



Sharon Palmer  
MSFS, RDN

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**Sharon Palmer**

*The Plant-Powered Dietitian*

# Anti-Inflammatory Plant-Based Eating



*Berry Bowl with Quinoa and Walnuts, Sharon Palmer*

# My Plant-Powered Journey...



*I come from a long line of farmers*

# My Plant-Powered Journey...

I grew up in a semi-vegetarian home and grew food too!



*Image: Sharon and Paula in Washington*

# My Plant-Powered Journey...



My family in Greece, eating the Mediterranean Diet; my garden in Ojai, CA



# Eat More Plants

“Fall in love with plants and they will love you back,” Sharon Palmer, RDN, *Plant-Powered for Life*

*There are 40,000 edible species of plants on the planet, each with the power to nourish and help heal our bodies; each plant has its own story. There are 25,000 types of tomatoes alone!*



*Image: Heirloom tomatoes at Paso Robles, Sharon Palmer*

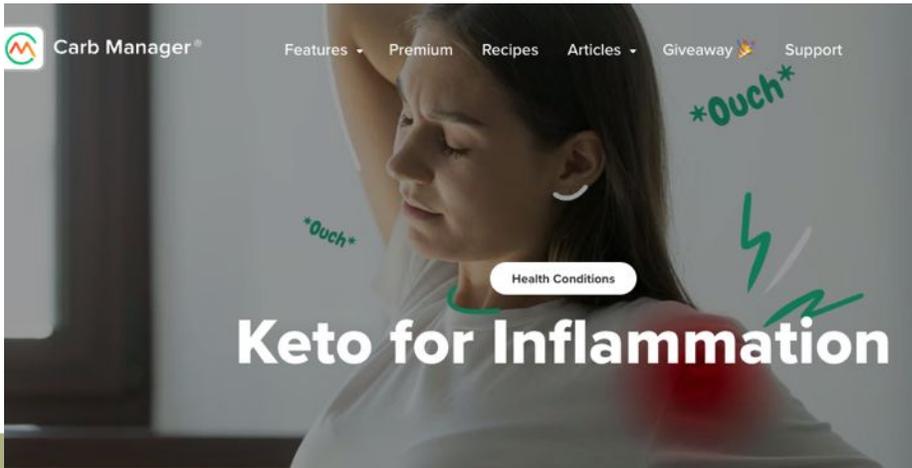
# Anti-Inflammatory Trends

- 10,000 “anti-inflammatory books” on Amazon
- 383 B hits “anti-inflammatory diet” on Google
- Recommended by top diet gurus, from Dr. Weil to Dr. Sears
- More mainstream phrase and diet trend today



# Benefits of Anti-Inflammatory Eating

- Recommended for a variety of benefits, from arthritis and injuries to brain and heart.
- Science-based evidence mixed with hype!



## The Carnivore Diet Can Decrease Inflammation

The carnivore diet can significantly reduce markers of systemic inflammation (like C-reactive protein and IL-6). This is likely due to a few factors such as: <sup>[5]</sup> <sup>[6]</sup> <sup>[7]</sup>

- The removal of potentially irritating plant-based foods that you may be sensitive to will immediately decrease inflammation levels.
- Elevated insulin levels promote inflammation. So minimizing blood sugar and insulin spikes have an anti-inflammatory effect.
- Omega-3 fatty acids have powerful anti-inflammatory properties.
- The carnivore diet supports a healthy gut, which plays a crucial role in mitigating inflammation.

The carnivore diet's ability to decrease inflammation is one of the key factors that make this way of eating so powerful.



# FOODS THAT FIGHT INFLAMMATION

Chronic inflammation has been linked to cancer, heart disease, diabetes, arthritis, depression, and Alzheimer's. Fight inflammation with a healthy diet.



## ANTI-INFLAMMATION FOODS



Tomatoes



Fruits

Strawberries, blueberries, oranges and cherries.



Nuts

Almonds, walnuts, and other nuts.



Olive oil



Leafy greens

Spinach, kale, collards, and more.



Fatty fish

Salmon, mackerel, tuna, and sardines.

## INFLAMMATION FOODS



Fried foods



Sodas



Refined carbs



Lard



Processed meats

# Harvard Health Report: Foods that Fight Inflammation

# Diet and Inflammation Connection

- Good news: more research in past two decades!
- Recognize chronic, long-term inflammation can fuel chronic disease.
- Diet may be important tactic to reduce risk.



Image, Black Beans and Rice Vegan Bowl, Sharon Palmer

# Growing Consensus



“Although it is not proven that inflammation causes cardiovascular disease, inflammation is common for heart disease and stroke patients and is thought to be a sign or atherogenic response. It’s important to know what inflammation is and what it can do to your heart.”



“Various anti-inflammatory diets are promoted online. But. Researchers are still figuring out how what we eat may affect inflammation. So far, it appears that eating a variety of nutritious foods may help reduce inflammation in the body. What we eat may help prevent and keep chronic inflammation in check. And, an overall healthy eating plan provides nutrients that help keep your immune system working well.”



“An anti-inflammatory diet holds strong potential to reduce cancer risk. Reducing cancer risk encompasses more than reducing inflammation.”

# The Science on Diet-Inflammation

- Connections between diet-inflammation are complex.
- Not enough science that an anti-inflammatory diet lowers body inflammation and disease unproven.
- But indirect evidence shows nutritious foods and components may help reduce inflammation.



*Image: Southwest Sweet Potato Shepherd's Pie, Sharon Palmer*

# Fighting Inflammation with Foods

- Specific foods and components may dampen inflammation, but in general it's the same healthy diet we've been praising!
- Most powerful tools to fight inflammation come from supermarket, not pharmacy.



Image: Turmeric Rice Chickpea Bowl, Sharon Palmer

# What Is Inflammation?

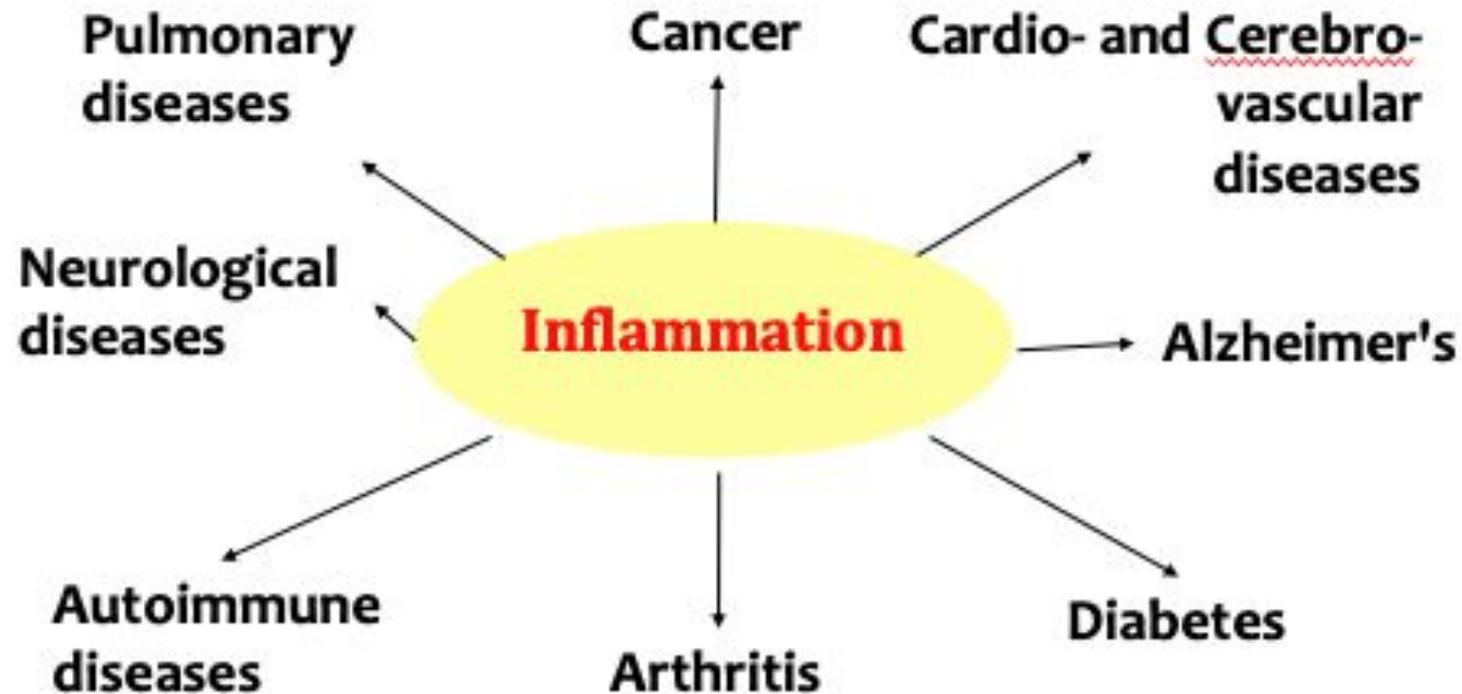
## Acute Inflammation Is Good!

- Body's natural pro-inflammatory immune response in reaction to assault.
- Cascade of events occur to fight infection and invading foreign substances.
- Causes significant pain.
- Classical inflammation

## • Chronic Inflammation, Not So Good!

- Low-level inflammation, below threshold of pain.
- Silent inflammation.
- When inflammatory response is triggered for no real cause, lasts for days, weeks, months.
- Eventually causes tissue damage, organ damage, chronic disease.

# Inflammation: Root in Chronic Disease



\*Obesity is pro-inflammatory with common links with all of these diseases

# How Can You Measure Inflammation?

- Many biomarkers measure inflammation (fibrinogen, IL-6, TNF)
- C-reactive protein (CRP): acute-phase protein produced by liver in response to cytokine production during illness, infection, tissue injury, general inflammation. But, not very selective or specific.



Image: Beet Smoothie, Sharon Palmer

# The Food-Inflammation Connection

- Studies find link between diet and chronic disease risk
- Some diet patterns lower risk; some raise risk.
- Two connections: Gut and Obesity
- Research on diet and inflammation: chemicals in foods decrease biomarkers in cell cultures/animals; observational studies of people and diet. Fewer RCTs.
- 2020 *JACC* study: 200,000+ US health professionals followed up to 30 yrs; found 46% higher heart disease, 28% higher stroke rates among most pro-inflammatory diet compared to most anti-inflammatory diet.



*Image: Roasted Butternut Squash. Sharon Palmer*

# Inflammatory Milieux



Image: Grilled Corn and Tofu Salad, Sharon Palmer

## Anti-inflammatory:

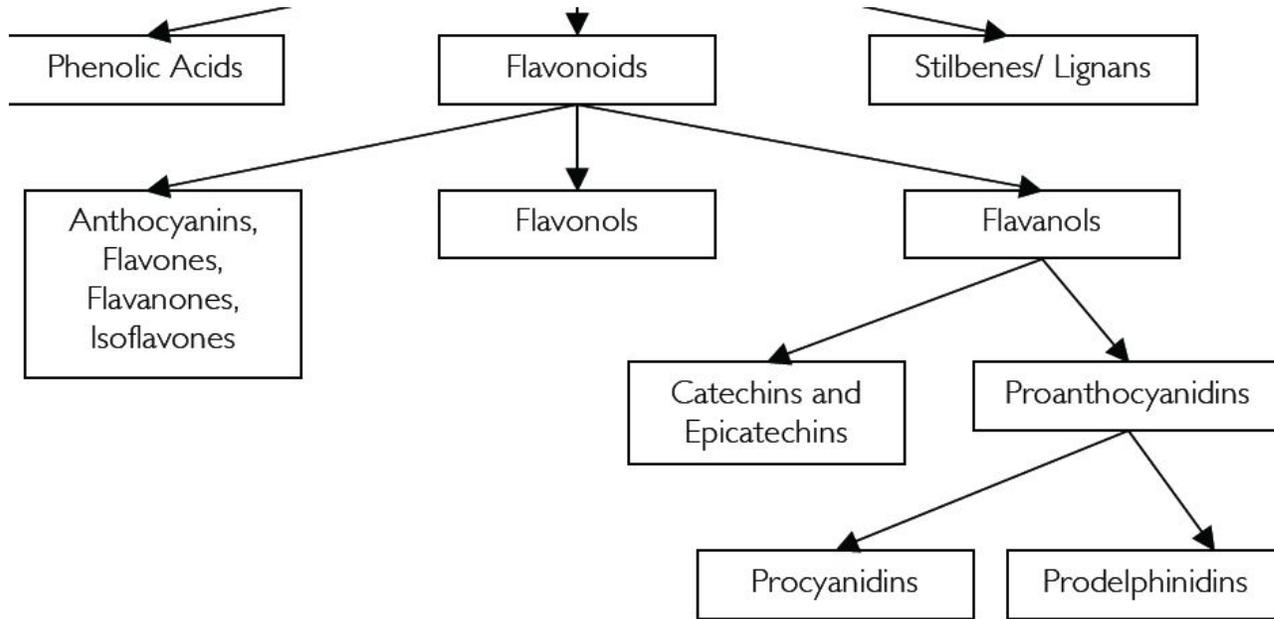
- Diet rich in whole foods, including healthful carbohydrates and fat and protein sources, along with regular exercise and not smoking, seems to cool down inflammation.

## Pro-inflammatory:

- Diets high in refined starches, sugars, saturated fats, and trans fats and low in fruits, vegetables, whole grains, and omega-3 fatty acids appear to turn on the inflammatory response.

(JACC, 2006)

# The World of Phytochemicals



PLANT COLOR	PLANT SOURCES	PHYTOCHEMICALS	HEALTH BENEFITS
<b>BLUE PURPLE</b>	 <p><b>Fruits:</b> Blackberries, blueberries, black currants, Mission figs, plums, purple grapes, raisins</p> <p><b>Vegetables:</b> Eggplant, purple potatoes, radishes, red cabbage</p> <p><b>Legumes:</b> Black beans</p>	Anthocyanins, ellagic acid, flavonols, flavones, isoflavones, polyphenols, resveratrol	Antioxidant and anti-inflammatory activity; helps promote urinary tract health and heart health, and improve memory function
<b>GREEN</b>	 <p><b>Fruits:</b> Rambutan, pear, green apple, grapefruit, kiwifruit, lime, kiwi fruit, kiwifruit</p> <p><b>Vegetables:</b> Artichokes, asparagus, avocados, broccoli, cabbage, celery, cucumbers, green beans, green bell peppers, leafy greens, okra, peas, lentils, lettuce, spinach, green-skinned sweet potatoes, watermelon</p>	Chlorophyll, carotenoids, flavonols, flavones, isoflavones, polyphenols, polyterpenes, sulfur compounds, resveratrol	Antioxidant and anti-inflammatory activity; helps promote heart health, and protect vision
<b>WHITE</b>	 <p><b>Fruits:</b> Bananas, pears, dates, white peaches, white raspberries</p> <p><b>Vegetables:</b> Cauliflower, garlic, ginger, Jerusalem artichokes, jicama, kohlrabi, onions, parsnips, rutabaga, turnips, white corn, white mushrooms, white potatoes</p>	Flavonols, flavones, isoflavones, polyphenols, sulfur compounds	Antioxidant and anti-inflammatory activity; helps promote heart health, and reduce cholesterol levels
<b>YELLOW-ORANGE</b>	 <p><b>Fruits:</b> Apples (yellow), apricots, cantaloupe, figs (yellow), golden raisins, guavas, kiwis, grapefruit, lemons, mangoes, nectarines, oranges, papaya, passion fruit, peaches, persimmons, pineapples, raspberries, watermelon (yellow)</p> <p><b>Vegetables:</b> Carrots, pumpkin, rutabaga, turnips, squash (yellow), sweet corn, sweet potatoes, tomatoes (yellow), water squashes, yellow beans, yellow bell peppers, yellow potatoes</p>	Alpha-carotene, beta-carotene, lutein, zeaxanthin, flavonols, flavones, isoflavones, resveratrol	Antioxidant and anti-inflammatory activity; helps promote heart health and protect vision
<b>RED</b>	 <p><b>Fruits:</b> Apples (red), blood oranges, cherries, cranberries, grapefruit, red grapes, pears (red), pomegranates, raspberries, rubarb, watermelon, watermelon</p> <p><b>Vegetables:</b> Beets, radishes, radishes, red bell peppers, red onions, red potatoes, tomatoes (red)</p>	Anthocyanins, ellagic acid, flavonols, flavones, isoflavones, polyphenols, resveratrol	Antioxidant and anti-inflammatory activity; helps improve cognitive function and promote heart health and urinary tract health



# Phytochemicals in Plants

## Benefits to Humans:

- Antioxidants
- Anti-inflammatory agents
- Enhance cell-to-cell communication
- Alter estrogen metabolism
- Cause cancer cells to die
- Repair DNA damage
- Detoxify carcinogens
- Tufts review: regular consumption reduces risk of several chronic conditions

## Benefits to Plants:

- Act as natural defense system: UV protection, anti-bacterial, -fungal, natural pesticide
- Attract pollinating or other seed dispersing insects

# Diet and the Gut



Image: Easy Vegan Yogurt Dressing, Sharon Palmer

- Gut microbiome impacts health and disease risk.
- Diet shifts microbial community in composition and population to a more protective profile.
- Synthesizes nutrients, produces byproducts that boost immune function.
- Fermented foods and fiber-rich foods support gut microbiome.

- Developed in 2004 based on research linking diet and inflammation.
- Estimates inflammatory potential of dietary patterns, individual foods, nutrients.
- Most inflammatory diets have highest scores; anti-inflammatory diets scores in negative.
- Several large studies showed people with highest DII scores had much greater risk of multiple disease.

# Dietary Inflammation Index (DII)



DII used in more than 200 studies, 12 meta-analyses; linked to following:

- Flavones (red and purple foods)
- Soy products
- Beta carotene (orange foods)
- Flavonols (i.e., onions, kale, broccoli)
- Omega-3 fatty acids (i.e., fish, flax, walnuts)
- Vitamin C (i.e., citrus, strawberries, and kiwi)
- Fiber (i.e., whole grains, vegetables, beans)
- Tea (green and black)
- Spices (i.e., turmeric, saffron, ginger)

# Low DII Diets



Image: Nicoise Tofu Salad, Sharon Palmer

# Higher DII Score Foods

- Higher levels of saturated fat (such as animal fats, butter, lard, and dairy products), trans fats (partially hydrogenated oils), fried foods (such as potato chips and French fries)
- Refined grains (like white bread, white rice, white pasta, snack foods)
- Low amounts of plant-based foods (fruits, vegetables)
- High scores linked with higher risk of chronic disease.



*Image: Arugula Salad with Tomatoes, Sharon Palmer*

# Parallels with the Western Diet

- Western diet similar to pro-inflammatory diet.
- Low in whole plant foods, beans, whole grains, fruits, vegetables, nuts, seeds.
- High in refined foods, like chips, white bread, sugary beverages, snack foods, animal foods



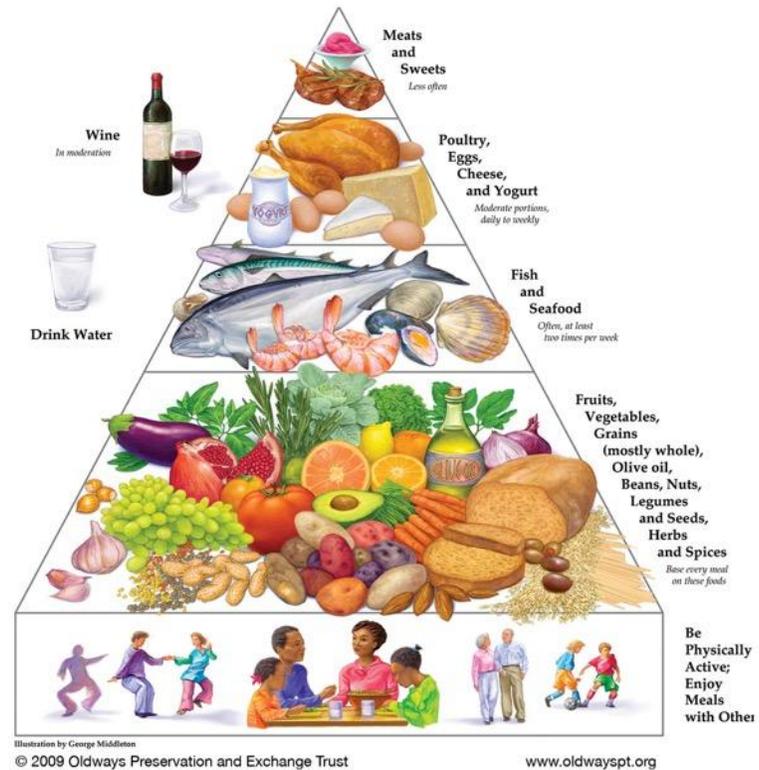
Image: Western diet, Sharon Palmer

# Mediterranean Diet

- Large body of evidence linking Med diet to lower inflammation and risk of chronic disease.
- The Med diet is low in red meats, refined grains, saturated fats, sugars.
- Contains greater level of anti-inflammatory foods:
  - Beans
  - Fish
  - Fruits
  - Nuts and seeds
  - Olive oil
  - Red wine, in moderate amounts
  - Spices and herbs
  - Vegetables
  - Whole grains



Mediterranean Diet Pyramid



# Traditional Diet Patterns

- Other healthful dietary patterns reduce inflammation and chronic diseases.
- Studies have linked traditional Nordic diet (emphasis on fruits, vegetables, fish, whole grains, vegetable oils, with low red meat intake) to reduced inflammation.
- The traditional Japanese diet (rich in fish, soy foods, fruits, vegetables, fermented foods, green tea, and low intake of animal fat and meat) has potential health and anti-inflammatory benefits.

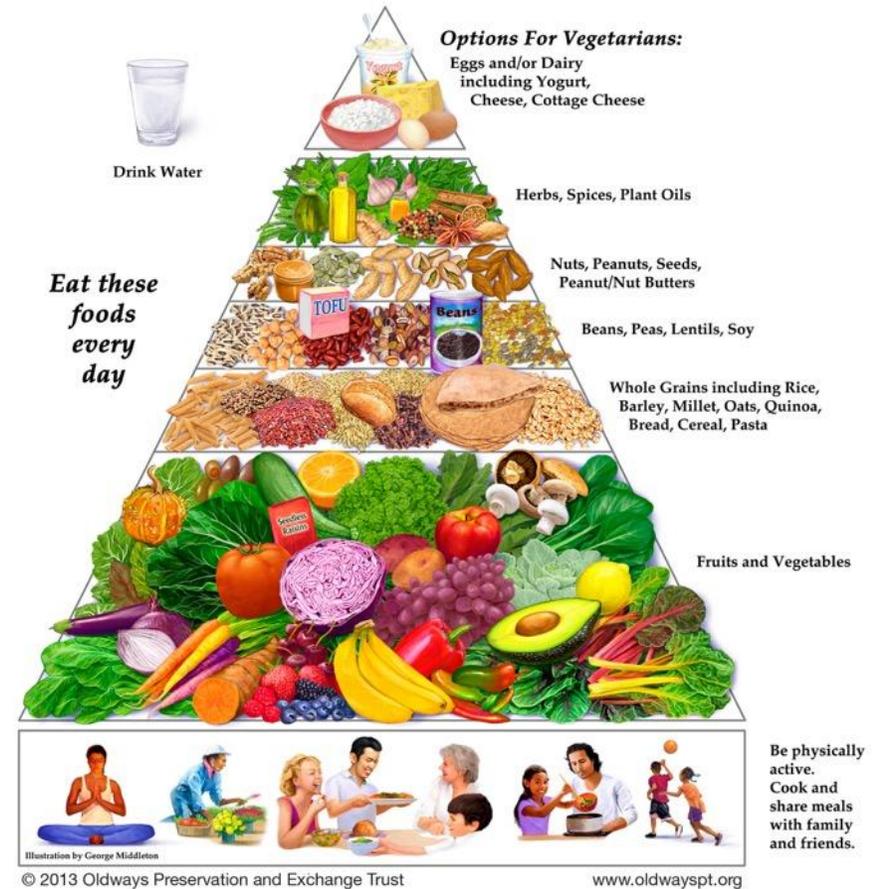


Image: Swedish Pea Soup, Sharon Palmer

# Plant-Based Diets

- Plant-based dietary patterns (vegan, vegetarian, pescatarian, semi-vegetarian) linked to lower inflammation, chronic disease.
- 2019 analysis of 30 studies found lower CRP and other biomarkers among people who followed vegetarian diets.
- This makes sense given diets emphasize beans, lentils, grains, fruits, vegetables, soy foods, nuts, and seeds, with little or no animal protein.

## Vegetarian & Vegan Diet Pyramid



- DASH diet helps reduce blood pressure.
- Research consistently shows broad health benefits.
- DASH Trial and other studies show (in addition to improving blood pressure) lower cholesterol levels.
- Includes generous amounts of anti-inflammatory foods: fruits, vegetables, whole grains, fish, nuts; moderate low-fat dairy, poultry, and meat; limits saturated fat, added sugars, including sugary drinks.
- High in fiber, calcium, and other minerals; low in sodium.

# DASH Diet



*Image: Jambalaya with Red Beans and Rice, Sharon Palmer*

# Dr. Weill's Anti-Inflammatory Diet

- Research supports his eating plan.
- Similar to Med diet.
- Focus on plant-based foods, healthy protein sources.
- Avoids highly processed foods (refined grains, processed meats, sugar).
- Includes fish, soy, fruits, vegetables, mushrooms, whole grains, pulses, olive oil, nuts, seeds, tea, dark choc, mod wine.



*Image: Watermelon Poke Bowl with Tofu and Quinoa, Sharon Palmer*

# More than One Diet...

- Clearly, more than one anti-inflammatory eating style.
- Research on dietary patterns, nutrition, inflammation, disease prevention shows diets share common features.
- More whole plant-based foods, healthful fats (olive oil, omega-3s), fermented foods, low animal foods (red meats), low-nutrient foods, highly processed foods.



*Image; Snow Pea Seitan Stir-Fry, Sharon Palmer*

- Protein foods: fish, pulses, nuts, seeds, peanuts, soyfoods
- Whole grains: oats, whole wheat, brown rice, buckwheat, wild rice, sorghum, millet, amaranth
- Vegetables: tomatoes, green leafy, mushrooms, squash, beets, onions, cruciferous
- Fruits: berries, apples, stone fruits, grapes, citrus, pomegranates
- Healthy fats: unsaturated, olive oil, avocados
- Extras: spices, herbs, chocolate, tea, coffee

# Inflammation-Fighting Foods



Image: Red Quinoa Berry Bowl, Sharon Palmer

# Pro-Inflammatory Foods

- Data from Multiethnic Cohort: higher red and processed meat intake linked with higher inflammatory markers.
- Refined grains
- Saturated fats and trans fats
- Fried potatoes, chips, foods
- Sugar-sweetened beverages



*Image: Hamburger and fries at airport*

# A Portrait of An Anti-Inflammatory Diet



Variety of foods	Healthful fats
Low in refined, low-nutrient foods	Includes omega-3 fatty acids
High in fruits and vegetables	Rich in antioxidant spices and herbs
Balanced in calories to promote optimal weight	Tea consumption
Healthful carbohydrates	Moderate consumption of red wine (if alcohol is consumed)
Low in animal proteins	Small amounts of dark chocolate (at least 70% cocoa) as a treat
Includes plant proteins such as pulses, soy foods, nuts	



# Tips for a Healthy Plant-Based Eating Style



**Start the day right.** Go veggie at breakfast.



**Join the Meatless Monday bandwagon.**



**Shop for plants first.** Instead of planning your menu around meat, plan it around plants.

# Tips for a Healthy Plant-Based Eating Style



**If you eat meat, use it as a seasoning.** Cut down on animal food intake while pushing plants by using meat as a flavoring in dishes instead of main event.



**Create a plant-based pantry list.** Many plant-based foods like beans and whole grains are shelf-stable, convenient, and economical.



**Get cooking!** Plan at least one night a week to try a new vegetarian recipe.

# Tips for a Healthy Plant-Based Eating Style



**Keep it simple.** Not every meal has to involve cookbooks and cutting boards; it can be as easy as black bean burritos, vegetarian chili, or hummus pita sandwich.



**Try global flair.** Some cultures know how to do vegetarian meals right!



**Convert your favorite dishes.** Turn your favorite meat-based recipes veggie for an easy dinner solution.

# Tips for a Healthy Plant-Based Eating Style



**Dust off your slow-cooker.** Just throw in veggies, herbs, vegetable broth, canned tomatoes, whole grains, and dried beans; then turn the dial on.



**Try plant-based dairy products.** Try more plant-based alternatives for milk, yogurt, and cheese.



**Think “yes”.** Don’t dwell on what you *can’t* have, think about what you *can* have!

# Thank You!

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