

Inflammation and Nutrition: Friend or Foe?

Dana Rizzo RN, BSN, ACM-RN
Area Manager for Waltonwood Senior Living

Dana.Rizzo@singhmail.com

571-918-4854 ext. 2121



Objectives: Upon completion of this presentation the participant will be able to:

- 1. Discuss the effects of Inflammation at the Cellular level.**
- 2. Define the terms Senescent, Cellular Senescence, and Immunosenescence and its relationship to aging.**
- 3. Discuss how chronic inflammation affects our bodies' organs as we age.**
- 4. Discuss the difference between Chronic and Acute Inflammation.**
- 5. Discuss how Gut Microbiota affects the Gut and how poor nutrition can lead to Leaky Gut.**
- 6. List 7 Diseases affected by chronic inflammation.**
- 7. List 6 ways Life Style Choices can Improve Healthy Aging, reduce inflammation, and promote longevity.**

Inflammation

The Human body is incredible, it has over 37 trillion cells, it performs a multitude of tasks with precision and strength every day.

Our hearts pump over 2000 gallons of blood each day, our eyes distinguish over 10 million colors. Our thigh bones(femurs) can withstand 6,000 pounds of compressive force.

Our Human Body also comes with a built-in defense system- a complex army of infection-fighting cells and proteins that warn other cells of invaders, fights them off when they arrive, and heal any damage the resulting conflict produces within our bodies. These are called Antibodies.

This Inflammatory process is essential for survival, especially during this pandemic.

You have seen the effects of inflammation in real time, paper cut, sprained your ankle, pimple, or a bee sting.

Aging is characterized by systemic chronic inflammation, which is accompanied by Cellular Senescence (aging of cells where they no longer divide, but do not die), Immunosenescence (gradual deterioration of the immune system), organ dysfunction, and age-related diseases.

Factors secreted by senescent cells, known as the senescence-associated secretory phenotype (SASP), promote chronic inflammation and can induce senescence in normal cells.

At the same time chronic inflammation accelerates the senescence of immune cells, resulting in weakened immune function and an inability to clear senescent cells and inflammatory factors, which creates a vicious cycle of inflammation and senescence.

Persistently elevated inflammation levels in organs, such as, the bone marrow, liver, and lungs cannot be eliminated in time, leading to organ damage and age-related diseases.

Inflammaging at the Cellular Level

As the basic unit of the body, cellular senescence and the accompanying low-energy, effects and drives organismal aging.

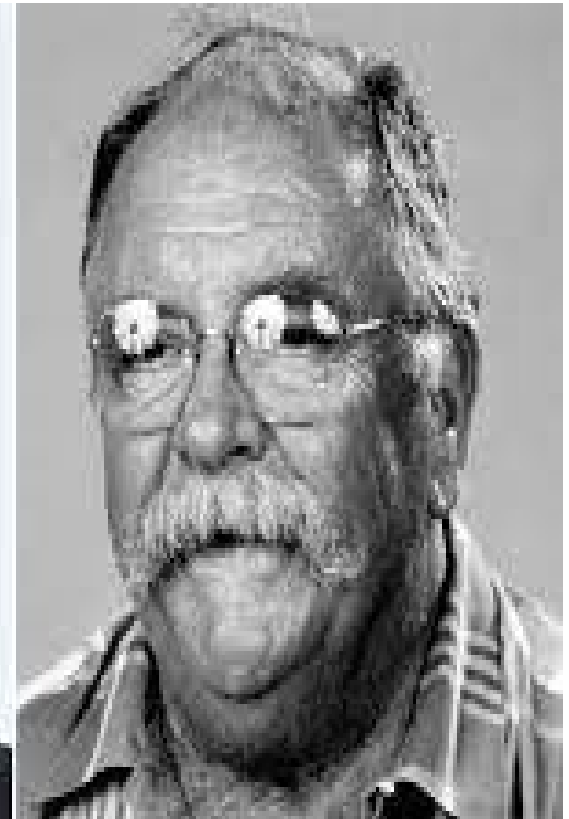
Recent studies have systematically summarized the biomarkers of cellular aging. Immunocytes, as key regulators of aging cells, have always been a focus of research due to their dysfunctional changes during aging.

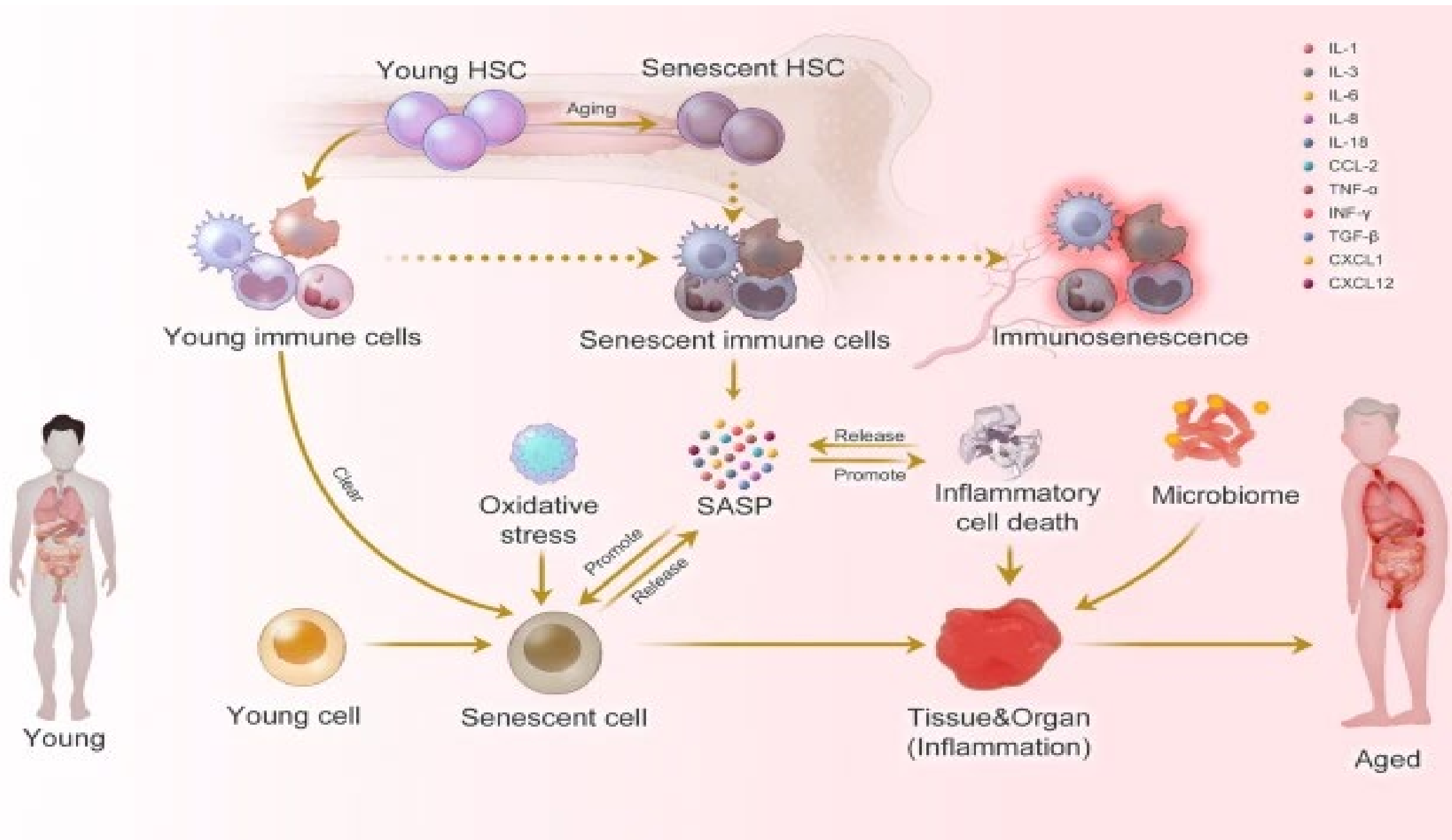
As early as 1969, Walford proposed “The Immunologic Theory of Aging”, which further developed into the concept of immunosenescence, which is mainly manifested by a decrease of the body’s immune response to endogenous and exogenous antigens, leading to a decrease of the individual’s anti-tumor capacity and the ability to clear senescent cells (Fig. 1).

Immunosenescence is a multifactorial cascade of events with different types of immune cells exhibiting different sensitivities.

However, due to the inherent complexity of the mechanisms of immunosenescence, it is imperative to conduct research on immune cellular changes in multi-modal and systematic ways.

Inflammation has been recognized as an endogenous factor in aging, and the elimination of inflammation could be a potential strategy for anti-aging.

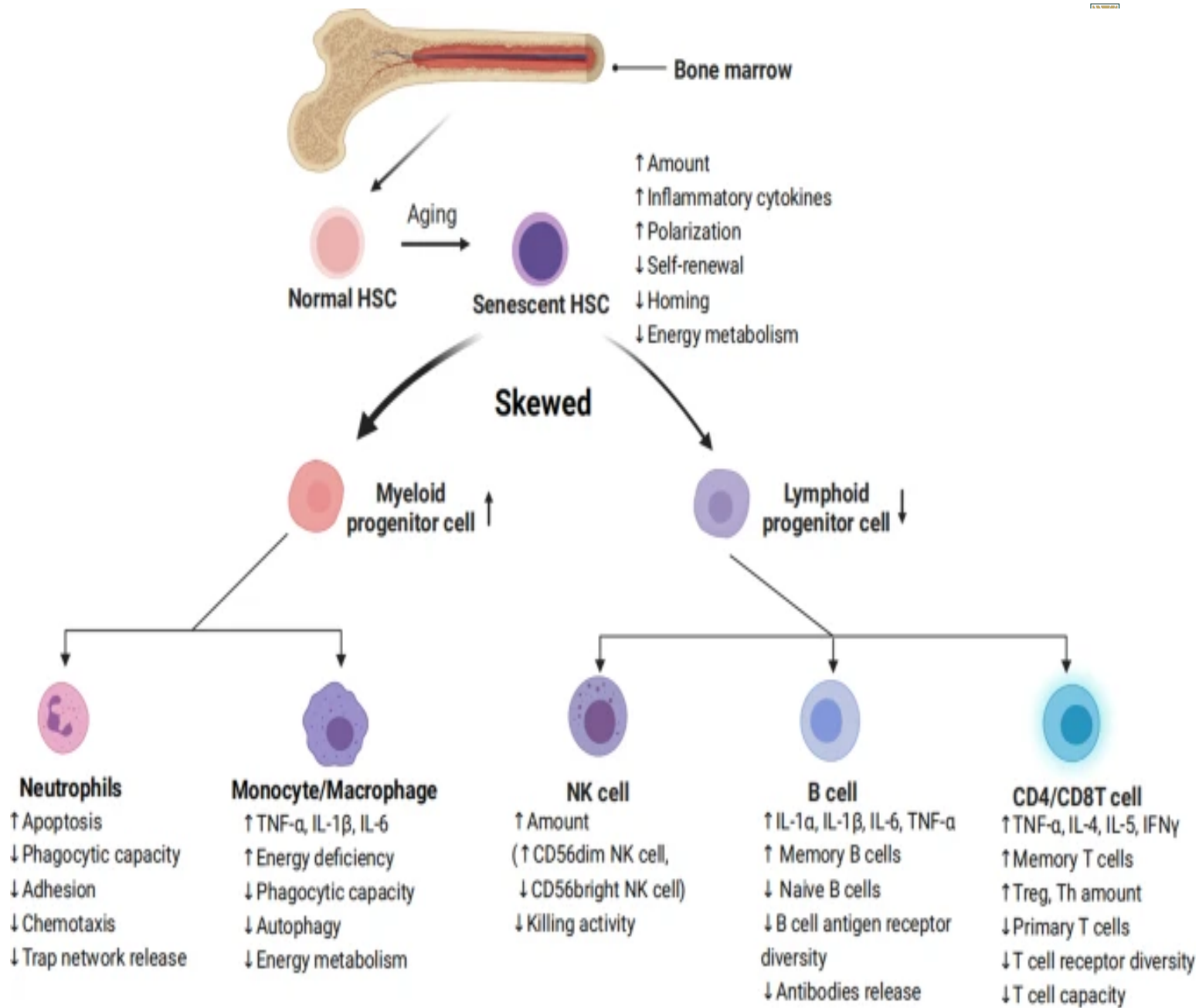




Characterization of Hematopoietic Stem Cells (HSC) differentiation into immune cells during aging.

Inflammation in senescent bone marrow impairs the function of HSCs. HSCs differentiate into various immune cells, and their senescence leads to changes in the number and functions of immune cells.

Common features of immune cell senescence include a decline in performing immune functions and an increase in the release of inflammatory factors



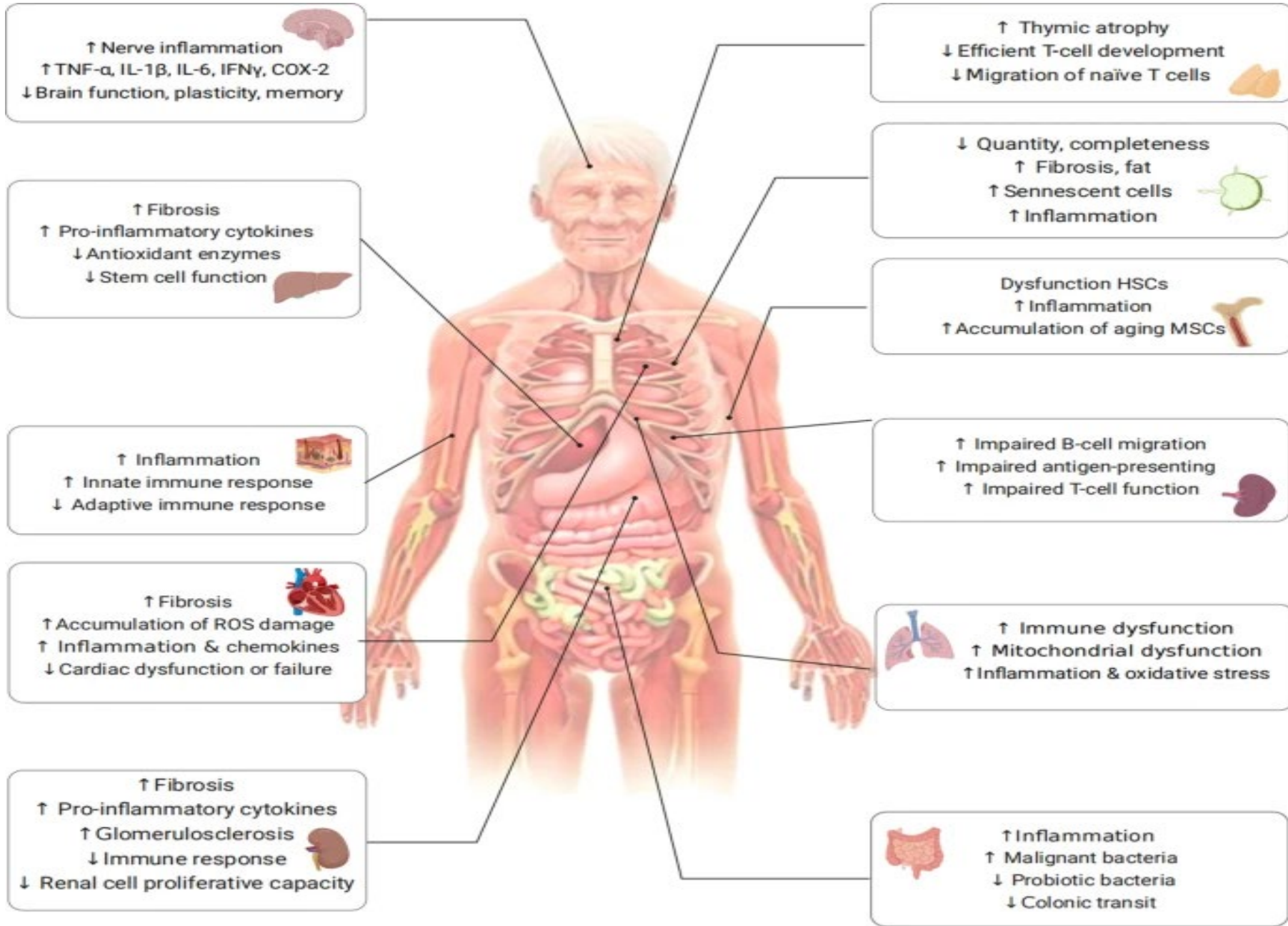
Aging-organ atlas

Aging manifests as a decline in organ function and an increased susceptibility to diseases. Organs are mainly divided into immune organs, sterile organ, and others.

Functional changes in cells are shown in each organ in the next power point.

Nutrition serves as the source of essential nutrients, providing energy and substrates for the numerous metabolic functions.

Inflammation is an acute reaction to stressors such as trauma or infection and an increasing number of chronic diseases.



Chronic Inflammation

Sometimes the immune system misfires and turns against our own body.

This launches an **AUTOIMMUNE RESPONSE** that manifests in diseases like Lupus, Rheumatoid arthritis, psoriasis, and multiple sclerosis, and type 1 diabetes.

For example, in type 1 diabetes, the immune system attacks cells in the pancreas, crippling the body's ability to produce the hormone, insulin.

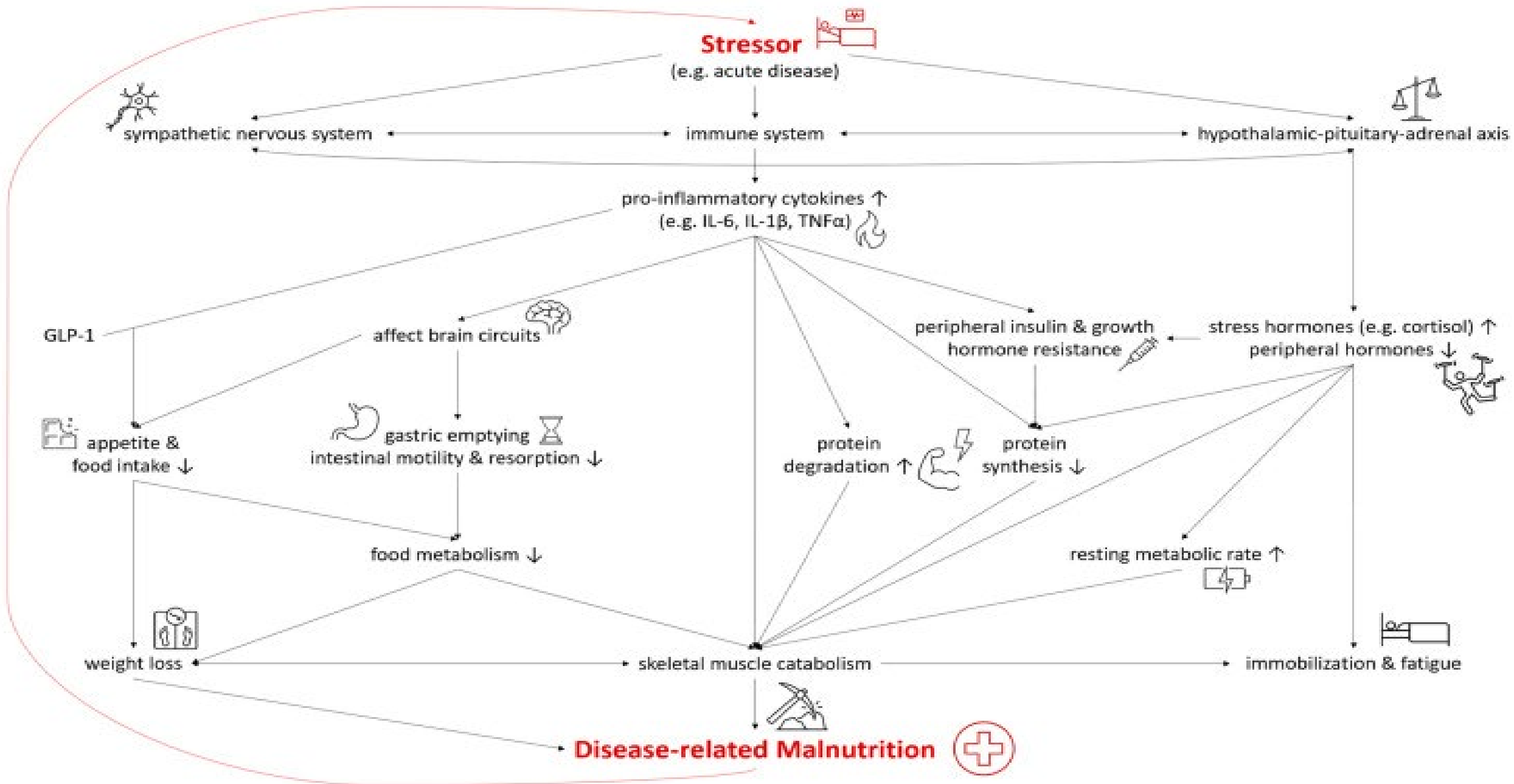
A growing body of evidence suggests that low-grade, chronic inflammation-the kind that simmer for decades without your being aware of it-contributes to some of the nation's leading killers, including cardiovascular disease, cancer, and type 2 diabetes, which together are responsible for two-thirds of all deaths in the United States. (Mayo clinic). It is frightening because it is silent , invisible, and insidious.

Research is ongoing

Chronic Inflammation is unique on how we all respond to the stressors of life. We are all unique and effects are driven by a combination of genes, lifestyle, and current health. Researchers still have holes in their understanding of chronic inflammation. Researches are still determining whether inflammation actually causes the disease process, contributes to it, (along with other factors) or is it an effect of the disease.

When you have chronic inflammation, your body is in a constant state of high alert.

The release of inflammatory chemicals can affect different systems in your body and can be the cause or consequence of multiple diseases. (Robert Shmerling,M.D.).



LONG-CHAIN SATURATED FATS

MEDIUM/SHORT-CHAIN SATURATED FATS



TLRs activation

Lipid intermediates acculumation

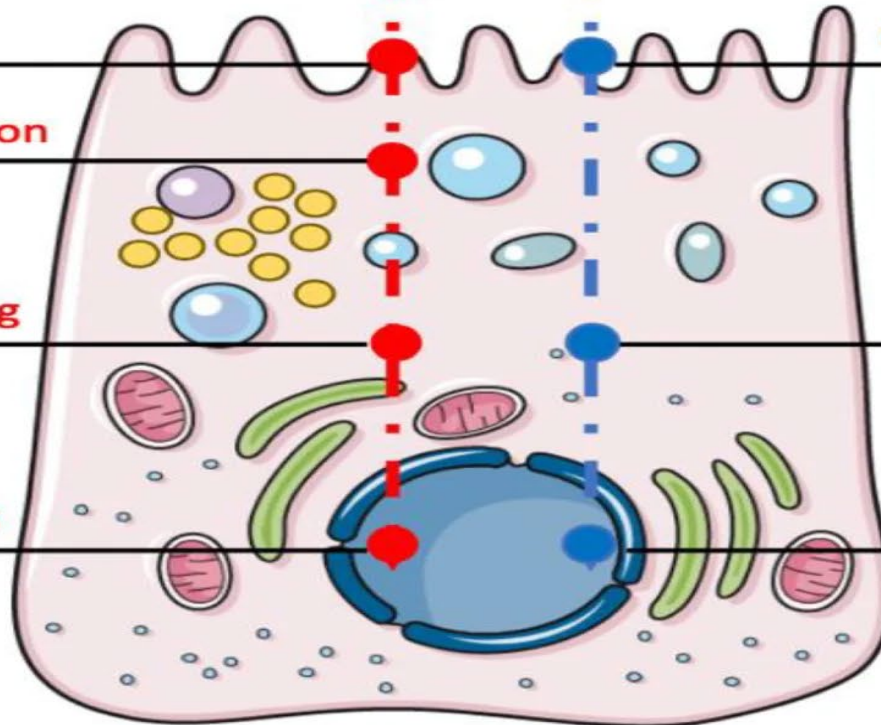
↑ ROS production
Endoplasmic reticulum suffering

↑ MAPK, NF-κB, AP-1 pathways

G protein-coupled receptors agonist

Inhibitor of histone deacetylase

↓ complement system and
inflammation genes



Gut Microbiota Strains

Stomach

$10^1 - 10^3$ CFU/ml

Lactobacillus, Streptococcus, Staphylococcus, Enterobacteriaceae

Duodenum

$10^1 - 10^3$ CFU/ml

Lactobacillus, Streptococcus, Staphylococcus, Enterobacteriaceae

Jejunum & Ileum

$10^4 - 10^7$ CFU/ml

Bifidobacterium, Bacterioids, Lactobacillus, Streptococcus, Enterobacteriaceae

Colon

$10^{10} - 10^{11}$ CFU/ml

Bifidobacterium, Bacterioids, Eubacterium, Clostridium, Peptostreptococcus, Fusobacterium, Lactobacillus, Streptococcus, Enterobacteriaceae

Dysbiosis of Gut Microbiota

Gut-Brain Axis:

Stress, Anxiety, Depression, IBS, Schizophrenia, Cognitive Decline, Autism

Gut-Brain Endocrine Axis:

Regulatory, Metabolic, Behavioral and Hormonal Disorders

Gut-Heart Axis:

Cardiovascular Diseases, Atherosclerosis, Thrombotic events, Hypertension

Gut-Lung Axis:

Chronic Obstructive Pulmonary Disease

Gut-Liver Axis:

Liver Inflammations, Hepatocellular Carcinoma, Non-Alcoholic Fatty Liver

Gut-Pancreas Axis:

Diabetes, Pancreas cell Inflammation

Gut-Bone Axis:

Bone Demineralization, Osteoporosis

Gut-Muscle Axis:

Muscle Impairment, Frailty, Sarcopenia

Gut-Skin Axis:

Acne, Psoriasis, Atopic Dermatitis, Wrinkles, Aging

Gut-Reproductive Axis:

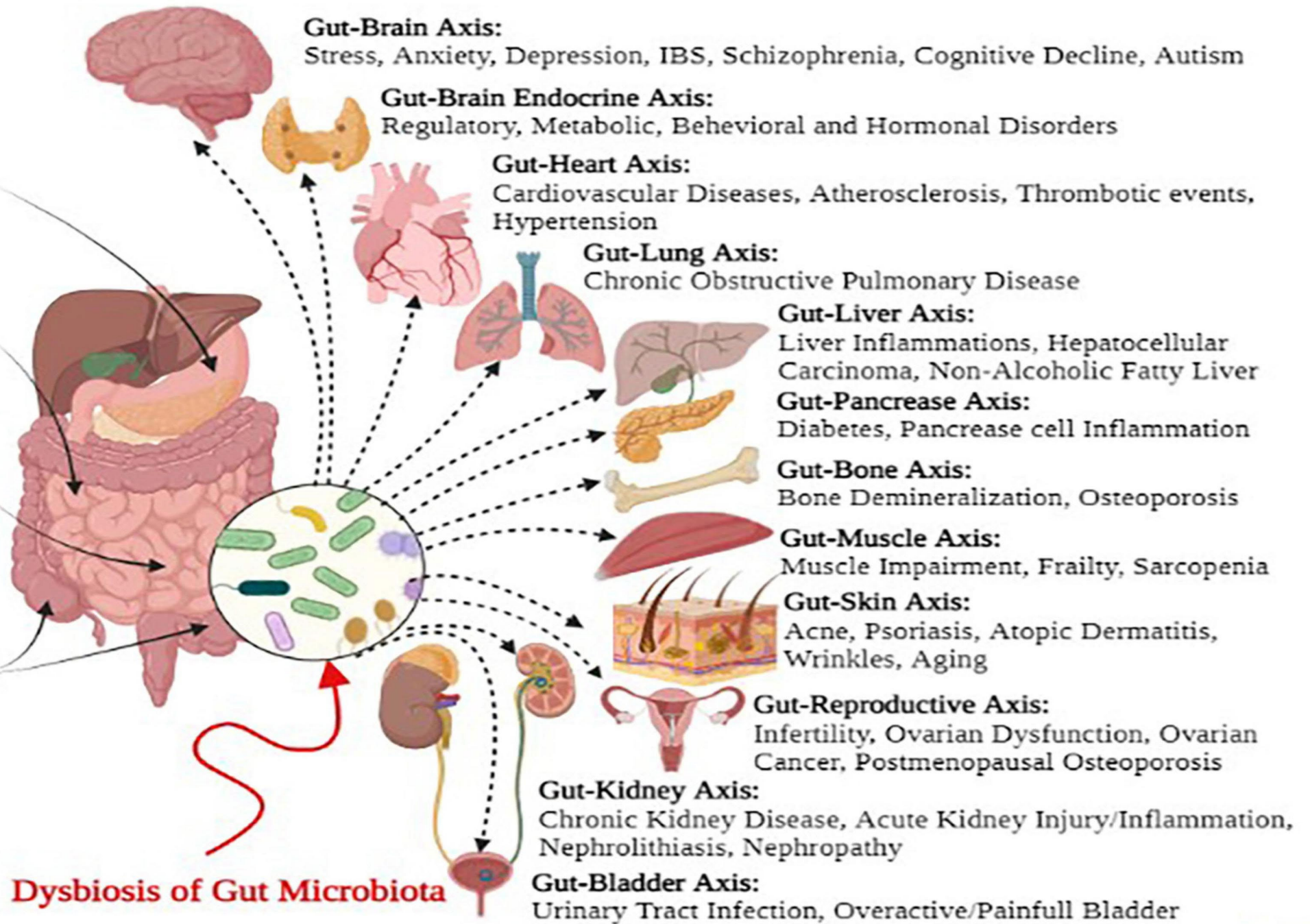
Infertility, Ovarian Dysfunction, Ovarian Cancer, Postmenopausal Osteoporosis

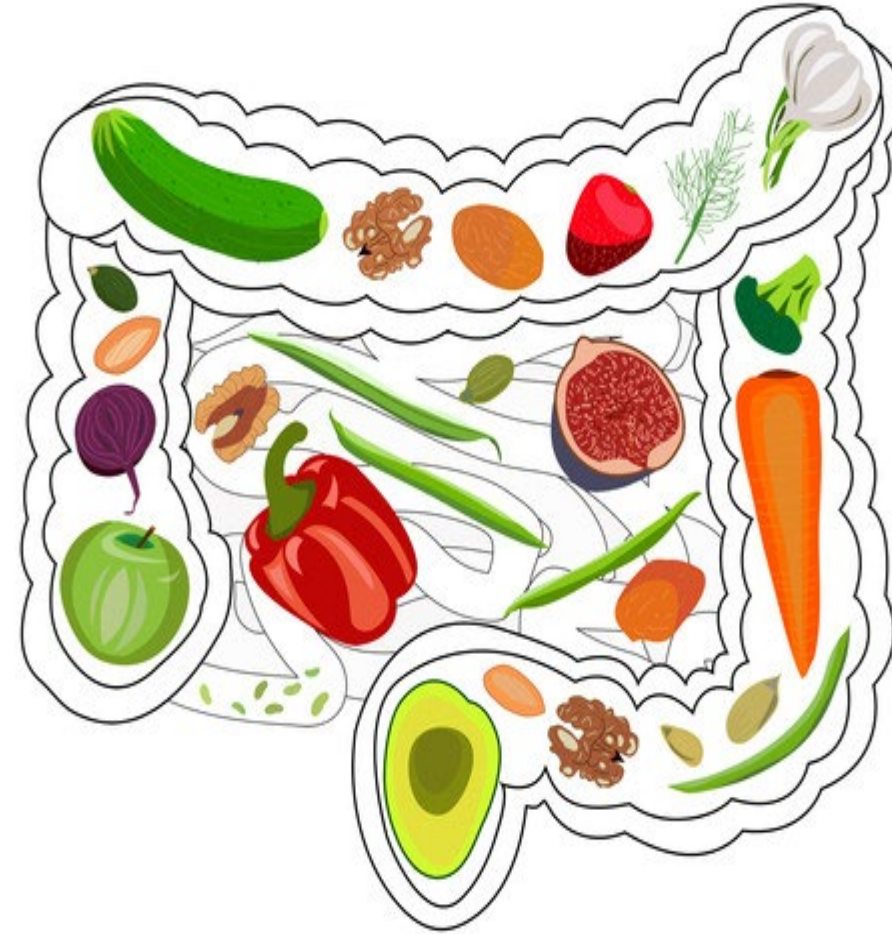
Gut-Kidney Axis:

Chronic Kidney Disease, Acute Kidney Injury/Inflammation, Nephrolithiasis, Nephropathy

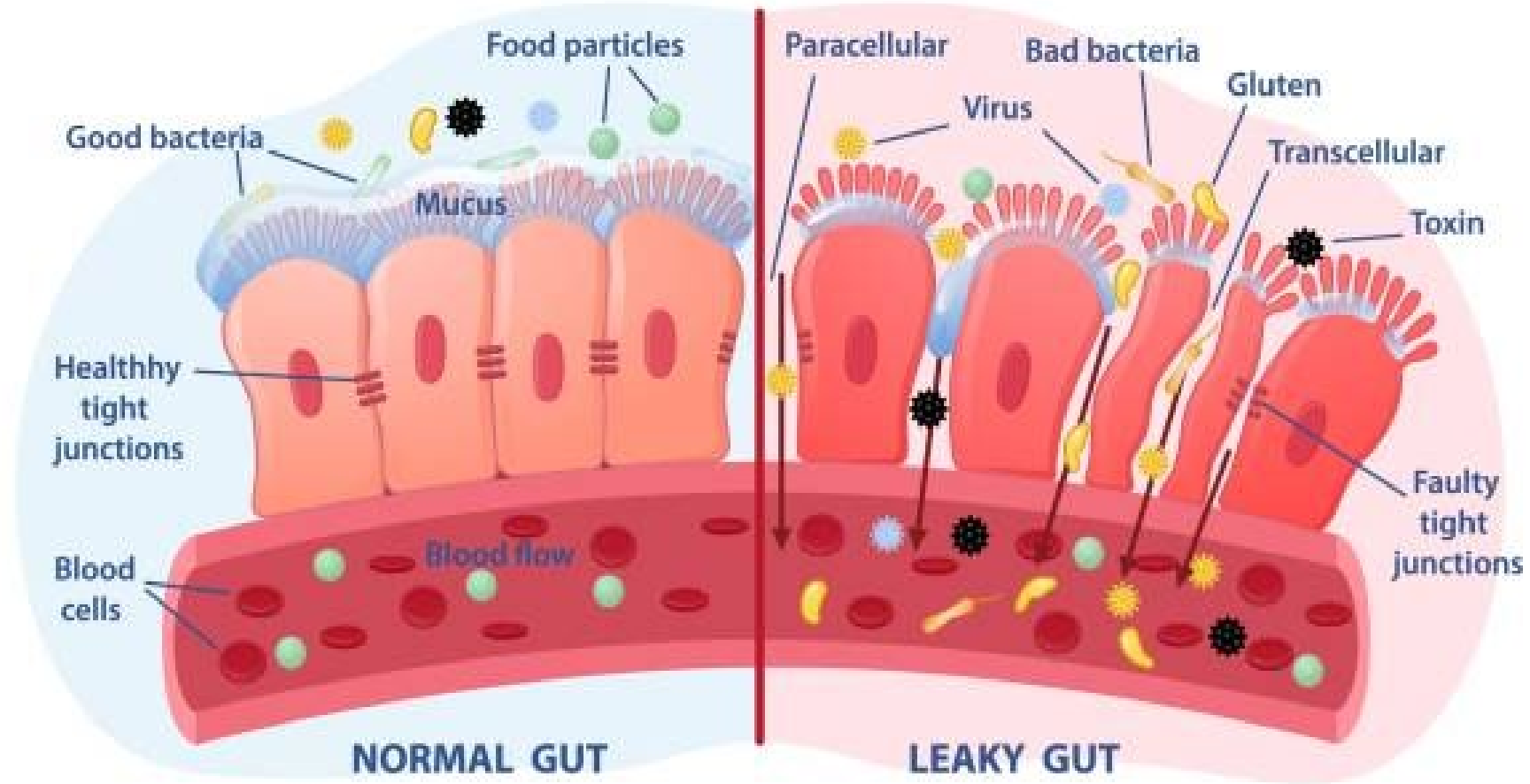
Gut-Bladder Axis:

Urinary Tract Infection, Overactive/Painfull Bladder





LEAKY GUT SYNDROME



Acute Inflammation

Acute inflammation occurs, whether from trauma, harmful substances, a bacterial or viral invasion, your body send's out pro-inflammatory cells to destroy the damaging substances, heal the tissues and return the affected area to a state of balance.

This rapid response results in all of the symptoms you see when you injure yourself; swelling, pain, redness, heat.

The Innate Immune system in Acute inflammation; The process begins by our injured tissue sending a message to our MAST CELLS, chemical release of histamine occurs, which results in swelling redness, and heat.

Chemotaxins (chemical released by damaged tissue and germs).

The first soldiers to arrive in this immune army are the NEUTROPHILS, the most abundant WBC, which go on the attack.

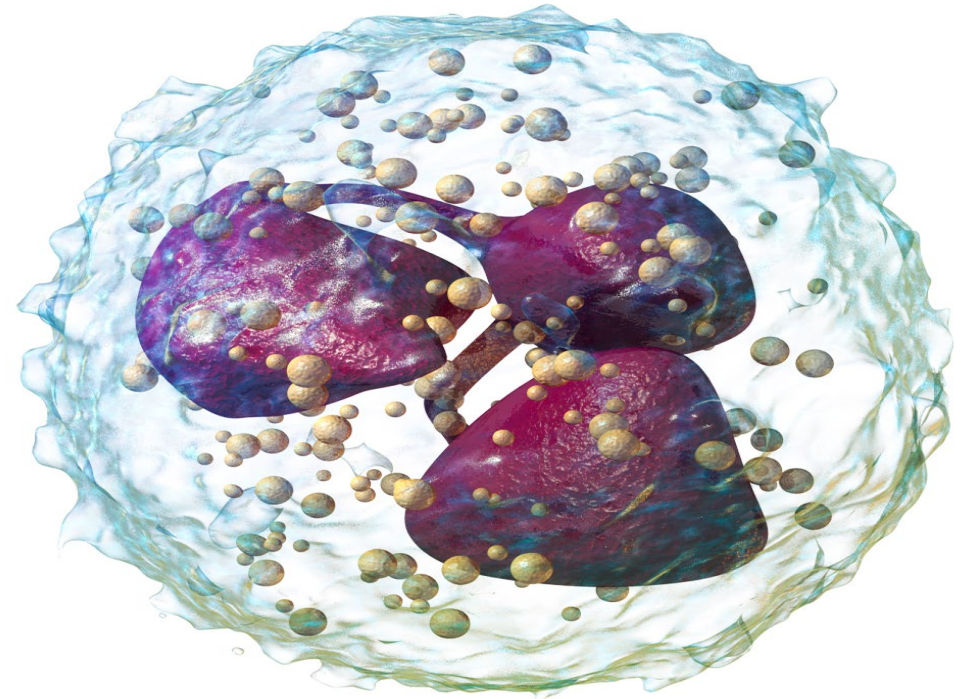
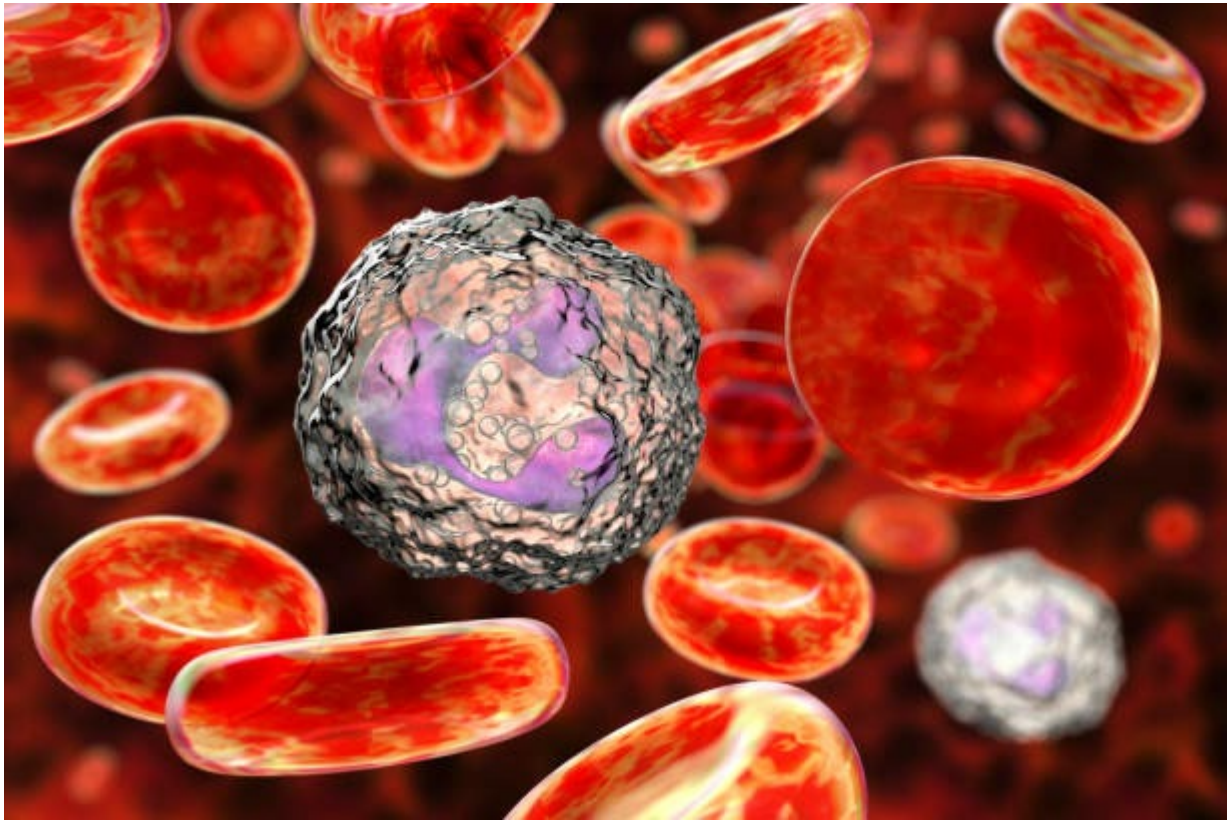
PHAGOCYTES another WBC engulf, consume, and destroy harmful organisms. Byproducts of this process, along with continuing distress signals sent out by damaged tissue, magnify the Acute inflammatory response

Macrophages, another White blood cell, eventually are sent out to clean up the dead cells, virus, bacteria.

Neutrophils

Neutrophils are like the hand grenades of the immune system. They blow up everything in site, healthy or not. Each Neutrophil has a short life span, but in Chronic inflammation, they continue to be sent out long after the real threat is over. Damaging healthy tissue in their path. 40-60 % of our White Blood Cells are Neutrophils that fight infections in our bodies.

Neutrophils



Study results: Cardiologists in Boston reported on a clinical trial with more than 10,000 patients in 39 countries(mean age: 61) that tested to see if an anti-inflammatory drug could lower rates of heart Disease.

Results were that it could lower heart disease.

They also found that it reduced lung cancer mortality by 77 percent.

Gout and Arthritis also fell with the use of these special anti-inflammatory drugs.

“When inflammation increases so does your risk for disease “per Dr. Dana DiRenzo a Rheumatologist at John Hopkins Hospital in Maryland.

Chronic Inflammation

In contrast to the Acute Inflammatory process, Chronic inflammation is NOT short-lived- and is rarely helpful.

Chronic inflammation may begin with the same cellular actions , as acute inflammation, but it morphs into a lingering state that persists for months or years.

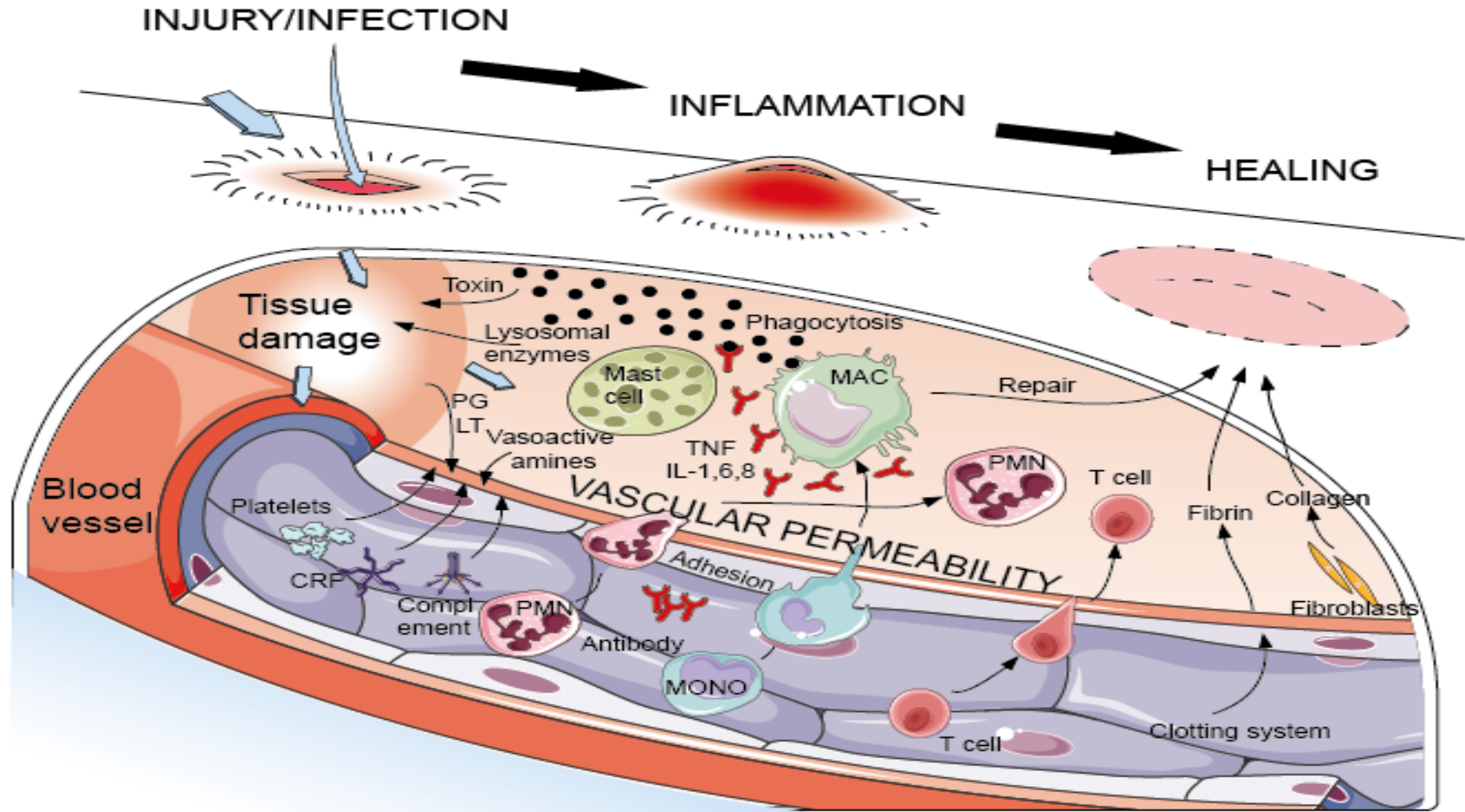
The body sounds the alarm, war cry, and emergency help arrives, but the threat never recedes, and the fire continues to burn within our bodies. “Misfiring of the Immune system.”

Chronic inflammation, as we have previously discussed is insidious, and is linked to over 60 serious diseases.

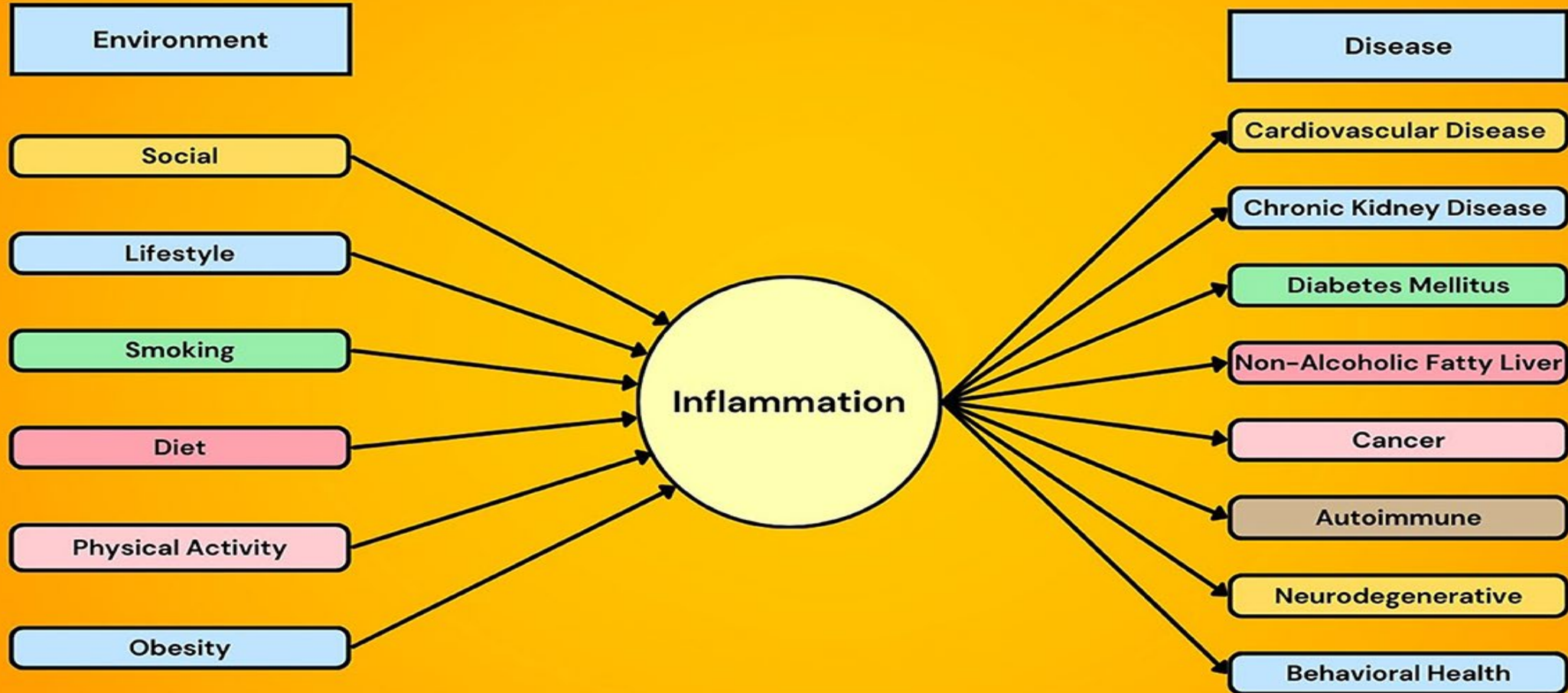


How can Something so Natural
to our bodies be toxic to our
health?

Inflammation and your Body



Pathway Through Inflammation to Disease



Diseases linked to chronic inflammation

BRAIN AND SPINAL CORD: Alzheimer's disease, MS, Parkinson's disease

THYROID: Thyroiditis

LUNGS: Allergies, asthma, COPD, lung cancer

LIVER: Chronic hepatitis

KIDNEYS: Chronic kidney disease, kidney failure, nephritis

SKIN: Acne, eczema, psoriasis, skin cancer

IMMUNE SYSTEM: Autoimmune disorders such as lupus, RA, Sclera derma

EYES: Macular degeneration, retinal degeneration, uveitis

HEART, BLOOD VESSEL, and PULMONARY : Atherosclerosis (hardening of the arteries), heart disease, COPD, Asthma, etc.

PANCREAS: Type 1 Diabetes, Diabetes type 2

DIGESTIVE SYSTEM: Inflammatory bowel disease, including Crohn's disease and Ulcerative colitis

JOINTS: Some forms of arthritis, including rheumatoid arthritis and psoriatic arthritis

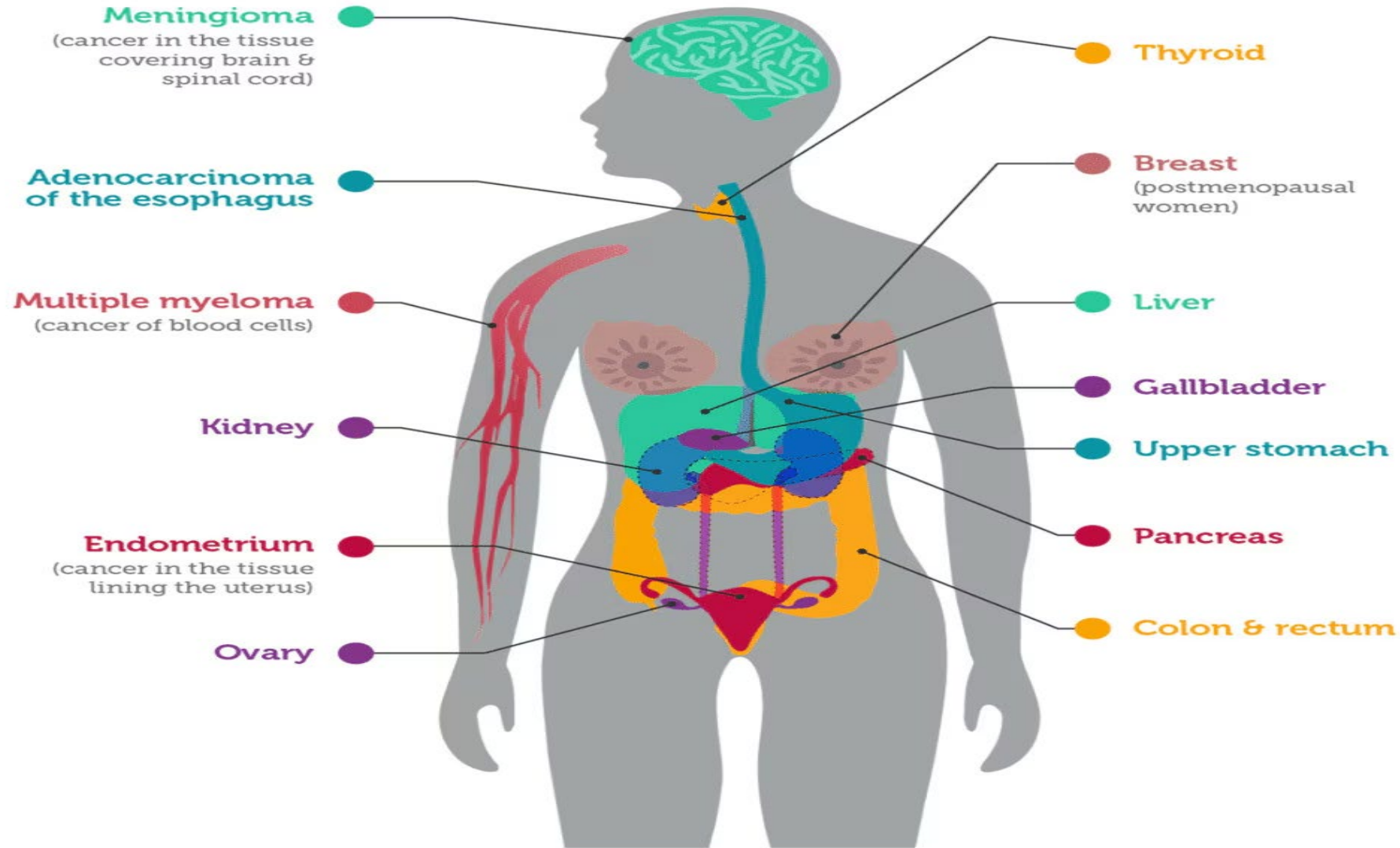
Acute versus Chronic



Diseases Linked to chronic inflammation



Cancers Associated with Overweight & Obesity



cancer.gov/obesity-fact-sheet

Adapted from Centers for Disease Control & Prevention



How Acute Inflammation turns Chronic

In chronic inflammation what may have started as a solution to the problem, getting rid of a dangerous invaders (pathogens), now becomes the problem.

Chronically inflamed tissues continue to send out alarms that signal the body's immune response, long after the threat has been cleared.

When white blood cells heed the call and arrive at the scene, they may attack healthy tissues and organs, further amplifying the response and setting up a persistent inflammatory state.

As a result, rather than healing the tissue, according to Harvard researchers, the WBC begin breaking down good tissue.

Chronic Inflammation Development

Chronic inflammation can develop in several ways according to Harvard and John Hopkins researchers;

One way is that the body cannot effectively rid itself of the threat, whether it be an offending substance, infectious organism, an irritant, or a chemical substance.

Another scenario is that our Immune system goes into “Threat Mode” when there is no true threat.

In an autoimmune disorder, the immune system becomes overly sensitive to the body's own healthy cells and tissues. It reacts against the joints, intestines, or other organs and tissues as if they were dangerous. As the inflammatory process continues, it damages the body instead of healing it.

Signs and symptoms of chronic inflammation

Signs and Symptoms of chronic inflammation include;

Fatigue and lack of energy: due to reduction in conversion of T4 to T3 reduces energy expenditure.

Depression and anxiety: Endocrine changes

Muscle aches and joint pain: related to increased fatty acids.

Constipation, diarrhea, and other GI complaints: related to slower gastric emptying

Changes in weight or appetite; Related to Disease Related malnutrition (DRM)

Headaches: blood sugar variations

A “fuzzy or foggy” mental state

The symptoms of chronic inflammation linger over the long term, or they come and go over

time. The symptoms of chronic inflammation may not be as obvious as those of acute inflammation

When good Inflammation Turns Bad

Situations where the Immune System does not turn off:

The Immune system has a set of “brakes” that turns it off after the threat is over. A faulty Immune System response occurs in cases with ARDS (adult respiratory distress syndrome) and Covid-19, where it does not brake.

1. When the immune system fails to revert to normal or to the baseline: For example, reactive arthritis. Possible Molecular Mimicry/autoimmunity responses can occur.
2. When the immune systems misfires; immune system can identify the difference between threat and non-threats. Hypersensitivity, allergies or Autoimmunity.
3. When inflammation is the result of lifestyle or aging: Increasingly scientists are finding that a number of major diseases involve Low-Grade Chronic Inflammation; Results in inflammation affecting your brain, inflammation and metabolic diseases, inflammation and cancer, and inflammation of the lungs, skeletal system etc. can occur. (National Heart, Lung, and Blood Institute NHLBI)

When inflammation is the result of lifestyle or aging

AGE: Inflammaging: chronic inflammation is a risk factor for a number of diseases that are more common with age, including high blood pressure, diabetes, hardening of the arteries (atherosclerosis), and cancer.

Scientists have found that with age itself we have higher levels of inflammatory molecules. With age comes more inflammatory CYTOKINES IN OUR BLOOD, more so than young adults. The process by which aging leads to chronic inflammation is complex involving a number of cellular processes.

Biggest player are the REACTIVE OXYGEN SPECIES (ROS) which include FREE RADICALS.

ROS form when our bodies are exposed to smoking, drugs, sunlight, pollution.

As our bodies try to balance the extra oxygen molecule with the unpaired electron it cascades and chronic inflammation is the result of these FREE RADICALS.

When inflammation is the result of lifestyle or aging

Also to blame for inflammation in the elderly is the gradual decline of the immune system which Harvard researchers call IMMUNOSENESCENCE.

The body tries to repair the damage done by the FREE RADICALS, but over time they take their toll.

With age comes shrinkage of the Thymus, the tiny organ in the chest where “T “Cells are trained.

T Cells are needed to fight infections.

With the T Cell decline or impairment of the production of T cells, comes more immune regulation impairment.

As we age time takes its toll. We are exposed to more harmful pollution, UV radiation from the sun, chemicals in cigarettes, and second hand smoke. This all leads to low grade chronic inflammation.

(Harvard, Mayo)

When inflammation is the result of lifestyle or aging

OBESITY: As the years accumulate so does our weight. An average of 1-2 pounds per year from early adulthood through middle age.

Nearly 40% of Americans are obese, meaning their body index mass is 30% or higher.

Chronic inflammation is one of the consequences according to scientists.

Buildup of fat ramps up the immune response, leading to a cycle of low level inflammation.

When inflammation is the result of lifestyle

DIET: How we fill our plate can either promote inflammation or help control inflammation.

Diets high in saturated fats and refined sugars are associated with increased production of pro-inflammatory molecules.

Pro-inflammatory foods include; white flour carbohydrates(white bread, cookies, cakes , pastries), fried foods, soda, sugar sweetened drinks, red and processed meats, margarine, and shortening.

Not only do these foods directly stimulate the release of inflammatory cytokines, they promote weight gain, meaning there will be more fat cells releasing adipocytokines.

Foods like green leafy vegetables, fatty fish (mackerel, sardines, salmon), and olive oil have the opposite effect.

They suppress the pro-inflammatory molecules and enhance the production of anti-inflammatory ones.

When inflammation is the result of lifestyle or aging

Sedentary lifestyle: The couch potato lifestyle has long been linked to health risks, obesity, high blood pressure, heart disease, type 2 diabetes, osteoporosis, and depression.

A study in the journal, "PLOS One," found elevated levels of the pro-inflammatory cytokine interleukin-6 (IL-6), in people who spent a lot of time sitting.

A sedentary lifestyle has a direct effect on inflammation.

Exercise Daily, Goal 150 minutes per week of exercise or Walk 4000-7,500 steps a day.

Avoid the "Sitting Disease" , How a Sedentary Lifestyle Affects Heart health: Sedentary jobs have increased 83% from 1950.

Physically active jobs now make up less than 20% of the U.S. workforce. Down from roughly half the jobs in 1960.

(John Hopkins Medicine, Erin Donnelly Michos, M.D.)



When inflammation is the result of lifestyle or aging

Smoking: Beyond its relationship to cancers, lung disease, and many other health problems.

Smoking is a known accelerator to inflammation.

This includes E cigarettes, pipes, cigars, medical marijuana, and second hand smoke. Smoke is Smoke.

Besides the 244 known carcinogens found in cigarettes, cigarettes create the ROS (Reactive Oxygen Species) and Free Radicals which damage the delicate cells of our breathing airways.

The damaged cells activate the immune response thus causing inflammation.

When inflammation is the result of lifestyle or aging

Stress is similar to inflammation in that it can be helpful in small amounts, but detrimental when allowed to continue long term. Release of Stress hormones, cortisol and catecholamines.

Eustress is **positive stress** that helps us to succeed, for example, marriage, getting an A on a test, winning a race, getting a new job. Meeting a deadline at work.

Distress: is **damaging stress**, continues and is often chronic, for example, high bills, stressful job with high demands, kids, poor marriage with conflict.

Fight or flight

When inflammation is the result of lifestyle or aging

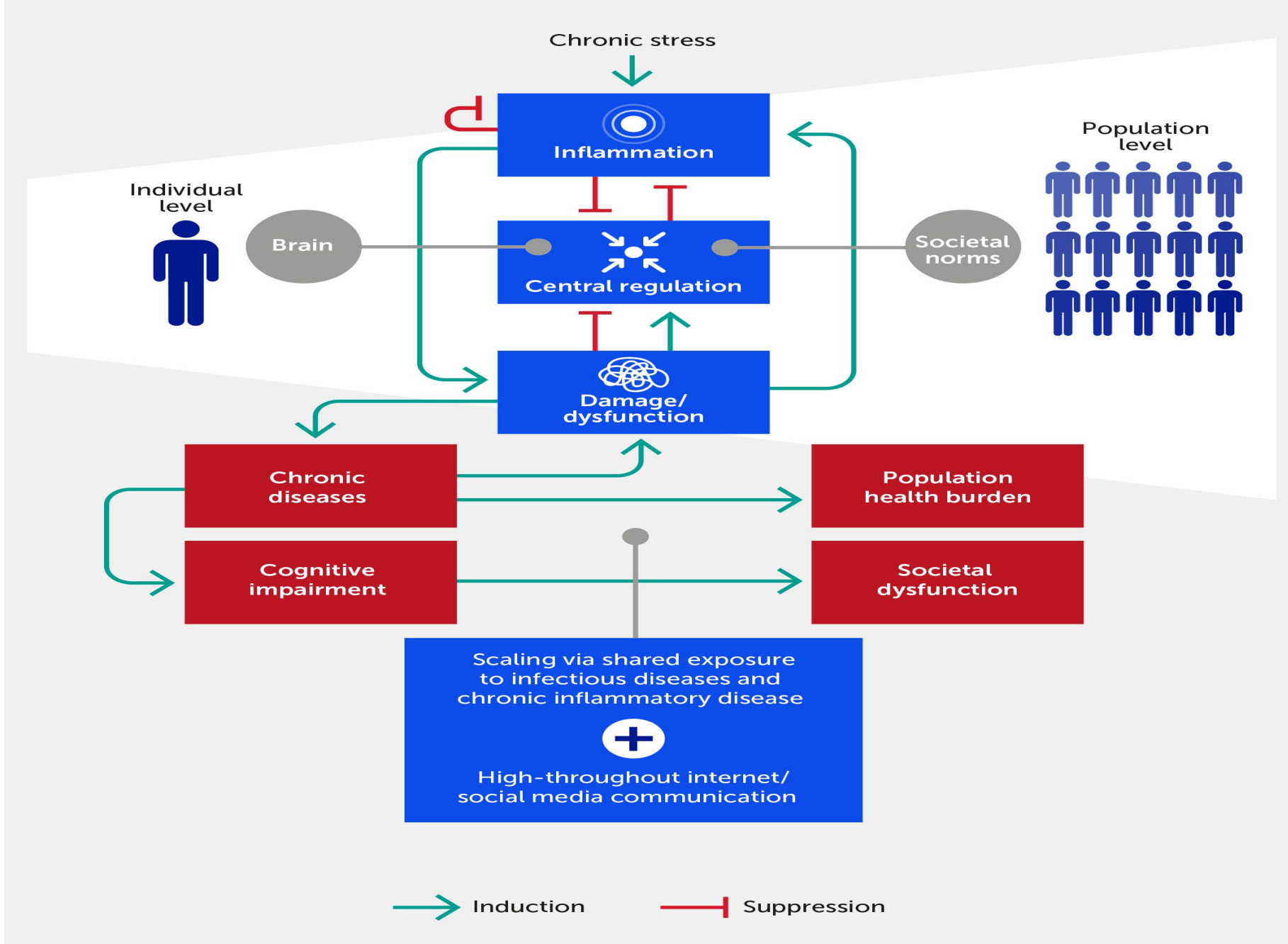
Stress Continued:

The release of stress hormones, like cortisol, catecholamines, and adrenaline, makes our heart rates go up, our blood pressures increase, breathing increases, pupils dilate, and our palms sweat. Our muscles are preparing for action. This is all well and good when you are under the threat, but what if it is a chronic stressor? (Grid lock, bills, work stress, health stressors)

This causes the Stress Response to fire again and again.

The continuous rush of cortisol makes our tissues and immune cells less sensitive to its effects.

As a result, cortisol becomes less effective at regulating the inflammatory response, and inflammation can spiral out of control.



Combating chronic inflammation with lifestyle changes

Eat to beat inflammation: How diet can transform the microbiome in our guts. (The bacteria and other microorganisms that live in our digestive tract).

Best anti-inflammatory diets include;

The Mediterranean diet: fruits, nuts, fish, seeds, vegetables, and olive oil.

DASH Diet(Dietary Approaches to Stop Hypertension) low in total fat, saturated fat, and cholesterol and lots of fruit, vegetables, whole grains,. Protein is supplied by low-fat dairy, fish, poultry, and nuts. Red meats, sweets, and sugary drinks are limited. DASH is high in fiber, potassium, calcium, and magnesium, and low in sodium.

Dr. Andrew Weil's Anti-inflammatory Diet: A Mediterranean diet with Asian Influence. About 40-50% of calories come from carbohydrates, 30% from fat, and 20%-30% from protein.

ANTI-INFLAMMATORY FOODS



Strawberries



Blueberries



Raspberries



Cherries



Oranges



Pineapples



Apples



Grapes



Spinach



Kale



Swiss Chard



Broccoli



Cauliflower



Brussels Sprouts



Bell Peppers



Tomatoes



Oats



Brown Rice



Quinoa



Barley



Buckwheat



Whole Wheat Bread



Whole Wheat Pasta



Lentils



Chickpeas



Black Beans



Kidney Beans



Pinto Beans



Edamame



Almonds



Walnuts



Flaxseeds



Chia Seeds



Hemp Seeds



Pumpkin Seeds



Lean Poultry



Eggs (Organic)



Tofu and Tempeh



Salmon



Trout



Herring



Mackerel



Sardines



Ginger



Garlic



Cinnamon



Rosemary



Basil



Water and Lemon



Cherry Juice



Matcha Tea



Turmeric Latte



Green and Herbal Teas



Oils: Olive, Coconut, Flaxseed



LEAKY GUT

FOOD CHART

ENJOY

AVOID

■ NON-STARCHY VEGETABLES

- Leafy greens (spinach, kale, Swiss chard)
- Cruciferous vegetables (broccoli, Brussels sprouts, cauliflower)
- Asparagus, bell peppers, carrots

■ FRUITS

- Berries (blueberries, strawberries, raspberries)
- Apples (without the skin for some individuals)
- Kiwi, papaya, pineapple, mango, oranges

■ HEALTHY FATS

- Avocado
- Olive oil
- Coconut oil
- Nuts and seeds (in moderation)

■ PROTEINS

- Fatty fish (salmon, mackerel, sardines)
- Lean poultry (chicken, turkey)
- Eggs
- Plant-based proteins (beans, lentils, chickpeas, tofu)

■ BONE BROTH

- Rich in collagen and amino acids

■ FERMENTED FOODS

- Yogurt (with live active cultures)
- Kefir

- Sauerkraut, kimchi, miso, tempeh

■ PREBIOTIC-RICH FOODS

■ GLUTEN-CONTAINING GRAINS

- Wheat, barley, rye

■ REFINED SUGARS & SWEETENERS

- White sugar, high-fructose corn syrup, artificial sweeteners (aspartame, sucralose, saccharin)

■ PROCESSED FOODS

- Fast food, packaged snacks, convenience meals

■ DAIRY

- Cow's milk (for some individuals), cheese, butter, cream

■ HIGHLY PROCESSED FATS & OILS

- Trans fats (partially hydrogenated oils, fried foods, packaged snacks, commercial baked goods)
- Margarine
- Vegetable oils (soybean oil, corn oil)

■ ALCOHOL

- Excessive alcohol consumption can exacerbate gut inflammation and damage

■ CAFFEINE

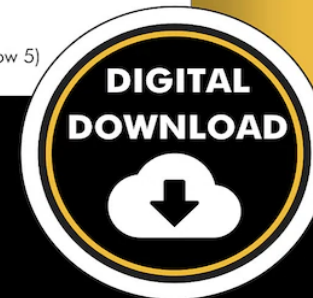
- Coffee, black tea, energy drinks

■ ARTIFICIAL ADDITIVES &

■ PRESERVATIVES

- Artificial flavors
- Artificial colors (Red 40, Yellow 5)
- Chemical preservatives

FOOD CHART



MEDITERRANEAN DIET PYRAMID

Limit Consumption

Red meat & sweets



Consume 1-2 Times Per Week

Poultry, eggs, & dairy



Enjoy 3+ Times Per Week

Fish & seafood rich in omega-3s



Enjoy Daily

Whole grains, vegetables, fruits, legumes, herbs, spices & healthy fats

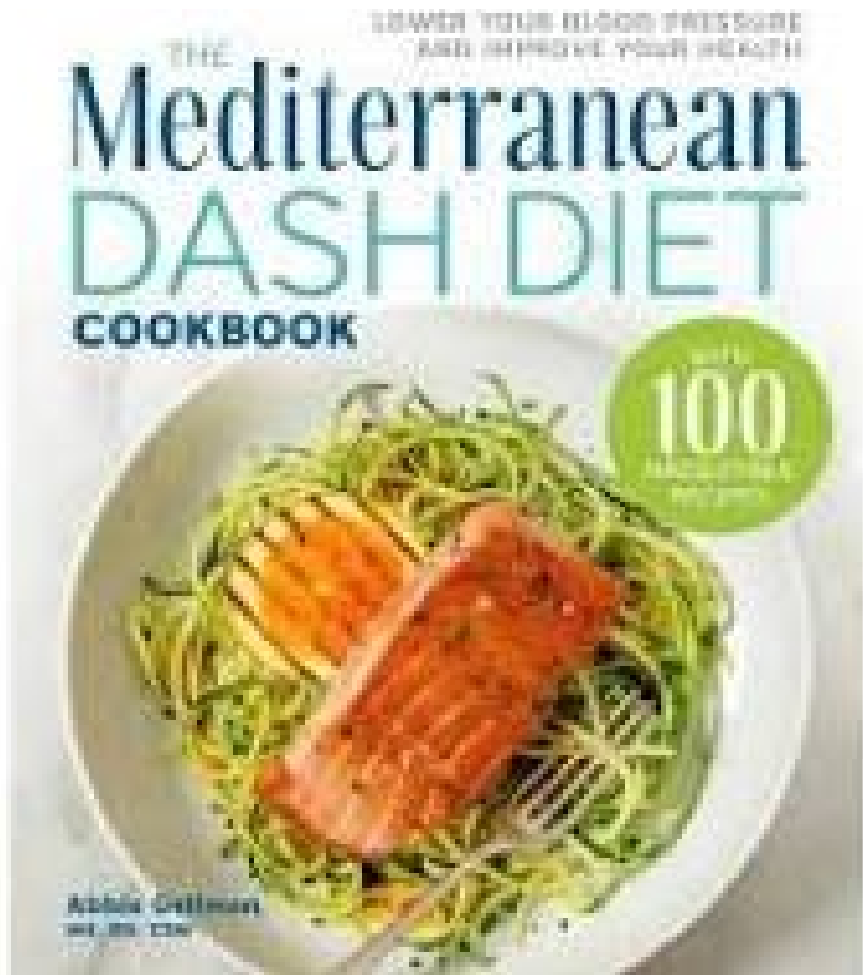


Practice Daily

Physical activity & enjoying meals



Copyright © 2016 Vita Optimus, L.L.C. All Rights Reserved.



DASH Diet

DASH Diet Grocery Shopping List

- Whole grain pasta
- Brown and wild rice
- Apples
- Grapes
- Bananas
- Strawberries
- Peaches
- Lettuce
- Carrots
- Plain Greek yogurt
- Steak
- Shrimp
- Cod
- Walnuts
- Almonds
- Beans





Foods that contribute to inflammation include;

1. FOODS WITH HIGH SUGAR
2. HIGH FATTY FOODS
3. FOODS that contain no Fiber or are very low in Fiber (Processed)

These foods feed the bad bacteria in the gut, (gut Microbiome) and that throws off the balance between the good and bad bacteria in our intestines.

Leaky gut term is often used, which can lead to toxins in the blood and lead to the inflammatory response.

Immune system cells are located near the intestines and take their cues from the inflammation caused by the leaky gut.







The Takeaway

- Protein is key for losing or maintaining weight and building muscle.
- You may need to get a little strategic in your food choices to boost your protein intake without going overboard on calories.
- Plenty of legumes, lean meats, poultry, and low-fat dairy foods can be high in protein and low in calories.

Summary of today's discussion;

Diet: Eat to beat inflammation discussed.

Exercise regularly: Get at least 150 minutes (2.5 hours of aerobic activity plus 2-3 strength training sessions per week. 4,000 -7,500 steps per day.

Manage your weight: Limit portions, select healthy alternatives, exercise, keep a food diary, increase vegetables, rely on fruit for dessert, close the kitchen after dinner, make your own salads, soups, meals.

Get enough sleep: 7-9 hours nightly

Don't smoke, anything!

Limit Alcohol use:

Reduce Chronic Stress: (Distress) through daily exercise, meditation, walk in the park, Tai chi, hang out with a friend, let it out, communicate, keep a journal and write in it every night something that is troubling you. Helps clear your mind so you sleep better, try water aerobics.

Testing for Inflammation

Signs of inflammation serve as a warning for your heart risk.

The only inflammatory marker that is commonly tested for is called a C-reactive Protein(CRP), a substance your liver makes in response to inflammation within your body.

Blood test ordered is hsCRP (high sensitivity CRP) test. Covered by Medicare. Results:

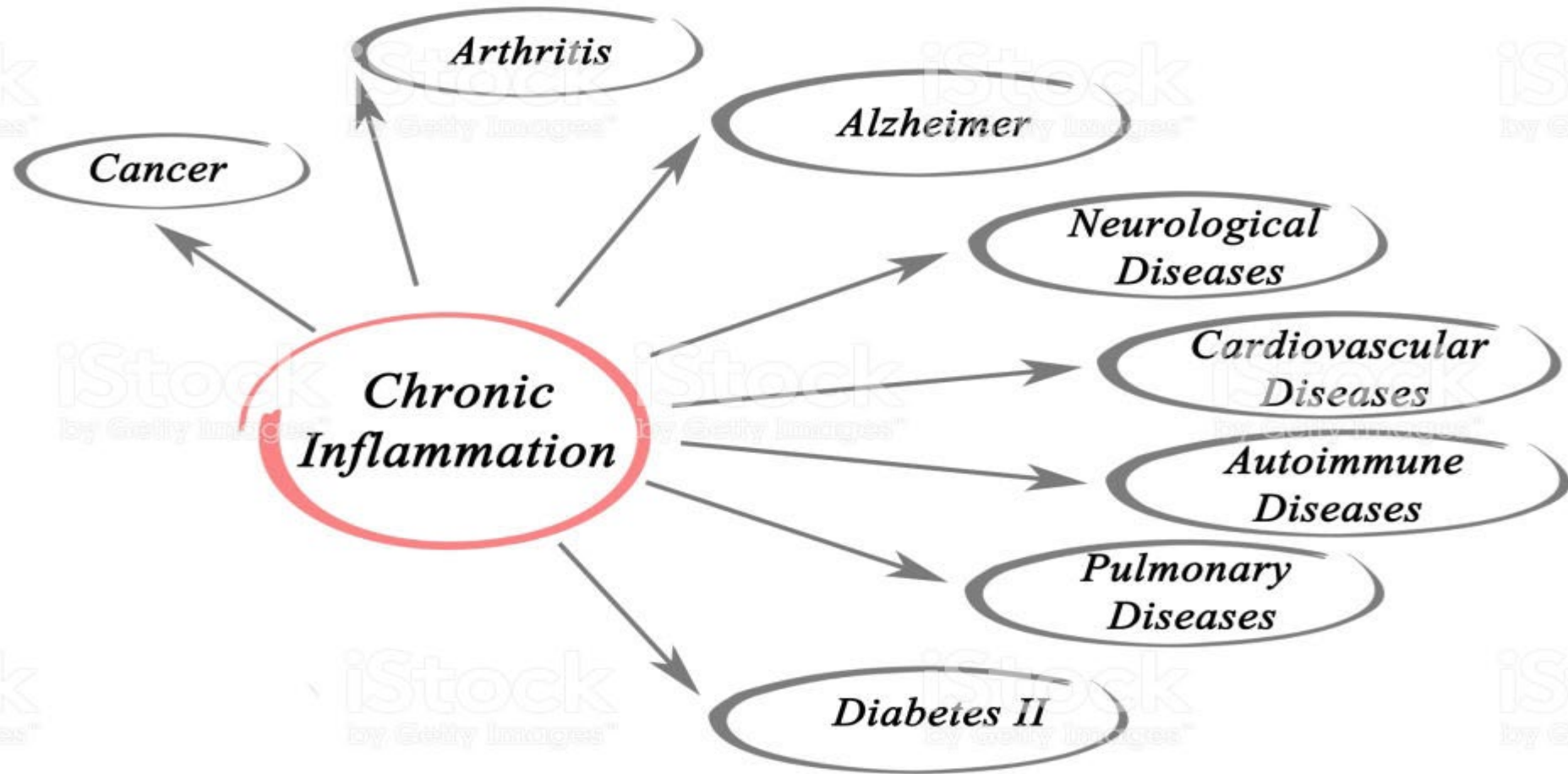
A hsCRP test result lower than 1 milligram per liter (mg/L) means you are at LOW Risk.

A hsCRP of 1 to 3 mg/L indicates AVERAGE risk

A hsCRP of 3 mg/L means you are at HIGH risk for cardiovascular disease.

If your hsCRP is high your doctor may order other tests to look for a cause for your inflammation, and you may need to institute heart-protecting lifestyle changes or start taking medications to manage your risks.

In Summary we learned that chronic inflammation may lead to;



Chronic inflammation summary

We have learned that chronic inflammation is linked to many lifestyle factors, which by definition do not go away, because they are part of our lifestyle.

But most are in our power to change, including excess weight, a poor diet, sedentary behavior, smoking and poor stress management.

You can do it; you have learned why we must do it!

References

1. Kacy Church M.D., Johannah Sakimura RD :10 Surprising Causes of Blood sugar Swings”, Everyday Health, April 8, 2023.
2. Eric Donnelly Michos, M.D. M.H.S.”Sitting disease: How a Sedentary Lifestyle Affects Your Heart Health”, John Hopkins Medicine, January 2024.
3. Roma, Pahwa M.D., Amandeep, Goyal M.D. Ishwarlal, Jialal M.D., “Chronic Inflammation” National Library of Medicine-NCBI, January 2024.
4. Fritsch J, Abreu MT. “The Microbiota and The Immune Response: What is the chicken and What is the Egg? Gastrointestinal Endosc Clin North America. 2019 July;29(3): 381-393.
5. Michals da Silva D, Langer H, Graf T. “inflammatory and Molecular Pathways in Heart Failure –Ischemia”, HFpEF and Transthyretin Cardiac Amyloidosis. Internal Journal Molecular Science. 2019 MAY 10;20(9).
6. Franziska Stumpf, Bettina Keller, Carla Gressies, Philipp Schuetz, “Inflammation and Nutrition: Friend or Foe?” National Institute of Health. Nutrients. 2023 Feb. 25;15(5):1159.