

Leading an Anti-Inflammatory Lifestyle

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Objectives

- Examine the role inflammation plays in the disease process
- Define components of an anti-inflammatory lifestyle
- List foods and behaviors that impact inflammation

Anti-Inflammatory Lifestyle

- Inflammation plays a vital role in the health of our bodies
- It is protective in normal circumstances
- Modern lifestyles have led to inflammatory processes causing disease

What is inflammation?

- Inflammation is a way the body protects itself.
 - Increases blood flow to promote healing
 - Causes pain which is a warning, alerting us that there is a problem
- There are negative impacts of too much inflammation.
 - University of Wisconsin Integrative Health compares inflammation to fire: a controlled fire keeps us warm in the winter, a raging fire destroys

Recent findings about inflammation

- Low-grade and/or chronic inflammation can also be harmful.
 - It can be subthreshold for causing pain so it does not alert us to make a change to avoid damage.
 - Low-grade inflammation can impair the body's ability to repair and heal.
 - Low-grade inflammation can damage healthy areas of the body including blood vessels, organs and joints.
- 75-90% of human diseases are related to the activation of the stress system.

Illnesses and medical conditions caused by too much inflammation

- Alzheimer's disease
- Asthma
- Cancer
- Chronic obstructive lung diseases (emphysema and bronchitis)
- Chronic pain
- Type 2 diabetes
- Heart disease
- Inflammatory bowel disease (Crohn's or ulcerative colitis)
- Stroke
- Auto-immune diseases

How to know if you have too much inflammation

- Doctors can test for C-Reactive Protein (CRP)
 - Found in blood plasma
 - It is released into the blood as part of the inflammatory response
- Ways to stop or reduce unnecessary inflammation:
 - Medications such as NSAID (Ibuprofen, Aspirin)
 - Lifestyle

Components of an Anti-Inflammatory Lifestyle

- Eating anti-inflammatory foods
- Not smoking
- Limiting alcohol intake
- Being active and exercising
- Getting a good night's sleep routinely
- Stress management
- Weight management
- Healthy social life

Eating an anti-inflammatory diet

- Modern diets tend to be more inflammatory
- Up to 60% of chronic diseases could be prevented by diet
- One example of an anti-inflammatory diet is the Mediterranean Diet.
- The Mediterranean diet is protective against many chronic diseases, such as:
 - Cardiovascular disease
 - Type 2 Diabetes mellitus
 - Parkinson's disease
 - Alzheimer's disease
- Many traditional diets have similar benefits because they are centered around eating whole, unprocessed foods.

What is the Mediterranean Diet?

- Overall, the Mediterranean diet is relatively high in fat; however, the primary fat source is olive oil and other monounsaturated fats
 - High in omega-3 fatty acids from fish and plant sources
 - Low omega-6 to omega-3 ratio
- Primarily plant-based – lots of fresh fruits and vegetables!
 - When picking fruits and vegetable, color is your friend
 - Fruits and vegetables that are green, orange, yellow, red and purple contain phytochemicals that have antioxidant properties and reduce inflammation

What is the Mediterranean Diet? (continued)

- Whole grains
- Legumes
- Nuts and seeds
- Olive oil
- Moderate amounts of fish, seafood, white meat, eggs and fermented dairy, like cheese and yogurt
- Small amounts of red meats, processed meats and sweets
- Low amounts of high glycemic carbohydrates

Increase Omega-3 Fatty Acids (Essential Oils)

Eicosapentanoic acid (EPA) and docosahexanoic acid (DHA) are strong anti-inflammatory agents

Fatty fish—salmon, sardines, albacore tuna, mackerel and lake trout are good sources

Plant sources typically contain more alpha-linolenic acid (ALA) which isn't as strong an anti-inflammatory agent.

There are now some algae-derived supplements that have higher levels of DHA and EPA

Supplements can be helpful but are probably not as effective as dietary sources

Traditional diets have a ratio of Omega-6 to Omega-3 of about 1:1

Modern, western diets have a ratio of >10:1

This is primarily due to the prevalence of seed oils

Healthy oils and more

- Olive oil!
 - Lowers blood pressure and LDL cholesterol (the bad stuff)
- Coconut oil
 - Still being researched
 - Appears to increase HDL cholesterol (the good stuff)
- Avocado Oil
 - Almost 70% of avocado oil consists of heart-healthy oleic acid, a monounsaturated omega-9 fatty acid (this fatty acid is also the main component of olive oil)
- Tea and Spices
 - Ginger, turmeric and green tea are strong anti-inflammatory agents
- Moderate Dairy
 - Full fat dairy may increase inflammation to a small degree
 - Fermented dairy, like yogurt and Kefir, may decrease inflammation to a small degree

Reduce blood sugar—the glycemic index

- High glycemic index food means that your blood sugar rises **quickly** after you eat.
 - This causes your body to produce high amounts of insulin and -produces inflammation
 - Carbohydrates like white flour, white rice and refined sugar are all high glycemic index foods
- Low glycemic index foods means that your blood sugar rises **slowly** after you eat
 - Whole grains, starchy vegetables and fruits, protein, fats and high fiber foods are low glycemic index foods

Increase fiber

- Fiber slows the digestion of carbohydrates and lowers the glycemic index.
- “Prebiotic” leading to healthier gut bacteria
 - Current evidence suggests that use of prebiotics is more beneficial than use of probiotics
 - Prebiotics help optimize YOUR PERSONAL gut microbiome
 - Probiotics force a standard gut biome upon you
- Good fiber sources
 - Whole grains like oats, brown rice, quinoa, barley, bulgur wheat, etc.
 - Fruits
 - Legumes (beans, like garbanzos & black beans and peas)
 - Starchy vegetables (beets, sweet potatoes, winter squashes, pumpkins etc.)
 - Supplements like Metamucil

Maintain adequate magnesium

- Magnesium (Mg) deficiency is linked to increased inflammation
- 60% of Americans don't get enough
- Sources include nuts, legumes, dark leafy vegetables, seeds and whole grains

Avoid inflammatory foods

- “Hydrogenated oils”
 - Partially hydrogenated = trans fats (banned)
 - Fully hydrogenated
 - Margarine, shortening, processed foods
 - Many deep-fried foods are fried in hydrogenated oils
- Refined seed vegetable oils
 - Soybean, corn, sunflower, safflower, grapeseed, cottonseed
 - Appear to have pro-inflammatory properties
- Probably only problematic in high amounts
- Omega-6 fatty acids—the jury is still out

Reduce saturated fats

- Sources of saturated fats:
 - butter, ghee, lard, coconut oil and palm oil
 - fatty cuts of meat
 - sausages
 - bacon
 - cured meats like salami, chorizo and pancetta
 - cheese
- Traditional diets have a ratio of Omega-6 to Omega-3 of about 1:1
- Modern, western diets have a ratio of >10:1
 - This is primarily due to the prevalence of seed oils

It's not just what you eat but how you eat

- Stress can increase when you:
 - Eat fast
 - Eat alone
 - Eat while multitasking

- Stress can decrease when you:
 - Eat slowly
 - Savor your food
 - Eat with other people
 - Eat while gathered around a table

Smoking

- Smoking affects systemic inflammation by activating and releasing inflammatory cells into the circulation
- Smoking decreases levels of anti-inflammatory substances in the body
- Smokers have increased levels of C-reactive protein and it takes **20 years** after quitting smoking for the levels to fall to those who never smoked

Alcohol

- Chronic inflammation is associated with alcohol-related medical conditions
 - This appears to be related to “gut microflora-derived lipopolysaccharide” (LPS)
 - Alcohol appears to facilitate LPS entering the body from the gut
 - Alcohol appears to impair the liver’s ability to detoxify LPS
 - Alcohol may impair the central nervous system’s ability to regulate inflammation through “neuroimmunoendocrine” actions
- There is evidence from studies in mice that alcohol increases levels of inflammatory “cytokines” (Small proteins involved in cell signaling) and this leads to neurodegeneration.
- How much alcohol is too much?
 - Any?
 - More than 1-3 drinks per day for men
 - More than 1-2 drinks per day for women

Exercise

- Inactivity leads to the accumulation of visceral fat (fat that accumulates around the center of the body)
 - This leads to activation of a network of inflammatory pathways
- The effect of exercise on lowering inflammation may be due to lowering visceral fat AND induction of anti-inflammatory pathways
- In one study, engaging in exercise more than 22 times per month led to a 37% decrease in C-reactive protein
- In another study, even occasional exercise was associated with a 39% decrease in C-reactive protein
- Exercise-related decrease is greater in men than women
- Extreme endurance athletes are more susceptible to infection, presumably because they have lowered their rates of inflammation so much that they are immunosuppressed.

Sleep

- During sleep, blood pressure (BP) decreases
 - With inadequate sleep, BP doesn't lower enough
 - Blood vessel walls respond to higher BP by triggering inflammation
- Inadequate sleep leads to the accumulation of “beta-amyloid,” which is linked to inflammation and brain damage

Stress

- Stressful events activate the fight, flight or freeze response
 - Increased blood pressure and pulse
 - Stress induces inflammatory pathways in the whole body, including the brain
- Chronic stress
 - Leads to increased levels of C-reactive protein
 - Psychological stress triggers inflammatory activity and plays a critical role in the onset, maintenance, and recurrence of depression.

Weight

- Inflammation increases with weight
- Levels of C-reactive protein increase with weight
- Weight gain triggers leptin resistance
 - Leptin is a key hormone that tells the brain when to eat, when to stop eating and when to speed up or slow down metabolism.
 - With leptin resistance the brain gets the message that the body is starving and weight gain escalates

Psychosocial

- Social engagement is associated with lower levels of inflammation
- Isolation and loneliness are associated with a decreased ability to regulate inflammation
- Social disengagement can lead to the upregulation of inflammatory responses including increased levels of C-reactive protein

Lifestyle Change

- Lifestyle change is hard
- It is not about willpower
- It is about changing habits
- Incremental changes over time may be more successful than wholesale change all at once
- Start small – try switching from canola, corn or sunflower oil to olive or avocado oil when cooking

Summary

- 75–90% of human diseases are related to the activation of the stress system
- Up to 60% of chronic diseases could be prevented by diet
- Activation of the stress system and diet are modifiable risk factors for adverse health conditions
- Making adjustments in these areas will improve your health:
 - Eating anti-inflammatory foods
 - Not smoking
 - Limiting alcohol intake
 - Being active and exercising
 - Getting a good night's sleep routinely
 - Stress management
 - Weight management
 - Healthy social life

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