (strawberries, blueberries, raspberries, blackberries) 2 or more servings per week.
 - Nuts 5 or more servings per week.
 - Olive oil use as your primary oil.
 - Whole grains 3 or more servings per day.
 - Fish (not fried) such as salmon, herring, mackerel, tuna, anchovy, rainbow trout. 1 or more meals per week.
 - Beans (beans, lentils, soybeans) more than 3 meals per week.
 - Poultry (chicken or turkey) 2 or meals per week.
- 

The above information was sourced from: *Superlife* by Darin Olie, *Radical Remissions* by Kelly Turner and *This is your Brain on Food* by Uma Naidoo, MD



- **Foods for FATIGUE:**
- Anti-inflammatory foods: Omega 3 and colorful vegetables.
- Minerals such as zinc and magnesium.
- Vitamins B1, B6, B12, C, D and E.
- Capsaicin -rich foods: Chili peppers including cayenne, serranos, and jalapenos.
- Spices: Black cumin and tumeric

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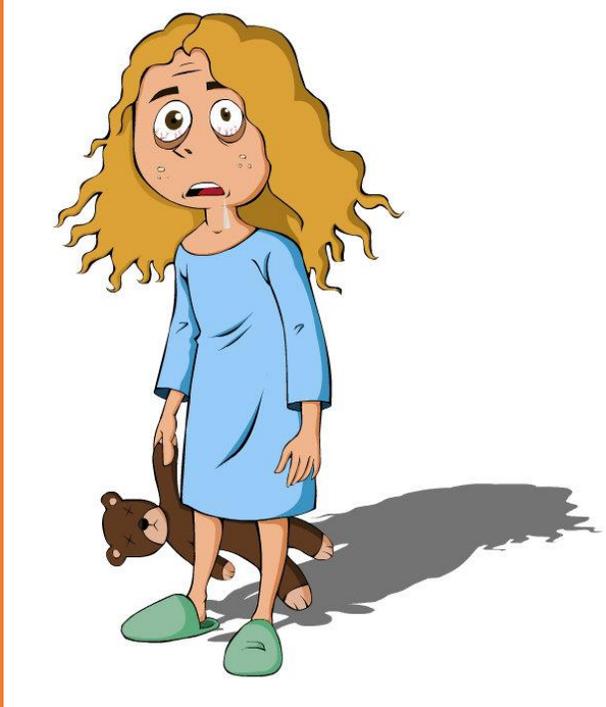
- **Foods for your SEX LIFE:**
- Oxytocin Boosters: Dark chocolate, magnesium, essential amino acids (meat, grains, milk, dairy, vegetables and eggs).
- Coffee less than 400mg a day.
- Red Wine: no more than one glass per day
- Nuts: Pistachios, almonds, and walnuts.
- Apples
- Pomegranate juice (no sugar added)
- Onions, Avocado
- Herbs and spices such as Saffron and Fenugreek.
- **Foods that lower sex drive**
- Red meat, fried foods
- White bread, white rice, pasta, white potatoes, anything high in sugar or refined flour.
- Sugar: Baked goods, candy, soda, or anything containing high-fructose corn syrup.
-

The above information was sourced from: *Superlife* by Darin Olie, *Radical Remissions* by Kelly Turner and *This is your Brain on Food* by Uma Naidoo, MD.

- **Foods for Alopecia:**

- Grains and seeds
- Onions
- Red Leaf Lettuce
- Cranberries
- Black plums
- Apples





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- **Insomnia and Fatigue Food Fixes**
- High fat, high carbohydrate diets decrease slow wave sleep, which makes us feel rested, and REM sleep which helps to memory and brain power.
- **Foods to Avoid:**
- Caffeine
- Alcohol
- **Foods to Embrace:**
- Omega 3 fatty acids: fatty fish like salmon, mackerel, tuna, herring and sardines.
- Melatonin: Eggs, fish, milk, rice, barley and rolled oats, grapes, pomegranates, walnuts, sunflower seeds, asparagus, broccoli and cucumber.
- Tryptophan: Turkey, other meats, chickpeas.
- L-ornithine: Meat, eggs, poultry, fish, soybeans, quinoa.
- Camomile (nature's xanax)

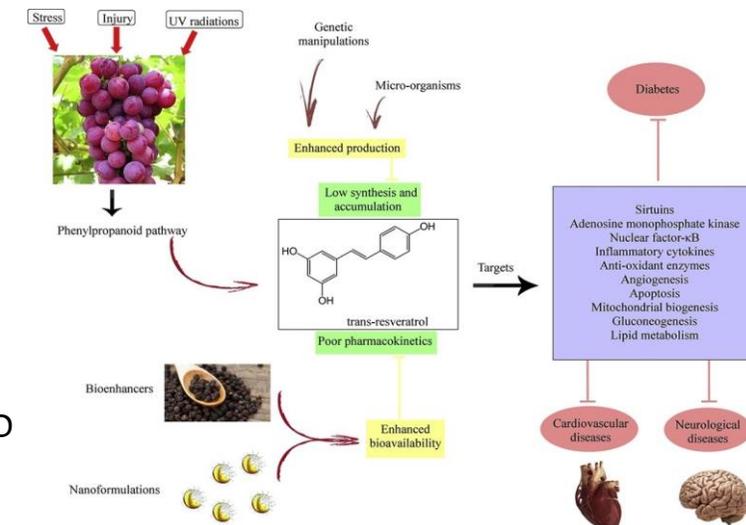
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- MedDiet has high antioxidant substances

- Free radicals → oxidative stress; may contribute to autoimmune diseases, cancer, CVD, aging
- Oxidative stress neutralized by endogenous mechanisms and exogenous substances (phytochemicals, vitamins)
- Dietary antioxidants: fruits, vegetables, nuts, cocoa, cereals: potent anti-inflammatory function
- Red fruits (raspberries, strawberries, blueberries): antioxidant, anti-inflammatory and analgesic effects. ↓ pain/inflammation in vitro and humans with arthritis.
- Resveratrol: Grapes, cherries and red wine: antioxidant rapidly absorbed in GIT inhibiting nuclear factor κB (NF-κB)¹



- RA (in vitro): resveratrol ameliorated synovitis by ↓ inflammatory cell infiltration, angiogenesis, oxidative stress and inducing synovial cell apoptosis
- Resveratrol ↓ Th-17 cell expansion, pro-inflammatory cytokines, RF levels, MMP-3 and ↑ anti-inflammatory mediators (IL-10)



1. Pannu N, et al. Biomedicine & Pharmacotherapy Volume 109, January 2019, Pages 2237-2251, from: Orrin M. Troum, MD Keck School of Medicine University of Southern California RWCS 2021 talk

MTHFR gene mutation

- Methyl tetrahydrofolate reductase is a gene that instructs the body on how to convert, absorb, and use B vitamins
- Influences liver detoxification, neurotransmitter clearance in the brain, and helps to remove inflammation from the body
- The gene mutation is associated with: fatigue, vitamin deficiencies, increased food sensitivities, fibromyalgia, increased risk of heart disease, stroke, high blood pressure, cancers, dementia, autoimmune diseases, depression, anxiety, ADHD, addiction, infertility, diabetes, and weight gain/difficulty losing weight
- 2 variants: A1298C & C677T
- C677T variant more significant - usually more symptoms exhibited; more likely to have elevated homocysteine levels
- Heterozygous type - 30% deficiency
- Homozygous type - 70% deficiency

PEARLS:

- MTHFR testing with every new patient - **50% of the population is affected!**
- MTX & folic acid vs methyl folate
- Treatment: methylated B vitamins & 1-2 servings of leafy-green vegetables daily
- Have patients check food labels for hidden folic acid

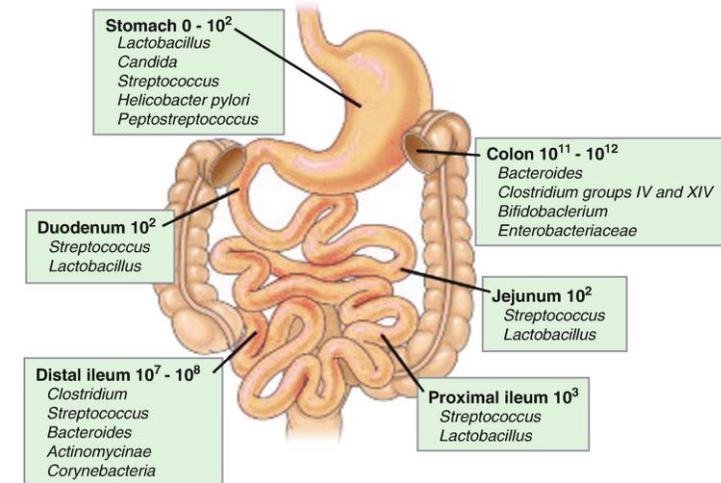
Summary

Give patients tools and hope

Eating better is less expensive than being sick

Believe that you can heal yourself and prevent disease

- Pathogenesis of chronic inflammatory disorders: **disruption of gut microbiota composition**¹
 - Alterations in gut microbial composition (dietary/antibiotics), creates “dysbiotic state” promoting a pro-inflammatory phenotype
- **RA:** Dysbiosis of gut microbiota is associated with disease progression
- Imbalance between “beneficial” and potentially “harmful” bacteria in RA:
 - ↓ GI **Bifidobacteria** and ↑ **Enterobacteria and Staphylococcus**)
 - ↑ **Prevotella copri** correlates with disease onset/severity
 - ↓ **Prevotella copri** in RA improves disease activity



- **SpA:** HLA-B27(+) rats (experimental models) → SpA-like disease with exposure to particular pathogen-free enteric bacteria
 - Gut dysbiosis drives naïve CD4+ T cell differentiation → Th-17 subset → autoimmune arthritis (mouse model)
 - PsA susceptibility associated with microbiota composition and toll-like receptors (TLRs) genetic polymorphisms
- **SLE:** modified **Firmicutes/Bacteroidetes ratio** vs healthy controls, ↓ species variety and > Gram(-) bacteria

Threshold Level for Long-term Healthy Diet Adherence to Reduce RA Risk in a Female Prospective Cohort

- Nurses' Health Study (NHS): eating healthier diet, measured by Alternative Healthy Eating Index (AHEI), associated with reduced risk of sero(+) RA in younger women
- N=83,585 in NHS II (1995-2017) prospective cohort
- Lifestyle, diet, and health by validated questionnaires biennially
 - >1,475,223 person years: 337 confirmed incident RA
 - Baseline: ~ age: 40.3 years, mean AHEI score: 57.1 points
- 22 years f/u: mean AHEI score improvement of 9.1 points
- RA risk reduced > 50% (RR 0.43) with long-term adherence to healthier diet with a AHEI score ≥75
 - Risk reduction similar for sero(+) and sero(-) RA

Table 1. Dietary changes required to improve Alternative Healthy Eating Index (AHEI) diet score.

AHEI Components	Change required to achieve 1-point improvement in AHEI diet score
Fruit	Adding 0.4 servings per day
Vegetables	Adding 0.5 servings per day
Nuts and legumes	Adding 0.1 servings per day
Whole grains	Adding 7.5 grams per day
Long-chain omega-3 fatty acids	Adding 25 mg per day
Polyunsaturated fat	Adding 0.8% of total energy
Trans fat	Eliminating 0.35% of total energy
Red and processed meat	Eliminating 0.15 servings per day
Sugar-sweetened beverages	Eliminating 0.1 servings per day
Sodium	Eliminating 222 milligrams per day
Alcohol	Eliminating 0.2 drinks per day

Table 2. Estimated RA risk following long term adherence to AHEI (1995-2017)

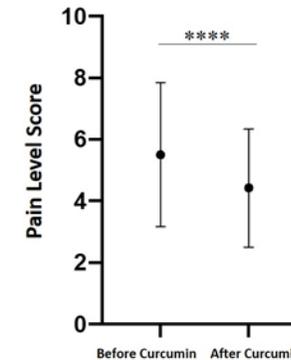
Long-term AHEI diet score adherence models ¹	Percentage of women with long-term adherence to diet score at or above cut-point	All RA		Seropositive RA		Seronegative RA	
		RR	95% CI	RR	95% CI	RR	95% CI
Model 1: AHEI score ≥ 60 v. <60 <i>Least healthy diet</i>	40.3%	0.92	(0.59, 1.44)	1.04	(0.62, 1.75)	0.74	(0.32, 1.72)
Model 2: AHEI score ≥ 65 v. <65	28.6%	0.94	(0.62, 1.43)	1.13	(0.69, 1.84)	0.63	(0.29, 1.37)
Model 3: AHEI score ≥ 70 v. <70	18.6%	0.72	(0.48, 1.06)	0.75	(0.45, 1.26)	0.63	(0.35, 1.12)
Model 4: AHEI score ≥ 75 v. <75 <i>Most healthy diet</i>	11.1%	0.43	(0.27, 0.67)	0.41	(0.22, 0.74)	0.47	(0.25, 0.91)

Adherence to higher quality diet (AHEI score ≥75) lowers RA risk > 50% in women

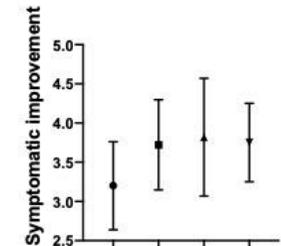
Curcumin: Prevalence and Perceived Efficacy in RA and PsA Treatment

- Observational, cross-sectional study
 - Qualtrics survey questionnaire regarding curcumin use, source, form, method, dose, patient perceptions of efficacy and side effects
- N=291. RA=84.9%, PsA=5.1%. 82.3% women; 17.7% men
- 37.2% on curcumin supplementation (not dietary). Majority from local store (54.3%), supplemented QD (53.4%) by capsule (59.2%), and dosed 0-200 mg/day or 200-500 mg/day
- Curcumin taken for years perceived ↓ symptoms (pain, swelling, stiffness, fatigue) vs shorter therapy (days, weeks, or months)
- Symptoms improved significantly with 200 - 1000 mg vs < 200 mg and QD or BID vs sporadic dosing
 - Pain (35.7%), swelling (25%), stiffness (23%) and fatigue (16%)

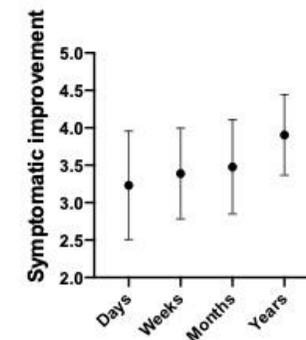
Pain level perception before vs after curcumin therapy



Correlation between symptomatic improvement and curcumin dosed



Correlation between symptomatic improvement and duration of curcumin therapy



RA and PsA patients on long-term curcumin reported decreased pain, swelling, fatigue, and stiffness.