

# Reversing Aging with an Anti-inflammatory Diet

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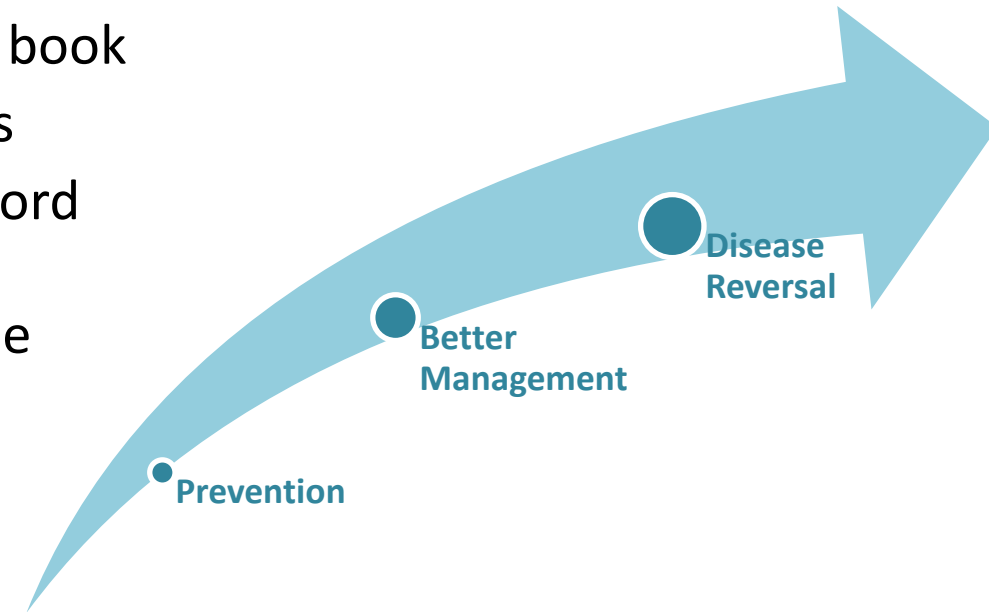


# My Experience/Background

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- Stony Brook University Medical School Alum
- Internal Medicine Residency University of Maryland
- 3 yr Fellowship w/ Joel Fuhrman, M.D., author of *Eat to Live*
- 15 years in Integrative/Lifestyle Medicine Practice
- Over 17,500 one-hour patient appointments
- Contributed chapter on eye disease and iron to Elsevier book
- Published five peer-reviewed studies in medical journals
- Over 250 well-referenced articles for Times-Beacon-Record newspapers
- Over 100 presentations on Integrative/Lifestyle Medicine

## Results from My Clinical Practice



# Objectives

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- Define Integrative/Lifestyle Medicine
- Identify pro-inflammatory vs anti-inflammatory foods
- Describe how a Whole-Food Plant-Based Diet helps reverse and prevent biological aging
- Describe what makes the LIFE diet different from other WFPB diets

# 6 Pillars of Lifestyle Medicine

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- Whole-food plant-based diet
- Exercise/Physical activity -Sleep Low
- Stress management
- Sleep
- Social connection/support
- Toxins

# Conventional Medicine vs Lifestyle Medicine

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Primary differences

Prevention

Reversal

Treatment

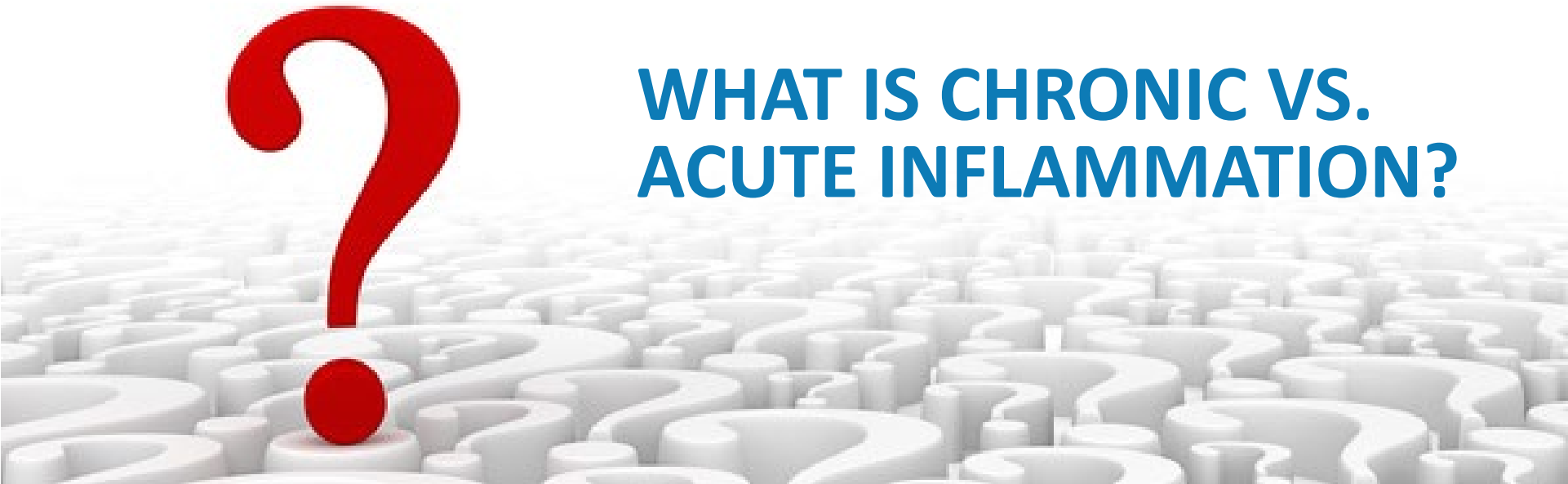


# Aging - accelerated

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You can't change the chronological clock but you CAN change the biological clock

What is Inflammaging?



## WHAT IS CHRONIC VS. ACUTE INFLAMMATION?

# Acute Inflammation

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- Need acute inflammation for muscle growth, to fight infection
  - working out, fever, COVID-19
- Use caution with NSAIDs, SAIDs and immunosuppressives
- COVID-19 acute but want lowest chronic inflammation
- Want to avoid chronic inflammation

Let's talk about chronic inflammation...

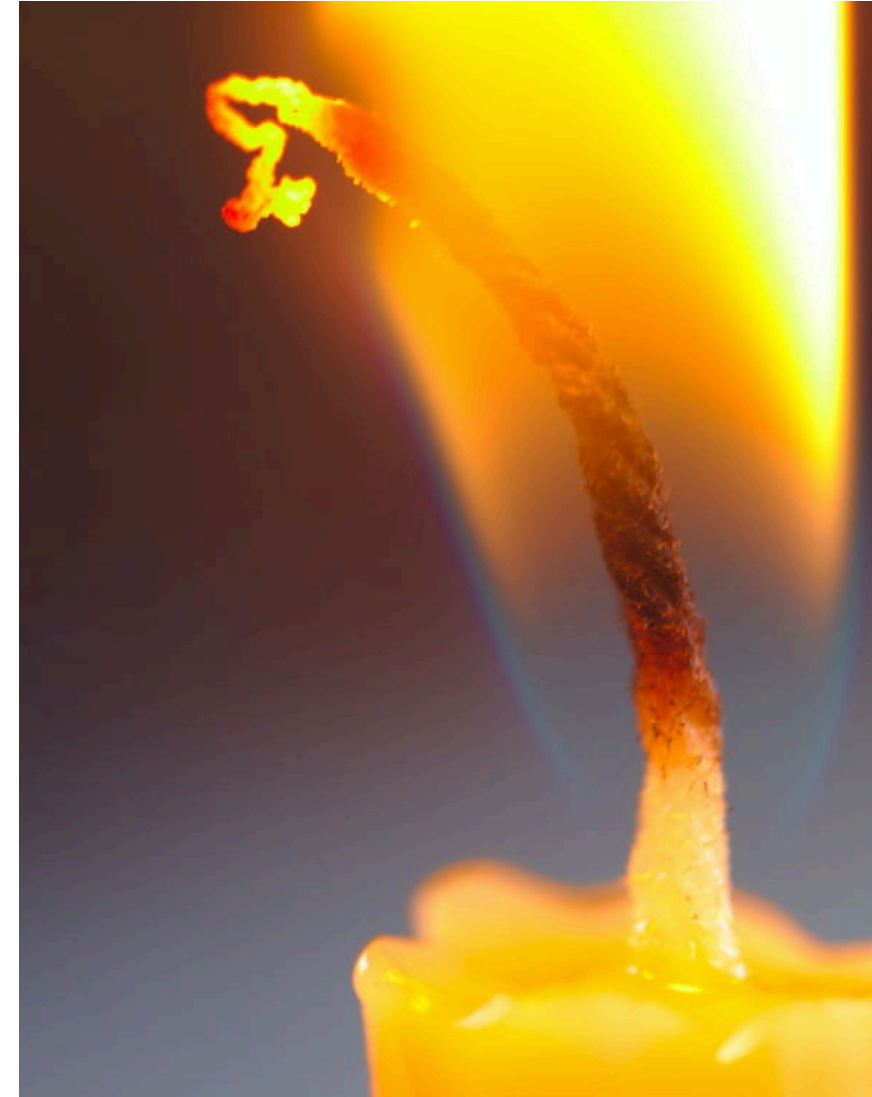


# Chronic Inflammation

**What is chronic inflammation?**

**What is the danger?**

- 80%+ of chronic diseases
- Affects every organ in the body – causing potential breakdown
- Increased risk morbidity and mortality
- It leads to events like cardiovascular events
  - Contributes to plaques and clots in the arteries,
  - Insulin resistance, Diabetes



# Aging - accelerated

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What factors promote inflammaging?

- A) toxins- smoking
- B) animal protein
- C) sedentary lifestyle
- D) stress
- E) all of the above

# Aging Reversed

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What factors reverse **biological** aging?

- A) Whole Food Plant based diet
- B) Better sleep
- C) exercise
- D) relaxation techniques
- E) all of the above

# Foods that accelerate Aging

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- Animal Protein
  - Keto diet- (define?)
    - New study results- increased risk heart attack and stroke by 2.18 fold
    - Mechanisms
      - Cholesterol – increase in LDL and in Apolipoprotein B (ApoB)
      - Most likely through inflammation though not mentioned in the study
    - From the BioBank UK 500,000 participants- one Food Frequency Questionnaire
  - Ketosis valuable potentially... How else can we achieve this?

# Foods that accelerate aging

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- Salt/Sodium –
  - Danger blood levels of 143 or higher
  - Normal range 135-145 mmol/ml
  - What is the Disease Impact?
    - A) heart failure
    - B) increased chronic disease
    - C) death
    - D) accelerated aging
    - E) all of the above – duh😊

# Foods that accelerate aging

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- Salt/Sodium –
- Quiz:
  - What were the Authors' suggestions with high normal sodium in the blood?
    - A) drink more water 12.5 glasses (100 oz) of water a day
    - B) reduce sodium intake
    - C) take diuretics- water pills
    - D) eat more potassium containing foods

# Ultra-processed food studies

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# Ultra-processed foods study #1

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- 3 large US health Professional studies- 160K women and 46K men
- Observational studies- therefore- may have confounding factors
- Duration two decades – FFQ every 4 yrs
- Results: **Increased colorectal cancer**
- Ready to eat meat/poultry/seafood and sugar sweetened beverages in men and ready to eat /heat mixed dishes in women
- Ultra-processed foods- packaged goods and snacks, sugary cereals, ready to eat and heat products- lacking in micronutrients

BMJ studies 2022- doi: 10.1136/ bmj-2021-068921



# Ultra-processed Food Study #2

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- 22,895 Italian adults
- Average age 55 yo
- Duration 14 years
- Observational study- therefore- may have confounding factors
- Quantity and quality of food consumed- analyzed
- 32% increased risk of Heart disease death
- 19% increased risk of all cause mortality
- Conclusion of both studies: increase availability, attractiveness and affordability of fresh and minimally processed foods

BMJ Studies 2022 - doi: 10.1136/ bmj-2022-070688

# Reversing Aging

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With a WFPBD

# WFPBD Disease Reversal

Heart disease  
Diabetes  
Hypercholesterolemia  
Hypertriglyceridemia  
HTN  
CKD  
Heart failure  
Afib  
Autoimmune diseases  
    IBD, RA, SLE, Psoriatic  
    arthritis, MS  
Osteoarthritis  
Osteoporosis  
Neuro  
    Dementia, PD,

GERD  
Gastritis  
Eczema  
Gout  
Cancer  
    BC, PC, CRC, Lung, Liver...  
Migraine  
IBS  
Fibromyalgia  
Constipation  
Diarrhea  
Asthma  
Allergy  
Hypo/Hyperthyroidism

COPD  
AMD  
Uveitis  
Glaucoma  
OSA  
NAFLD  
Long COVID  
And more....



# Reversing Heart Disease with WFPB Diet

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# Caldwell Esselstyn, M.D. Heart Disease Studies

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# Reversing Heart Disease Study

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- First study- Demographics
  - 24 patients (50 combined cardiovascular events)
    - 6 non-adherent
    - 18 adherent following whole food plant-based diet / became 17 after a few years - 1 dropped out
    - 5-year and 12-year follow-ups
  - All patients had severe angiographically demonstrated CAD at Baseline
  - Prospective study

Am J. Cardiol. 1999;84: 339-341

# Reversing Heart Disease Study

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- Whole Food Plant-Based diet included
  - Fruits
  - Vegetables
  - Legumes
  - Beans
  - <10% calories from fat
  - Eliminated dairy, fish, fowl and meat

# Reversing Heart Disease Study

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- Results
  - Adherent group
    - By angiography no disease progression
    - 73% had reversal of atherosclerosis
    - **ZERO** cardiac events
    - Cholesterol dropped over 5 years
      - Total cholesterol mean 237 dl/mg to 137 dl/mg
      - Why is this important? (Framingham Heart Study)
  - Non-adherent group
    - Adherent for first 12-18 months
    - Then- 13 cardiac events



# Caldwell Esselstyn, M.D. Heart Disease 2

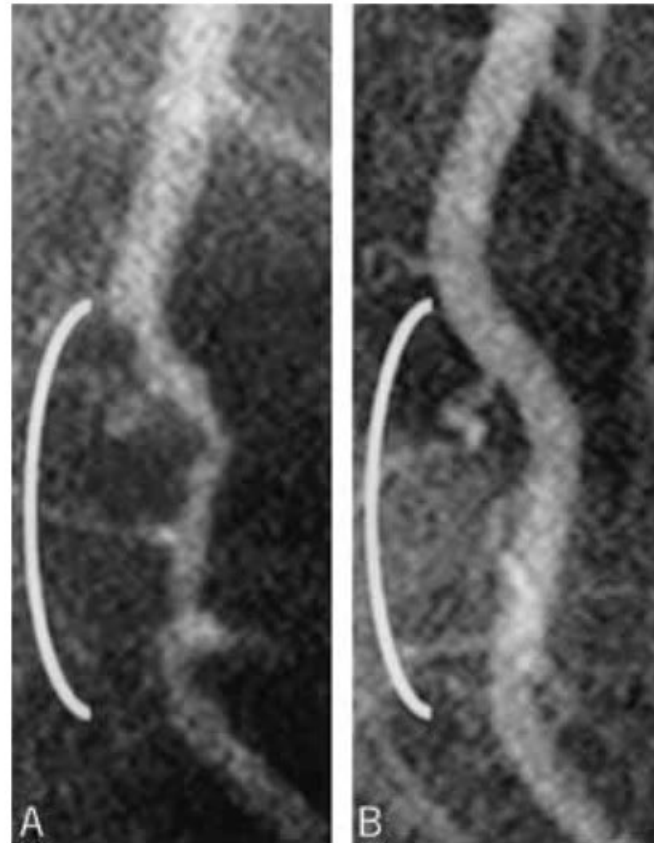
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- Confirmed previous results
  - 198 patients
  - 177 adherent
  - 21 non-adherent
  - Results over 3.7 years
    - Adherent 0.6% cardiovascular event
    - Non-Adherent 62% cardiovascular event

J Fam Pract. 2014 Jul; 63(7):356-364b

# CAD: 32-month results

Reversal of coronary  
artery disease<sup>4</sup>



Coronary angiography reveals a diseased distal left anterior descending artery (A). Following 32 months of a plant-based nutritional intervention without cholesterol-lowering medication, the artery regained its normal configuration (B).

# Reversing Heart Disease

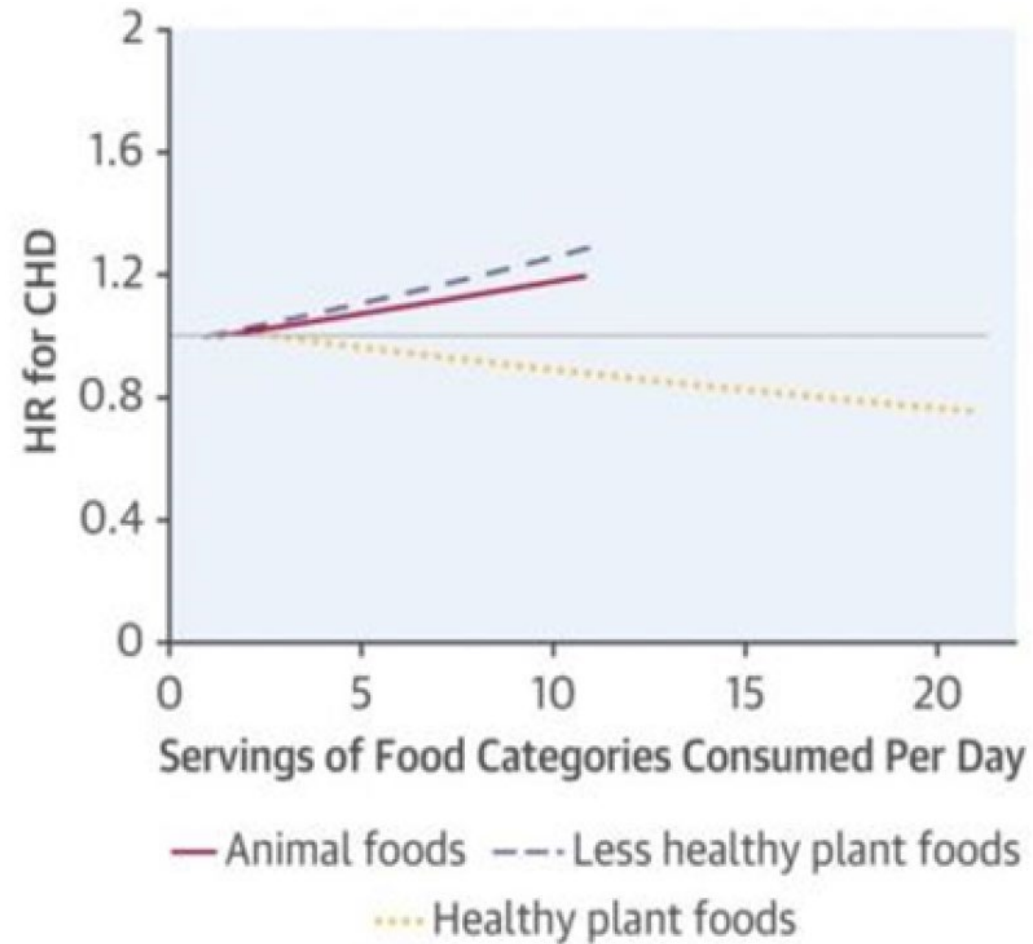
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- Mechanisms of action
  - IMPROVING Endothelial functioning
    - Increase Nitrates
    - Reduce **Inflammation**
    - Phytonutrients- carotenoids (DGLV), flavonoids (berries), plant sterols (legumes, seeds, DGLV), polyphenols (berries, nuts, seeds)
    - Reverse plaques (antioxidants)
  - Reducing Salt
  - Reducing saturated fats

# Does this mean vegan is synonymous with healthy?

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# Coronary Heart Disease



# Chronic Kidney Disease Reversal

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# All-Cause Mortality in CKD

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- **Study: Plant protein vs animal protein**
- Observational study
- Participants: 14,866 from NHANES III
- 20 years or older
- 24-hour recall of plant and total protein

Am J Kidney Dis 2016 Mar;67(3):423-30.

# Results and Conclusion

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- Results

- Average duration 8.4 years
- For each **33% increase in plant protein** to total protein ratio in subpopulation:  
eGFR<60 (4.9% of population; or n=728)
  - **23% decrease in mortality risk**

- Conclusion

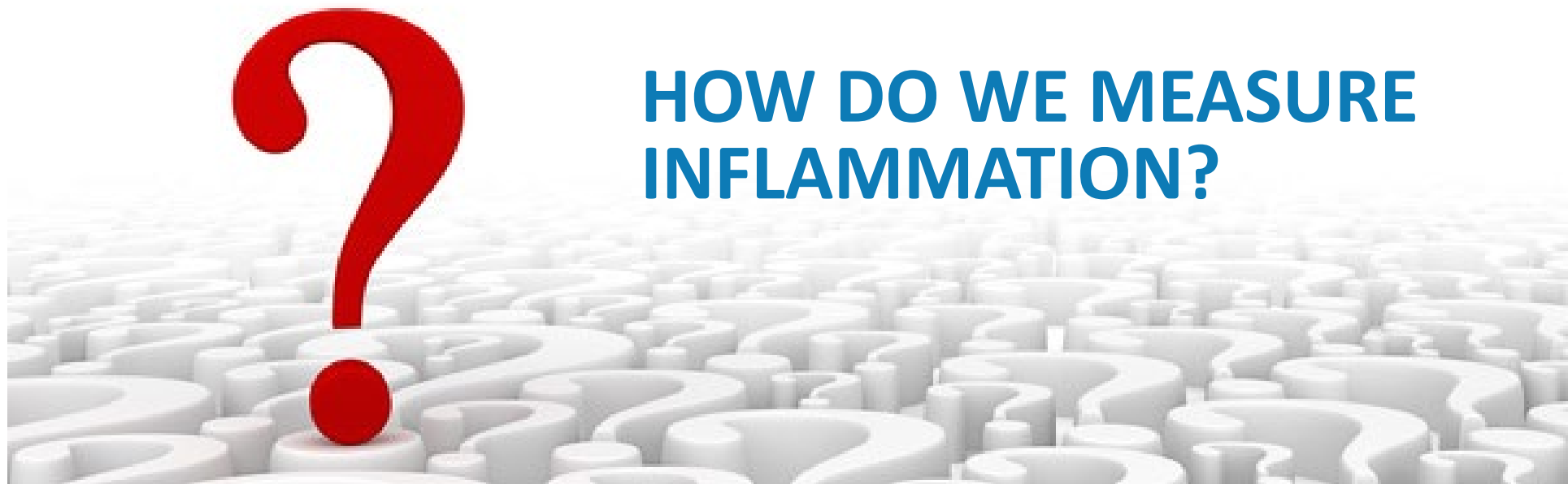
- With an increase ratio of plants to total protein in those with CKD, there may be lower mortality



# CKD Mechanism of action

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- Plant based protein's beneficial effects on the kidney include:
  - Normalizes perfusion of the kidneys
  - Reduced toxins
  - Increased hydration with plants
  - Reduced salt and reduced sat fat
  - Difference in amino acids- such as proline, phenylalanine, cysteine, and serine
  - reduce oxidized LDL induced glomerular damage
  - reduces the acid level and improving kidney function
  - Potentially reduce inflammation- CRP predictor of death in CKD

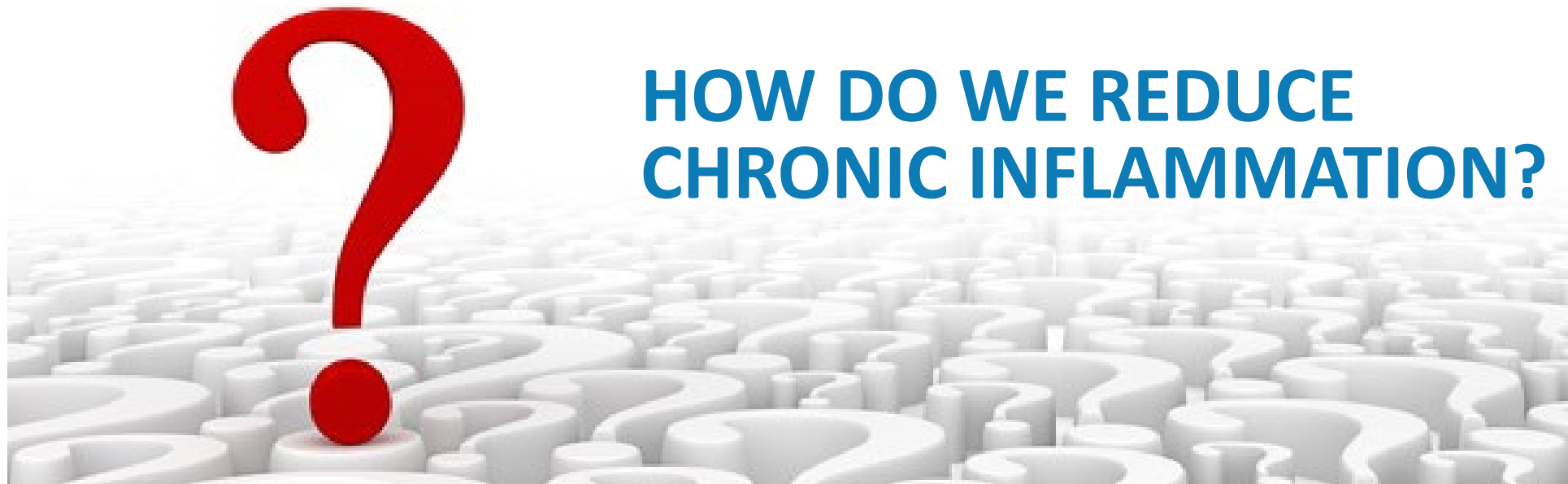


## HOW DO WE MEASURE INFLAMMATION?

# Inflammatory Factors

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- HsCRP promoter and biomarker of inflammation
  - High levels  $>3$
  - Average risk 1-3
  - Optimal levels  $<1$
  - Smoldering (low grade) inflammation – causes inflammaging



**HOW DO WE REDUCE  
CHRONIC INFLAMMATION?**

# How do you reduce HsCRP?

## Medications

- Statins
- steroids

## Lifestyle Modifications

- Whole Food Plant-Based approach
- Micronutrient-Dense
- Specifically, **LIFE** diet



# Lifestyle medicine study Involving Inflammation

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- **LIFE** diet retrospective Study
  - Comparing Phytonutrient levels to Inflammation using
    - Using beta carotene and hsCRP

# LIFE Diet Inflammation Study

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- Objective
  - To determine effects of this dietary approach on inflammation
- Hypothesis
  - Serum beta carotene (biomarker for phytonutrient intake) is inversely related to hsCRP

Am J Lifestyle Med. 2019 Dec 21;15(6):634-643

# LIFE Diet Inflammation Study

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- Retrospective longitudinal study
- 43 patients
- 22 adherent, 21 non-adherent
- Mean duration 6 months
- Diverse Population
- Adherence measured by Beta Carotene blood levels
- Endpoint- inflammation levels measured by hsCRP blood levels



# LIFE Diet Results from baseline

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- In nonadherent patients – results from baseline non-significant
  - Beta carotene 31.8 → 27.1 mcg/dL - **WORSE**
  - CRP 6.51 → 7.74 mg/L - **WORSE**
- In adherent patients results from baseline were statistically significant
  - Beta carotene 45.8 → 100.5 mcg/dL – **more than doubling - BETTER**
  - CRP 7.00 mg/L → 1.75 mg/L – **reduction of 75% - BETTER**
  - Adherent patients actually had a slightly higher hsCRP at baseline

# LIFE Diet Inflammation Study

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- Mechanism of action
  - Phytochemicals
    - Carotenoids
    - Flavonoids
    - Anthocyanins
  - Antioxidants
  - Anti-inflammatory effect
  - Fiber
  - Promote healthy gut microbiome
    - Bacterial diversity, strengthen immune system

# Findings that don't fit

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- Over the years had some patients with increased beta-carotene blood levels but no corresponding decrease in hsCRP
- This is from:
  - Beta-carotene supplements
  - Green powders
  - Starchy vegetables with carotenoids including beta-carotene- e.g. sweet potato, pumpkin
  - CONCLUDE- these foods and supplements do not have anti-inflammatory effect of the DGLVs

# Conclusion LIFE Diet Study

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- LIFE diet reduces inflammation significantly
- Applies to broad population
- The higher the serum beta-carotene, the lower the hsCRP
- Beneficial “side effects”
  - Energy
  - Hydration
  - Alkalinity – bicarbonate
  - Reverse inflammaging

# Micronutrient Dense Whole Food Plant-Based Diet



# Key Formula

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**Health Resurgence = Micronutrients/Calorie Ratio**

or

$$\mathbf{HR=M/C}$$

# Nutrient Dense WFPBD

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Goal: high micronutrient intake= high M/C ratio (micronutrient/calorie ratio)

- Plant-based diet: rich in fruits and vegetables
  - Micronutrients –
    - Phytochemicals-
    - V/M
    - Anti-inflammatory
    - Antioxidants
    - Fiber





**WHAT IS THE LIFE DIET?**



# LIFE Diet

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- (Low inflammatory Foods Everyday) diet
- Dark green leafy vegetables (DGLV) focus
- Smoothie: DGLV/fruit/plant milk, seeds
- Large salads
- DGLV, spices, herbs in low-sodium soups
- Beans, Legumes, bean pasta and bean spaghetti
- Steamed roasted grilled and/or sautéed vegetables
- Limited intact whole grains and starchy vegetables
- Healthy fats- nuts/seeds/avocado/nut butters

# LIFE Diet

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- What differentiates this Micronutrient Dense approach from WFPBD?
  - **Delivery System-** LIFE Diet Blueberry Banana Green Smoothies
    - Advantages:
      - **absorption, reduce inflammation, hydration**, alkalinity, kidney function, energy, **does not raise your sugars**, lots plant protein, lots of fiber, lots phytonutrients- plant nutrients
      - **Frequency x Dose = Better Health**
  - **Focused on** – Vegetable-rich: **DGLV** and beans, lentils and fruits
  - **Limiting** intact whole grains and starchy vegetables i.e. quinoa, oatmeal, sweet potato and winter squash
  - Importance of healthy fats especially for absorption of raw greens
  - Measuring Carotenoids which have been shown independently to reduce death with a dose response\*

\* Arch Intern Med. 2011;171(6):507-515.

# Micronutrients

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## Phytochemicals (define and number)

Helps plants thrive and thwart pathogens

### Examples

- Carotenoids
  - Beta-carotene
  - Lutein
  - Zeaxanthin
  - Lycopene
- Flavonoids
- Polyphenols
  - Anthocyanins
- Soy Isoflavones
- Isothiocyanates- Sulforaphane
- Indole-3-carbinol
- Lignans
- Fiber
- Omega 3s

# Dark Green Leafy Vegetables (DGLV)

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- Broccoli
- Cauliflower
- Kale
- Bok Choy (especially baby)
- Cabbage
- Brussel Sprouts
- Broccoli sprouts
- Collards
- Arugula
- Turnip greens
- Spinach
- Swiss Chard
- Asparagus
- Dark Romaine, butter lettuce and others

# Objective lab measures for Reversing Aging

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- Inflammatory Factors- hsCRP-
- Micronutrient levels - Carotenoid levels – beta carotene
- Kidney function – creatinine and glomerular filtration rate (GFR)
- Benefits of objective measures
  - Reverse Inflammaging
  - Extend telomeres
  - Kidneys are purring- signify reverse aging

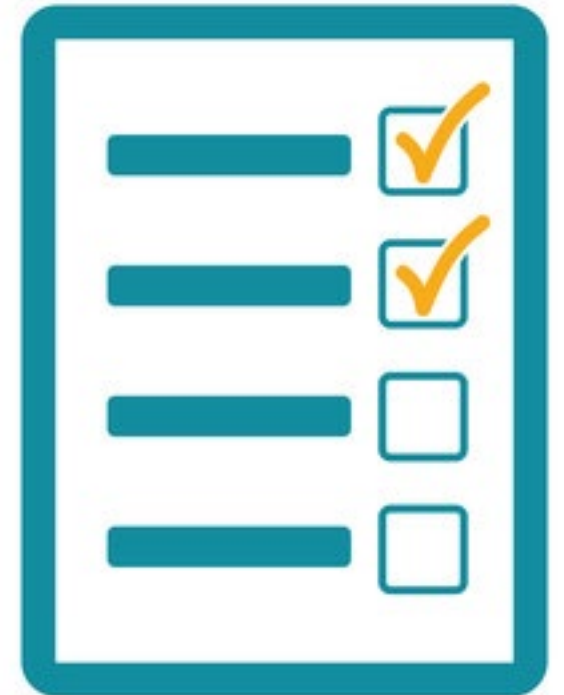


**WHAT HAVE WE LEARNED?**

# Takeaways

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- Reversing Chronic disease is possible
- Inflammation plays a critical role in inflammaging
- **LIFE** Diet helps to reverse inflammaging and improve quality of life
- **Thus: Increase micronutrients, decrease animal protein and minimize ultra-processed foods**



# Resources

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- *Eat to Live*, Joel Fuhrman, M.D.
- *How Not to Die*, Michael Greger, M.D.
- *In Defense of Food*, Michael Pollan
- *China Study*, T. Colin Campbell, Ph.D.
- PCRM.org
- [PPMNY.org](http://PPMNY.org) (Plant Powered Metro NY)
- MedicalCompassMD.com
- *Fiber Fueled*, Will Bulsiewicz, M.D.



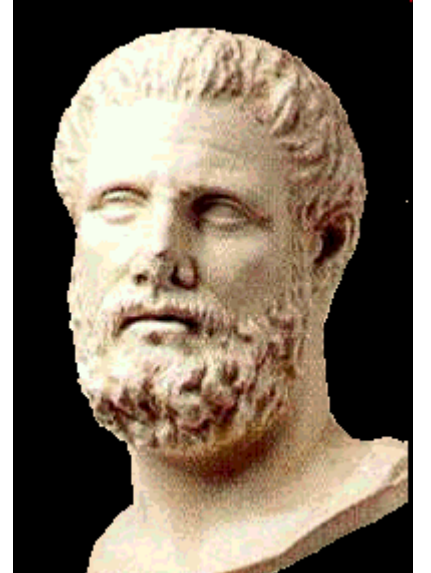
# Video Resources

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- Nutritionfacts.org- short videos
- *Game Changers* – movie by James Cameron
- *Forks Over Knives* – movie

“If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health.”

~Hippocrates



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