



Anti-Inflammatory Diet and Foods

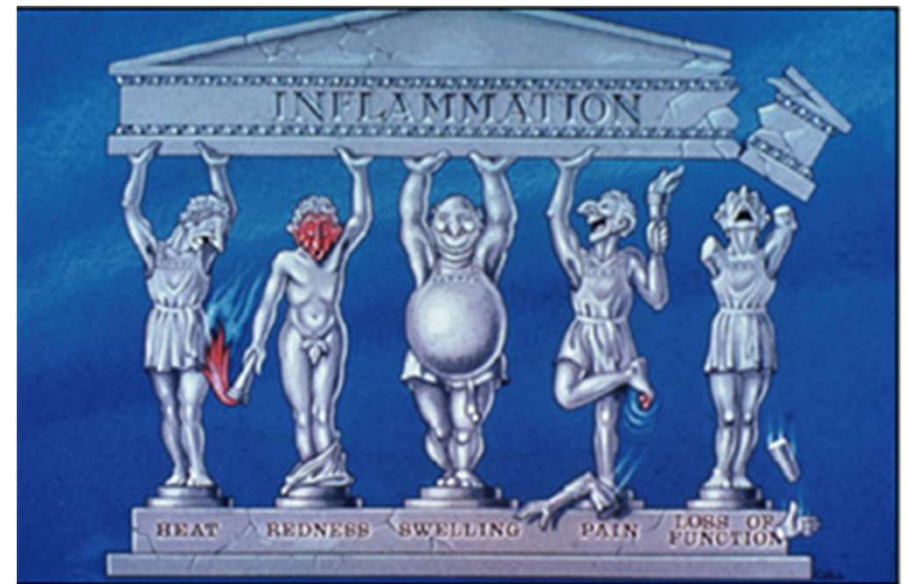
Mladen Golubić, MD, PhD, FACLM
Professor, Medical Director
UC Center for Integrative Health and Wellness

Stephanie Michalak White, EdD
Chef, Auguste Escoffier School of Culinary Arts

May 14, 2022

Inflammation

- Latin, *inflammare* = to set on fire
- Biological response of tissues to harmful stimuli (pathogens, damaged cells and irritants)
- Characterized by:
 - Redness
 - Heat
 - Swelling
 - Pain
 - Loss of function



Nature Reviews | Immunology

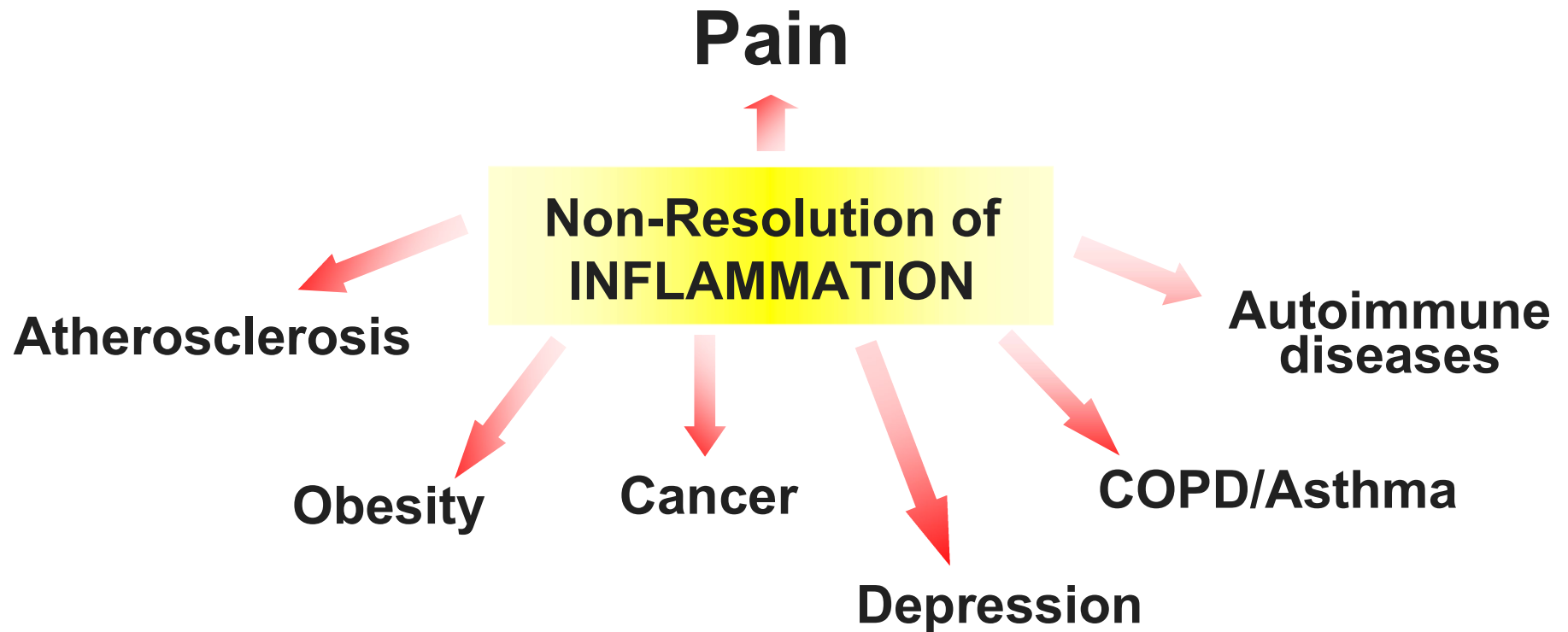
<http://en.wikipedia.org/wiki/inflammation>
Lawrence T et al., *Nature Rev Immunol*, 2002

Chronic inflammation in the etiology of disease across the life span

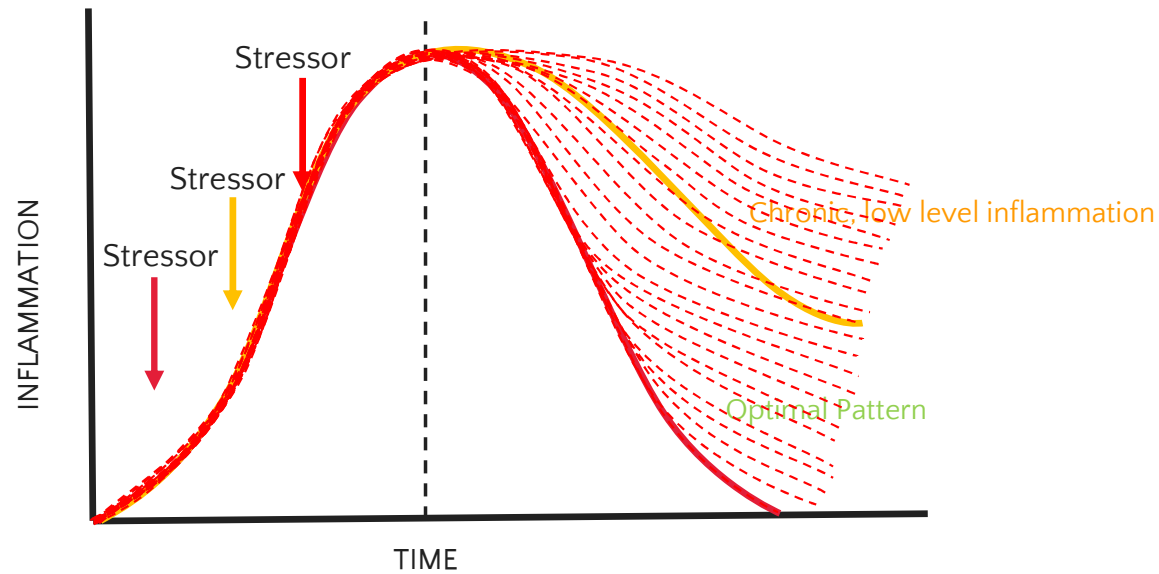
David Furman^{1,2,3,4*}, Judith Campisi^{1,5}, Eric Verdin¹, Pedro Carrera-Bastos⁶, Sasha Targ^{4,7}, Claudio Franceschi^{8,9}, Luigi Ferrucci¹⁰, Derek W. Gilroy¹¹, Alessio Fasano¹², Gary W. Miller¹³, Andrew H. Miller¹⁴, Alberto Mantovani^{15,16,17}, Cornelia M. Weyand¹⁸, Nir Barzilai¹⁹, Jorg J. Goronzy²⁰, Thomas A. Rando^{20,21,22}, Rita B. Effros²³, Alejandro Lucia^{24,25}, Nicole Kleinstreuer^{26,27} and George M. Slavich²⁸

- **intermittent** increases in inflammation are critical for survival during physical injury and infection
- systemic **chronic** inflammation → chronic disease

NonResolving Inflammation



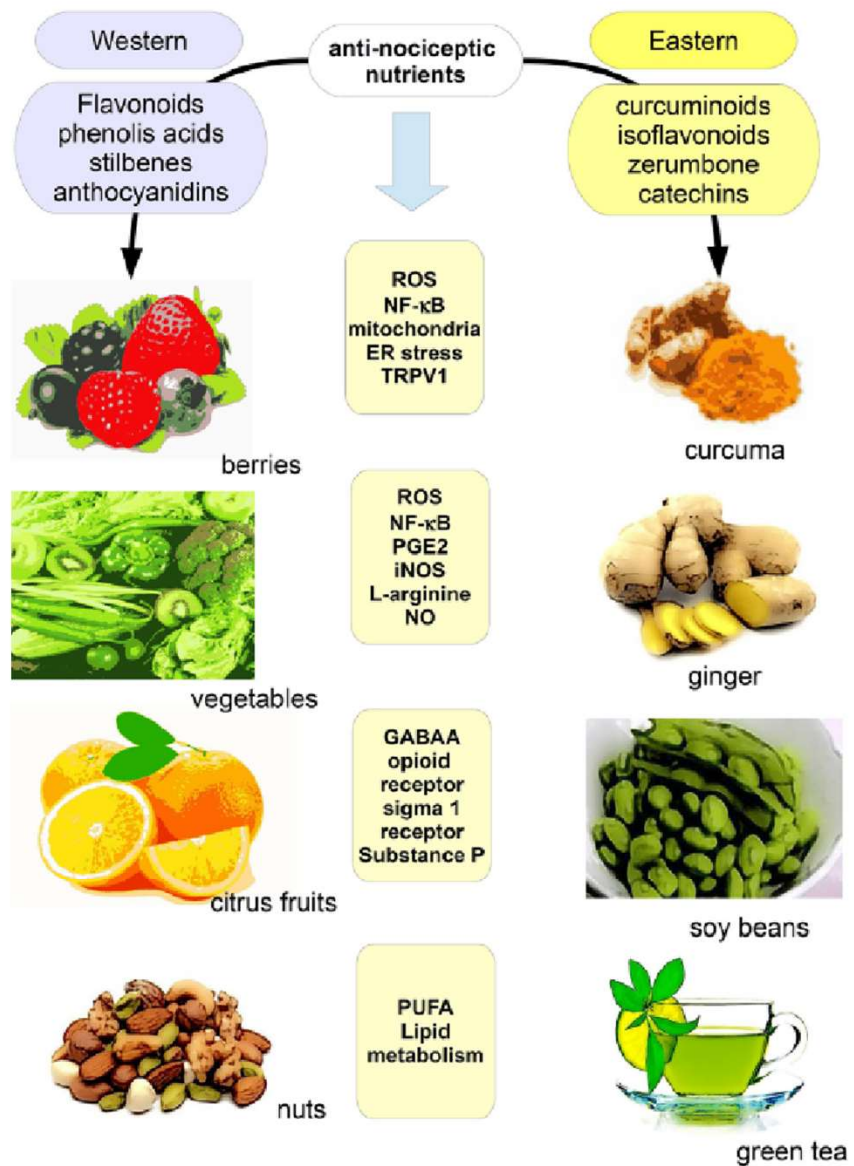
Importance of Returning to Baseline



Modified_ Courtesy of Dr. Adi Haramati

Anti-Inflammatory Diet in Clinical Practice

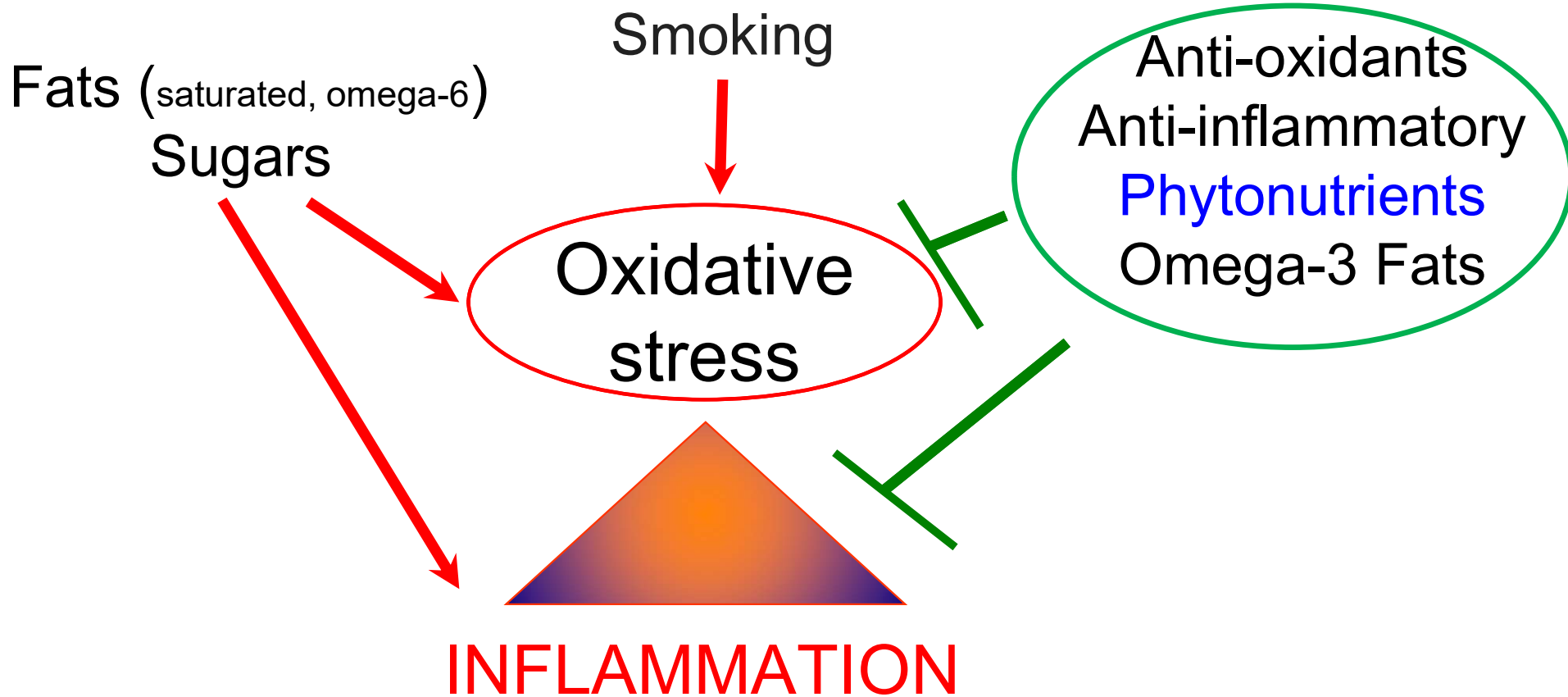
- Specific foods are now known to exert strong effects on inflammatory pathways
- An anti-inflammatory diet plan:
 - selecting foods that are anti-inflammatory in nature
 - avoiding foods that are proinflammatory
- A pattern of eating that:
 - (1) focuses on eating whole, plant-based foods that are rich in healthy fats and phytonutrients
 - (2) maintains a stable glycemic response



Association of chronic spinal pain with diet quality

Suzanna Maria Zick^{a,*}, Susan Lynn Murphy^b, Justin Colacino^c

- People with chronic spinal pain had significantly poorer diet quality compared to people without spinal pain (Healthy Eating Index)
- Higher fruit and whole grain intake were associated with 20-25% lower likelihood of chronic spinal pain
- Added sugars and saturated fats were associated with 40-46% increased odds of chronic spinal pain
 - The association with spinal pain was seen with added sugar as low as 8.8% of total dietary intake, approximately 5.5 tsp per 1000 kcal/d.



Antioxidant Power of Plant Foods

3/4 CUP OF COOKED KALE = 40 mg of vit. C + 10 IU of vit. E

**3/4 CUP OF COOKED KALE NEUTRALIZED as many free radicals as did
599 mg of vit. C or 837 IU of vit. E**

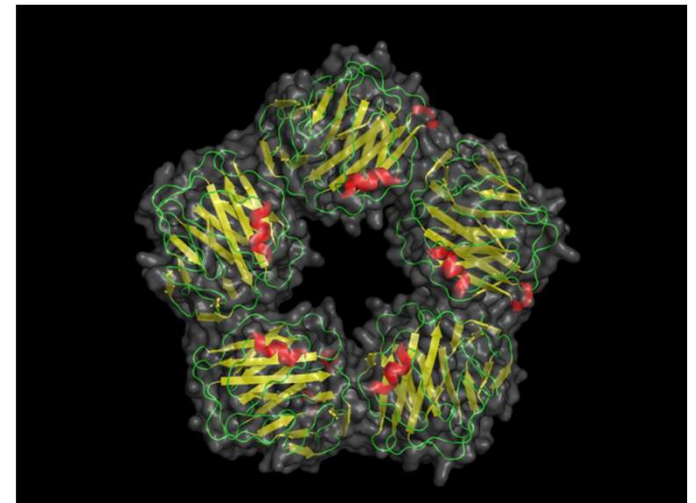
- | | |
|----------------------|-----------------|
| (1) Blueberries | (6) Plums |
| (2) Kale | (7) Broccoli |
| (3) Strawberries | (8) Beets |
| (4) Spinach | (9) Oranges |
| (5) Brussels sprouts | (10) Red grapes |

Inflammation Inhibitors in Culinary Herbs

		COX-2	5-LOX
Rosemary (<i>Rosmarinus officinalis</i>)	Betulinic acid	+	
Ginger (<i>Zingiber officinale</i>)	Melatonin		+
	Gingerols	+	+
Turmeric (<i>Curcuma longa</i>)	Curcuminoids	+	+
Holy Basil (<i>Ocimum sanctum</i>)	Ursolic acid	+	
Oregano (<i>Origanum vulgare</i>)	Apigenin	+	
Green tea (<i>Camellia sinensis</i>)	Catechins	+	+
Barberry (<i>Berberis vulgaris</i>)	Berberine	+	

C-Reactive Protein (CRP)

- Protein found in the blood
- Increased liver synthesis in response to inflammation
 - to IL-6 produced by macrophages and adipocytes
- Binds to lipids on the cell surface of microbes and dying cells to activate complement system and enhance phagocytosis

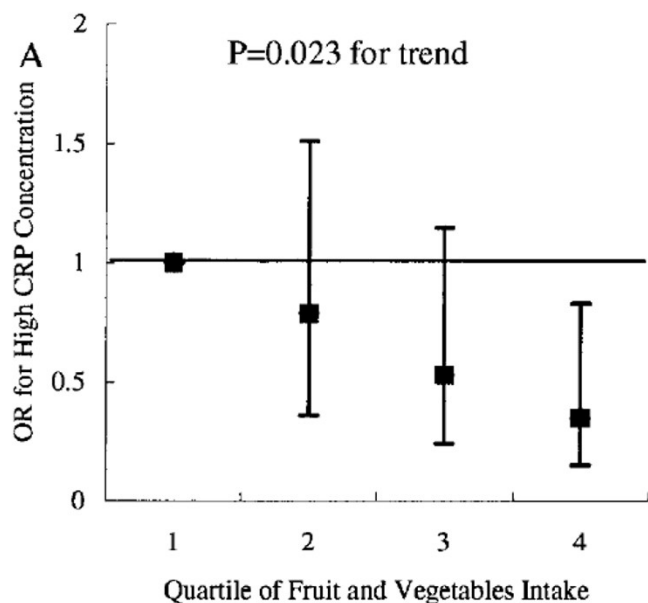


Anti-inflammatory effects of phytochemicals from fruits, vegetables, and food legumes: A review

Fengmei Zhu^a, Bin Du^{a,b}, and Baojun Xu^b

^aHebei Normal University of Science and Technology, Qinhuangdao, Hebei, China; ^bFood Science and Technology Program, Beijing Normal University—Hong Kong Baptist University United International College, Zhuhai, Guangdong, China

CRITICAL REVIEWS IN FOOD SCIENCE AND NUTRITION **2018**, VOL. 58, NO. 8, 1260–1270
<https://doi.org/10.1080/10408398.2016.1251390>



- Greater frequency of fruit and vegetable intake was associated with significantly lower plasma CRP and homocysteine concentrations.
- Lower concentrations of CRP were observed among people who consumed higher amounts of dietary fiber

Gao X et al., *J Nutr* 134:913-918, 2004

Ajani UA et al., *J Nutr*, 134:1181-85, 2004

Jenkins D et al., *JAMA* 290:502-510, 2003



Adults Meeting Fruit and Vegetable Intake Recommendations — United States, 2019

Seung Hee Lee, PhD¹; Latetia V. Moore, PhD¹; Sohyun Park, PhD¹; Diane M. Harris, PhD¹; Heidi M. Blanck, PhD¹

Overall, 12.3% of adults met fruit recommendations, ranging from 8.4% in West Virginia to 16.1% in Connecticut (**Ohio = 9.5%**) and 10.0% met vegetable recommendations, ranging from 5.6% in Kentucky to 16.0% in Vermont (**Ohio = 7.4%**)

Forget five a day, eat 10 portions of fruit and veg to cut risk of early death

Scientists say even just 2.5 portions daily can lower chance of heart disease, stroke, cancer and premature death



A boy plays in a mass of English beef tomatoes on a fruit and vegetable stall in Brighton. Tomatoes are also an excellent source of vitamin C. Photograph: Alamy

Sarah Boseley Health editor

Wednesday 22 February 2017 19:01 EST

Vegetables



1/2 cup
cooked
75g



1/2 cup
beans, peas
or lentils
75g



1 cup
raw
75g



1/2 cup
cooked
75g



1/2 cup
canned
75g




1 cup
salad
leaves
75g

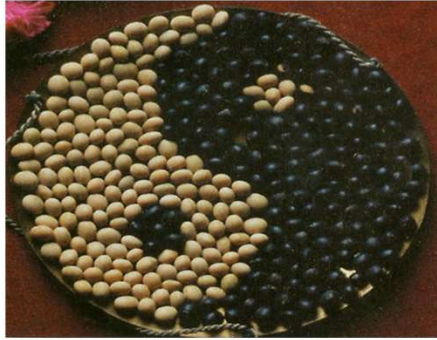


Review

Whole Grain Consumption and Inflammatory Markers: A Systematic Literature Review of Randomized Control Trials

Genevieve Milesi¹, Anna Rangan¹  and Sara Grafenauer^{2,3,*}

- 31 randomized control trials 4 weeks in duration, reporting 1 of the following: C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor (TNF)
- consumption of whole grain foods had a significant effect in reducing at least one inflammatory marker



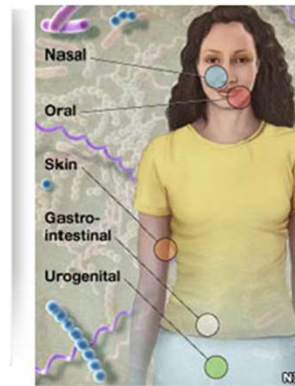
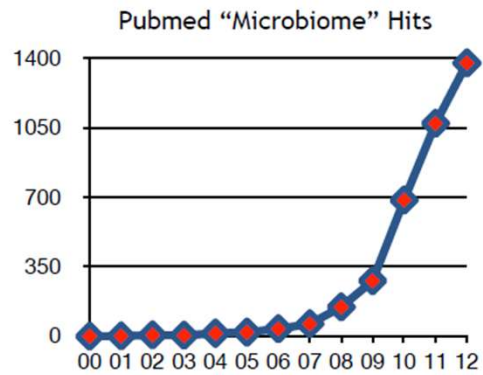
Review

A systematic review and meta-analysis of the effects of soy on serum hs-CRP

Mahdieh Khodarahmi ^{a, b}, Mohammad Asghari Jafarabadi ^{c, d}, Jalal Moludi ^e,
Mahdieh Abbasalizad Farhangi ^{f, g, *}

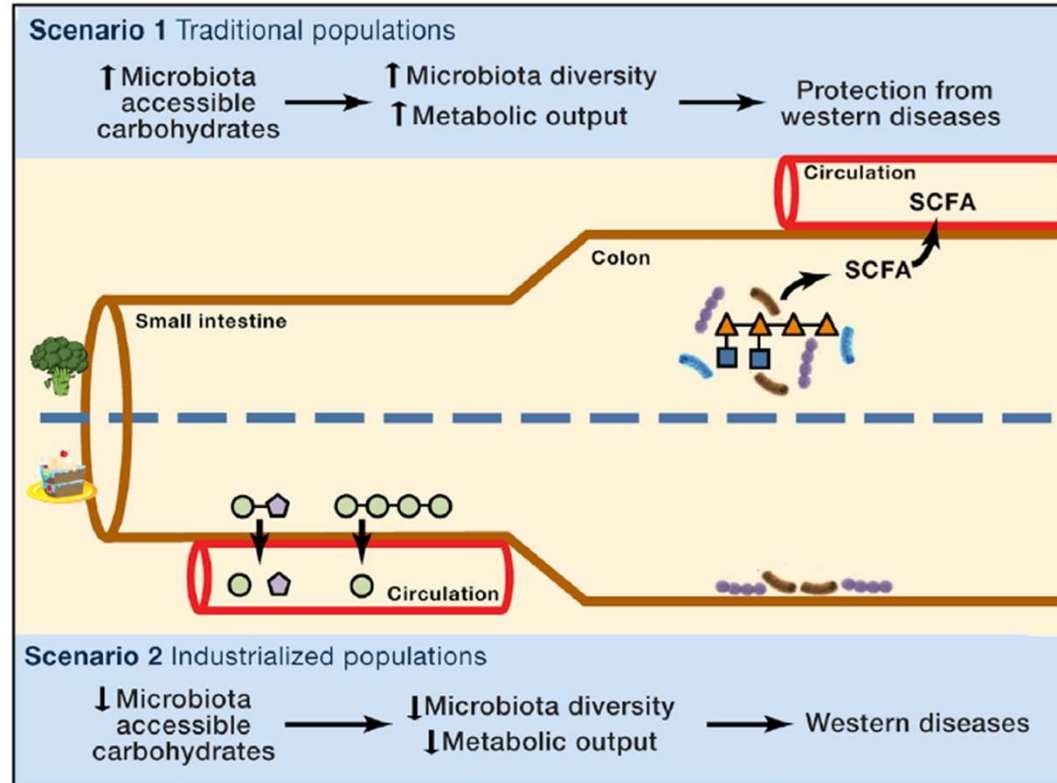
- natural soy products (TOFU, TEMPEH, EDAMAME, MISO) may reduce plasma levels of CRP in comparison to other source of isoflavones (soy extracts, supplements)

What About Microbiome?



Slide from
Dr. Jonathan Eisen
UC Davis

Avoid Starving Your Microbial Friends



Sonnenburg ED, *Cell Metabol*, 2014 Nov 4;20(5):779-86.

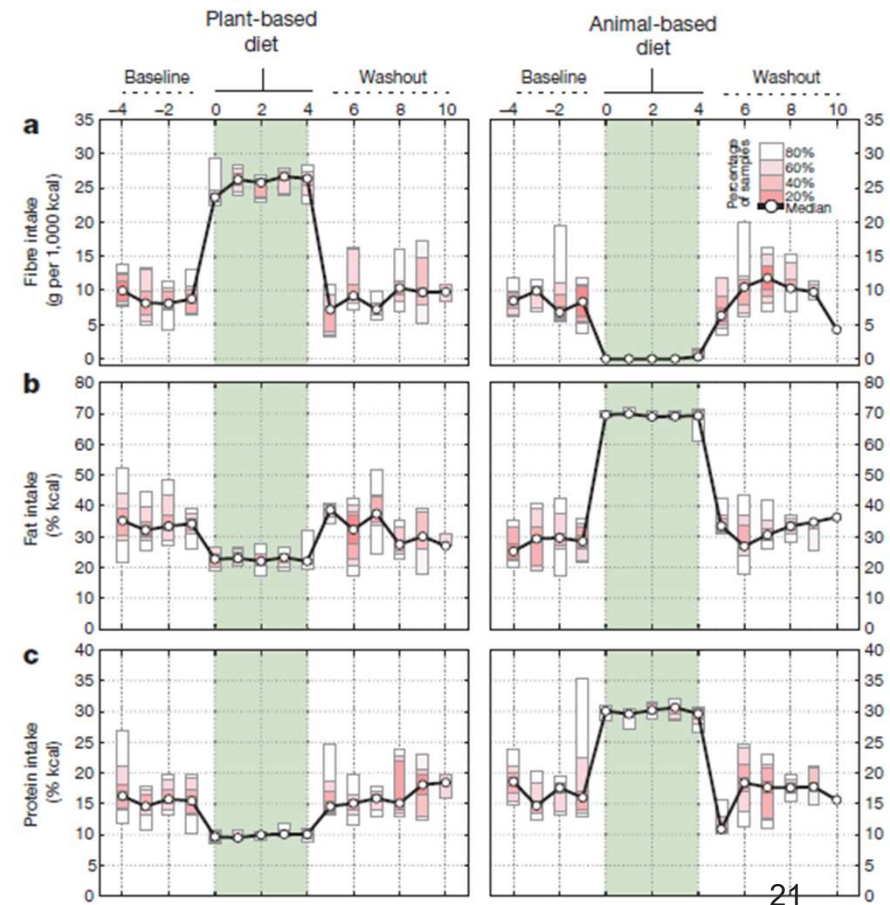
Pain regulation by gut microbiota: molecular mechanisms and therapeutic potential

Ran Guo^{1,†}, Li-Hua Chen^{2,†}, Chungen Xing^{4,*} and Tong Liu^{3,5,*}

-gut microbiota regulates pain in the peripheral and central nervous system, and targeting gut microbiota by diet may represent a new therapeutic strategy for the management of chronic pain

Human Gut Microbiome Rapidly Responds to Dietary Changes

- 6 male and 4 female volunteers
- Plant-based diet: cereal for breakfast and precooked meals made of vegetables, rice and lentils for lunch and dinner with fresh and dried fruits were provided as snack
- Animal-based diet: eggs and bacon for breakfast, cooked pork and beef for lunch; cured meats and four cheeses for dinner; pork rinds, cheese and salami as snack



David LA, et al., *Nature*, 505:559-563, 2014

Diet Changes Microbiome

- The animal-based diet increased the abundance of bile-tolerant microorganisms and decreased the levels of those that metabolize dietary plant polysaccharides
- Increases in the abundance and activity of *Bilophila wadsworthia* on the animal-based diet support a link between dietary fat, bile acids and the outgrowth of microorganisms capable of triggering **inflammation**

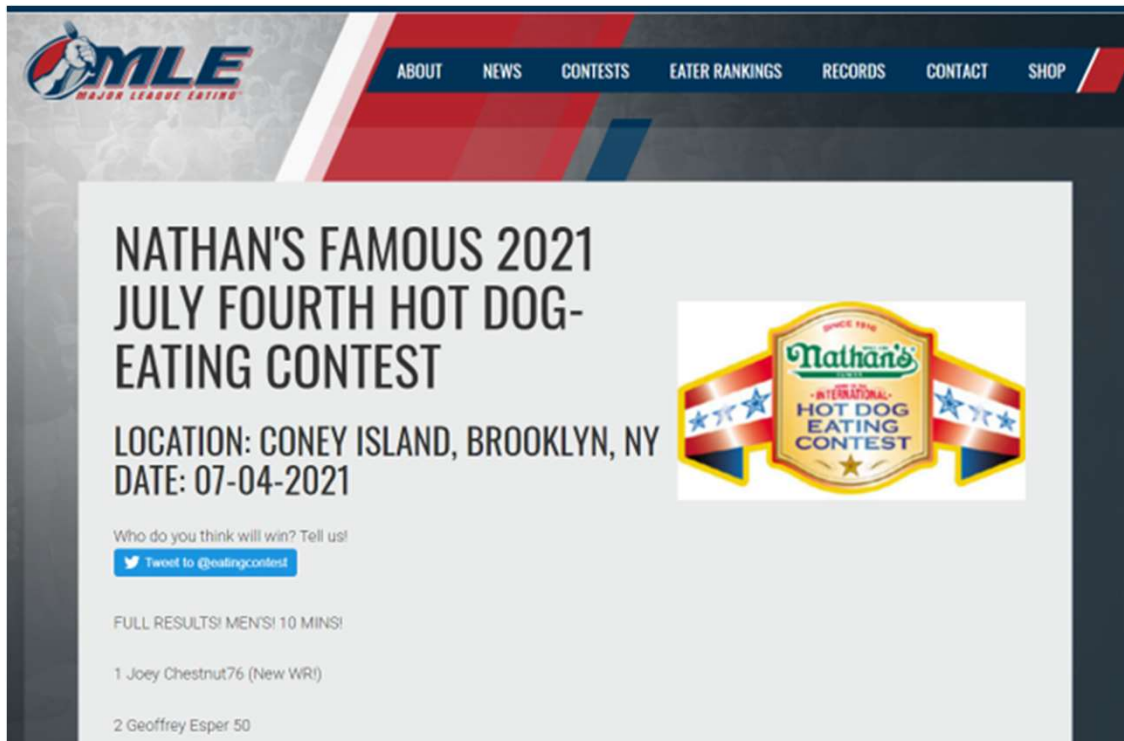
Anti-Inflammatory Effects of a Vegan Diet Versus the American Heart Association–Recommended Diet in Coronary Artery Disease Trial

Binita Shah, MD, MS; Jonathan D. Newman, MD, MPH; Kathleen Woolf, PhD, RD; Lisa Ganguzza, MS, RD; Yu Guo, MA; Nicole Allen, BS; Judy Zhong, PhD; Edward A. Fisher, MD, PhD; James Slater, MD

A vegan diet resulted in a significant **32% lower** high-sensitivity C-reactive protein (β , 0.68, 95% confidence interval [0.49–0.94]; $P=0.02$) when compared with the American Heart Association diet.

Conclusions—In patients with coronary artery disease on guideline-directed medical therapy, a vegan diet may be considered to lower high-sensitivity C-reactive protein as a risk marker of adverse outcomes.

Chew Well




MLE
MAJOR LEAGUE EATING

ABOUT NEWS CONTESTS EATER RANKINGS RECORDS CONTACT SHOP

NATHAN'S FAMOUS 2021 JULY FOURTH HOT DOG-EATING CONTEST

LOCATION: CONEY ISLAND, BROOKLYN, NY
DATE: 07-04-2021



Who do you think will win? Tell us!

[Tweet to @eatingcontest](#)

FULL RESULTS! MEN'S! 10 MINS!

- 1 Joey Chestnut76 (New WR!)
- 2 Geoffrey Esper 50

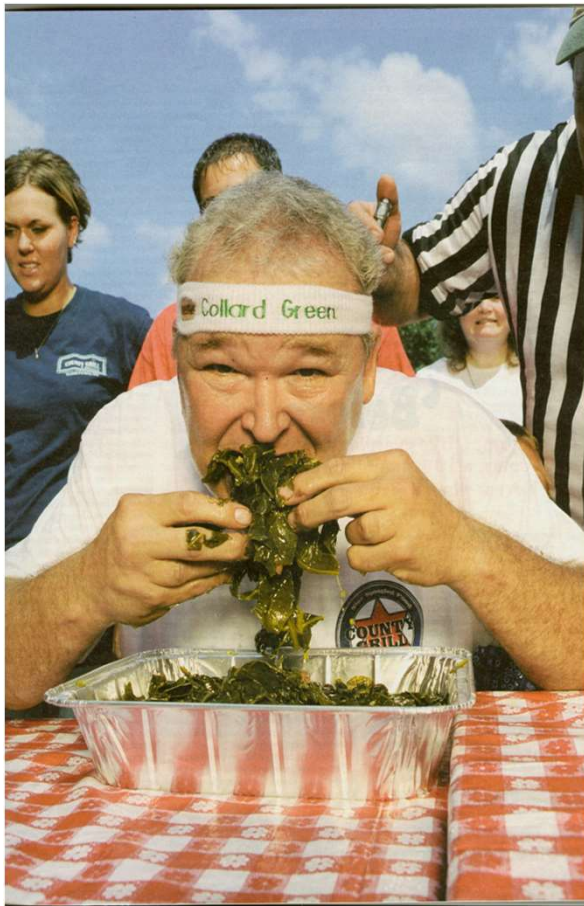


The New York Times, July 5, 2007

<https://majorleagueeating.com/contests/914>

Chew Well

2.5 pounds
17.5 seconds!



New York Times Magazine, Aug 31,
2003



DIETARY SPECTRUM



THE AMERICAN COLLEGE OF LIFESTYLE MEDICINE DIETARY POSITION STATEMENT

ACLM recommends an eating plan based predominantly on a variety of minimally processed vegetables, fruits, whole grains, legumes, nuts and seeds.

WHOLE FOOD PLANT-BASED EATING PLAN

WHAT AMERICA EATS



*Food items are not to scale

Increased risk for Obesity, T2Diabetes, Heart Disease, and some Cancers

Poor nutrition is the leading cause of death globally.

Increase whole plant foods, fruits, vegetables, whole grains, beans, legumes, nuts, seeds, water

Decrease sweets and snacks, fast food, fried foods, refined grains, refined sugar, meat, dairy, eggs, poultry, high sodium foods



*Food items are not to scale

ADD HERBS & SPICES

Decreased risk for Obesity, T2Diabetes, Heart Disease, and some Cancers

Chronic disease treatment and potential reversal



TIPS FOR IMPROVED NUTRITION AND HEALTH

- Any movement toward WFPB eating is positive
- More movement toward a WFPB eating plan increases impact
- Tailored and sustainable approaches are recommended

What We Eat in America (WWEIA) Food Category analyses for the 2015 Dietary Guidelines Advisory Committee. Estimates based on day 1 dietary recalls from WWEIA, NHANES 2009-2010.

Tuso PJ, Ismail MH, Ha BP, Bartolotto C. Nutritional update for physicians: plant-based diets. Perm J. 2013;17(2):61-66.

Food Planet Health. Eatforum.org. Published 2020. Accessed June 4, 2020

JAMA | Original Investigation

Trends in Consumption of Ultraprocessed Foods Among US Youths Aged 2-19 Years, 1999-2018

Lu Wang, PhD, MPH; Euridice Martinez Steele, PhD; Mengxi Du, MS, MPH, RD; Jennifer L. Pomeranz, JD, MPH, RD; Lauren E. O'Connor, PhD, MPH; Kirsten A. Herrick, PhD, MSc; Hanqi Luo, PhD; Xuehong Zhang, PhD; Darlush Mozaffarian, MD, DrPH; Fang Fang Zhang, MD, PhD

CONCLUSIONS AND RELEVANCE Based on the NHANES cycles from 1999 to 2018, the estimated proportion of energy intake from consumption of ultraprocessed foods has increased among youths in the US and has consistently comprised *the majority* of their total energy intake.

67%



Safety of Plant-based Diets

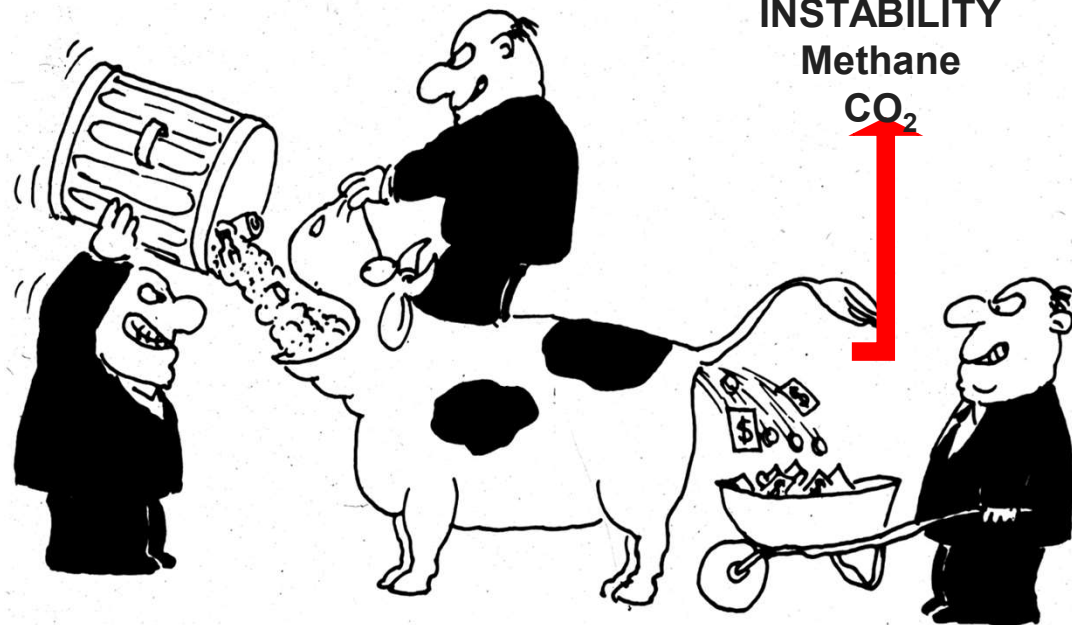
“As more people eat high-fiber foods, the gas blasted into the atmosphere is increasing dramatically”.

Robert Park of Scotland's Research Institute
warning that human flatulence may be
contributing to global warming

Vegetarian Times, April 15, 1991

livestock's long shadow

environmental issues and options



Greenhouse gas emissions from the livestock sector are estimated to account for 14.5 per cent of the global total, more than direct emissions from the transportation sector.

How To Implement Healthy Lifestyle Self-Care Practices?

“The only way to keep your health is to eat what you don't want, drink what you don't like, and do what you'd rather not'.”

Mark Twain

Following the Equator: A Journey Around the World

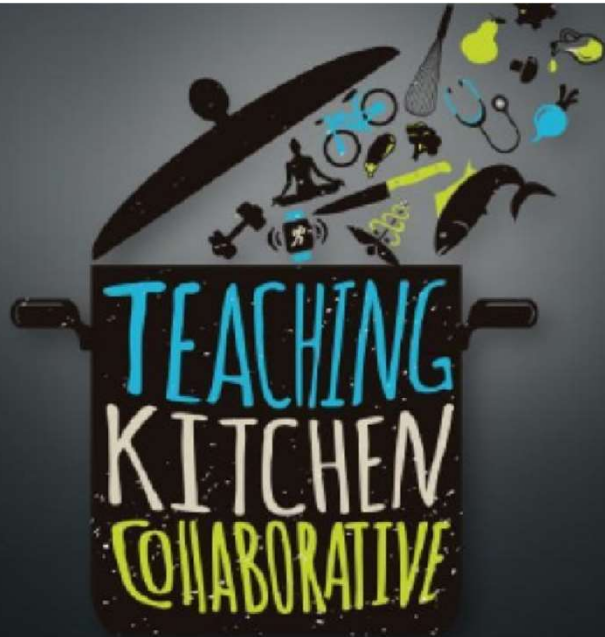
Transition Towards Healthier Lifestyles

- Experimentation
- Evolution
- Evaluation

- **CALL: 513-475- WLNS (9567)**
- <https://www.uchealth.com/integrative/>

What and How to Eat?

- **Chew Well!**
- **Stick with Whole, Predominantly Plant Foods**
- **Grains → Only 100% Whole**
- **Keep added sugars and syrups to a minimum**
- **Eat until You are no longer hungry, not until You are full**
- **Use Your Grandma's plates**
- **Cook More, order less**
- **Transform your kitchen into the environment that promotes health**



Advancing personal and public health through culinary literacy and integrative lifestyle transformation.

www.tkcollaborative.org/



Culinary Medicine

Evidence-based field of medicine that blends the *art of food and cooking* with the *science of medicine*

- to help people achieve optimal self-care via accessing, preparing and eating, high-quality meals
- to help prevent and treat a spectrum of common chronic, non-communicable, lifestyle-related, diseases and restore well-being

Culinary Medicine

“Cooking is the key to changing our health and the environment”.

Michael Pollan

“Diet Is the Single Most Important Predictor of Health”

David L. Katz MD, MPH

Pollan M: *Cooked: A Natural History of Transformation*, Penguin Books, 2014

Katz D. Diet Is the Single Most Important Predictor of Health. *Alter Complement Ther*, 25(6), 280-284, December 2019.

SMOOTHIE RECIPE:

YIELDS: 1 EA



FRUITS/VEGGIES

1/2 cup - 1 1/2 cups



PROTEIN/FAT

2 Tbsp



ICE/ FROZEN FRUIT

1/2 cup - 1 cup



LIQUID

1/2 cup - 1 cup





FRUITS/VEGGIE IDEAS:

Spinach
Kale
Cucumber
Berries, such as
strawberries,
raspberries,
blueberries
Pineapple
Bananas
Kiwi



FROZEN FRUIT IDEAS:

Frozen Strawberries
Frozen Blueberries
Frozen Raspberries
Frozen Grapes
Frozen Bananas
Frozen Cherries, pitted
Frozen Mango



PROTEIN/FAT IDEAS:

Walnuts
Chia Seeds
Flax Seeds
Avocado
Nut or Seed Butter
Extra Virgin Olive Oil



LIQUID IDEAS:

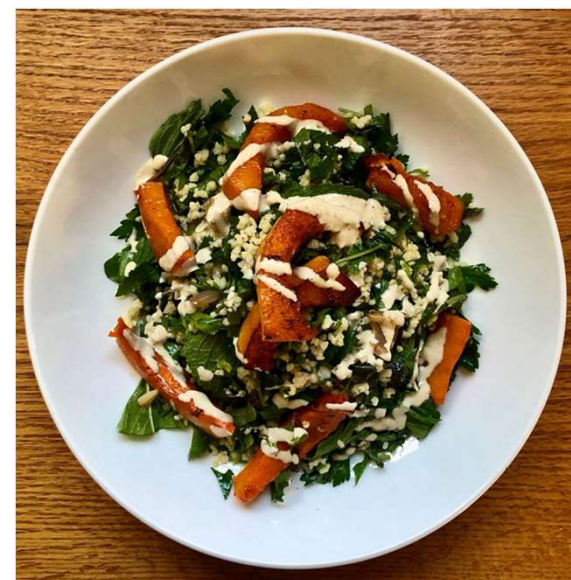
Oat Milk
Almond Milk
Coconut Milk
Juice (avoid sugar
added options):
Beet Juice
Carrot Juice
Orange Juice



ADD-INS:

Turmeric, ground
Cinnamon, ground
Ginger, ground
Dates, dried, pitted

Smoothies are great, but what else?



In The Kitchen with Chef Jim and Dr. Mike



<https://vimeo.com/showcase/inthekitchen>



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Brain Health Kitchen

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Welcome to Brain Health Kitchen!

I'm Annie Fenn — physician, chef and culinary instructor. Did you know that what we eat and how we live can help keep us from getting Alzheimer's and dementia? The number 1 found that

ANNIE FENN, M.D.

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FEED YOUR BRAIN: MONTHLY UPDATES OF FOOD AND SCIENCE DELIVERED TO YOUR INBOX.

Show all

[What if you could be your own, best, first doctor? | Melinda Ring | TEDxChicago – YouTube](https://www.youtube.com/watch?v=G5CpG5l3qy0)
<https://www.youtube.com/watch?v=G5CpG5l3qy0>

NEW YORK TIMES BESTSELLING AUTHOR
Dean Ornish, M.D., and Anne Ornish

UnDo It!



"Dr. Ornish pioneered the revolutionary field of lifestyle medicine, showing that changes in diet and exercise can reverse heart disease, type 2 diabetes, prostate cancer, high blood pressure, depression, weight gain, high cholesterol, and other chronic diseases. His new findings reveal a link between lifestyle and our health and longevity."

Whole Foods Plant-Based Eating Pattern

Documentaries:

Forks Over Knives - YouTube

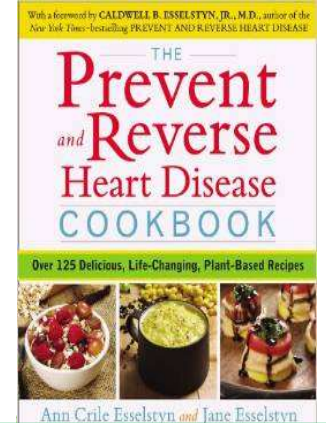
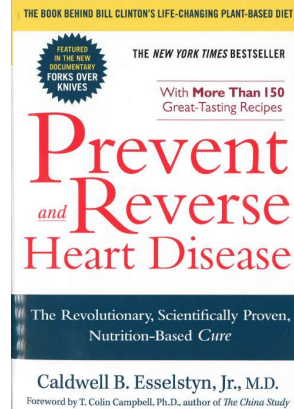
<https://www.youtube.com/watch?v=n1LUj3kxB9M>

The Game Changers - Full Documentary - YouTube

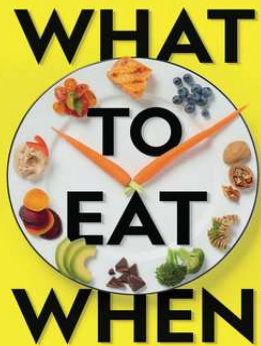
<https://www.youtube.com/watch?v=kRCIkTu1JLg>

Code Blue – Dr. Saray Stancic (drstancic.com)

<https://drstancic.com/codeblue>



A Strategic Plan to Improve Your Health & Life Through Food



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Michael Crupain, M.D., M.P.H.
WITH TED SPIKER

DEAN ORNISH, M.D.



THE SPECTRUM

A SCIENTIFICALLY PROVEN PROGRAM TO
FEEL BETTER + LIVE LONGER
LOSE WEIGHT + GAIN HEALTH



WITH RECIPES BY ART SMITH

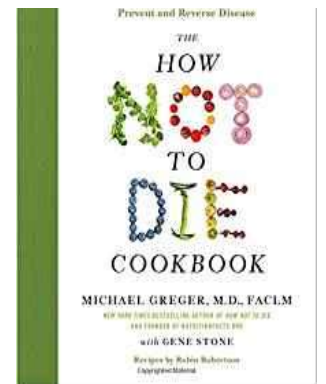
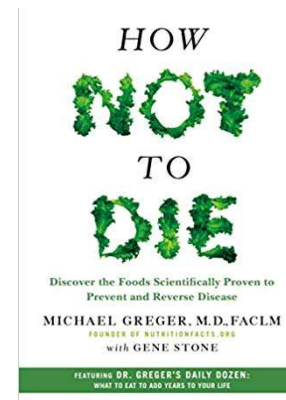
Weight
Down
Happily

Congratulations!
A Proven Program to Prevent and Reverse the
New Silent Epidemic—Fatty Liver Disease

Skinny Liver

- ✓ Eliminate everyday toxins
- ✓ Avoid diabetes, heart disease, and excess weight
- ✓ Increase energy, vitality, and longevity

Kristin Kirkpatrick, MS, RD, LD
WELLNESS NUTRITION SERVICES AT THE CLEVELAND CLINIC WELLSLIP NUTRITION
with Ibrahim Hanouneh, MD



Center for Science in the Public Interest at www.cspinet.org

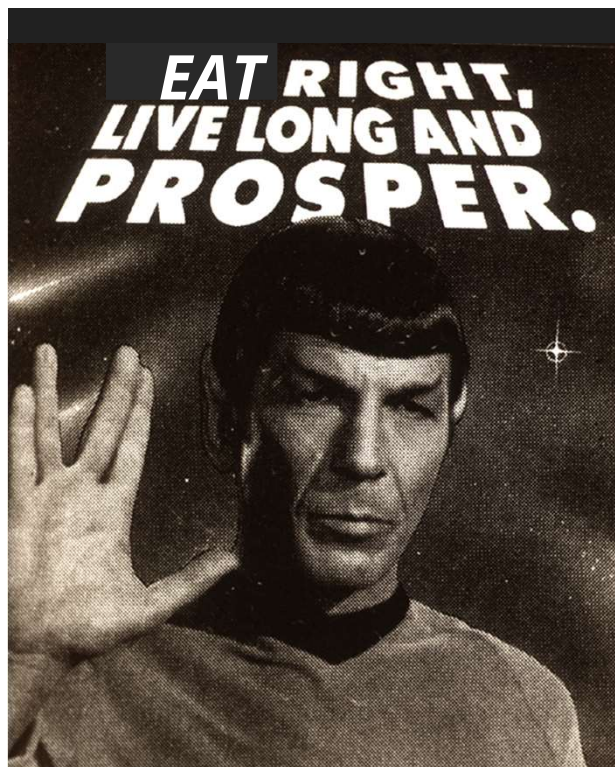
Mediterranean Eating Pattern

<https://www.lifestylemedicine.org/>

<http://www.dresselstyn.com/site/>

www.nutritionfacts.org;

www.pcrm.org



EATING RIGHT IS HIGHLY LOGICAL