

Chronic Inflammation, Disease Prevention and Quality of Life

There are numerous ways to consider health, physical fitness, quality of life and longevity. As with many things, we tend to consider the pieces of the puzzle instead of stepping back with patience and considering human existence from a broad perspective at high altitude. This tendency, if not checked, will lead many to focus on a few disparate pieces instead of the seemingly complex puzzle, which results in the pursuit of our goals never realized.

Considering the human body and how it reacts to input from our decisions and from the external environment, as these relate to quality of life within the pursuit of longevity, research tells us that that we should consider this paradigm through the lens of chronic inflammation accumulation within the body. That from this filter we can better create an overall game plan that considers all of the pieces - body composition, physical strength and conditioning, mental acuity, lack of chronic disease and overall excellent health leading to a higher quality of life and longevity.

Although inflammation has been studied for decades, there's still much to learn about this complex physiological condition. Inflammation is basically an unnecessary state of hyperactivity in the body, in which the immune system's reserve capacity is thrown into overdrive. This excess immune activation sends the wrong cellular signals to various tissues and systems of the body and can chronically worsen conditions such as obesity, diabetes, heart disease, cancer, asthma, arthritis, depression, auto-immune disorders and Alzheimer's. This concept is called the 'Inflammation Theory of Disease', in which inflammation is the common underlying factor among the leading causes of death and skyrocketing healthcare care costs world-wide.

However, preventing disease is not as simple as reducing inflammation. Anti-inflammatory drugs have predictable and potentially dangerous side effects and drug-drug interactions add another layer of long-term unpredictability. Specifically, medications taken to dampen down inflammation set the stage for external invaders to be unchecked because the body relies on inflammation to trigger the immune system to fight such invaders. "The problem is if you block inflammation, you're blocking a primordial mechanism by which we are protected from the organisms that share the planet with us," says Dr. Clay Semenkovich, chief of endocrinology, metabolism, and lipid research at Washington University in St. Louis.

In addition, every person responds differently to anti-inflammatory drugs, partly based on their genetic makeup. Even though research is beginning to find methods to work on a more targeted portion of the inflammatory pathways, some work like "sledgehammers", tamping down inflammation across the board, thus leaving the patient more susceptible to infection, says Dr. Sanjay Jain, Director of the Center for Infection and Inflammation Imaging Research at Johns Hopkins University.

For an example, diabetes is thought to be a consequence of chronic, low-grade inflammation, which appears to change the way glucose is absorbed by cells. Anti-inflammatory drugs have been found to improve some diabetes symptoms. However, prednisone, one of the most

commonly prescribed and potent steroids for inflammation, has been found to spike blood glucose levels and chronic use can inhibit the body's ability to use insulin. Chronic prednisone use, therefore, can cause or worsen diabetes over time. There are many other examples of medications causing unintended consequences - too many for this short paper to expose. So, if chronic medication is not the answer to reduce inflammation, what may be the answer? The answers may lie in three-fold - exercise, nutrition and behavior modification. But before interventions are pursued we must be able to measure inflammation to reveal if it exists at a level in need of attention.

Measuring low-grade chronic inflammation carries a number of limitations. Studies frequently measure cellular biomarkers such as cytokine, non-specific markers such as C-reactive protein and key inflammatory pathways including sympathetic nervous system activity (fight or flight = stress) and oxidative stress (poor nutrition and lack of exercise). It would be safe to say at this point there is no definitive test to measure chronic inflammation. So in lieu of revealing and measuring, we should focus on those things that we know reduce it beyond the realm of Western medicine.

Prolonged low-grade inflammation is associated with oxidative stress and altered glucose and lipid metabolism in our fat cells, muscle and liver. Research suggests that certain dietary components can modulate these key inflammatory pathways and reduce the presence of chronic disease. Consuming an "anti-inflammatory diet" is making food choices within the understanding of how individual nutrients affect the same molecular targets affected by pharmacological drugs. Compelling research from large-scale, longitudinal observational studies suggest that a diet with appropriate calories that is low in refined carbohydrates, high in soluble fiber, high in unsaturated fatty acids, a higher omega-3 to omega-6 ratio, and high in polyphenols, all have anti-inflammatory effects on the body.

A commonly known example of what is considered an anti-inflammatory diet is the Mediterranean diet pattern that incorporates olive oil, fish, modest lean meat consumption and abundant fruits, vegetables, legumes (beans, nuts, peas and lentils) and whole grain. This diet pattern shows more anti-inflammatory effects when compared to the typical American dietary pattern. Other studies have also suggested incorporating green and black tea, walnuts, flaxseed and garlic as anti-inflammatory.

Communication between the systemic immune system and the central nervous system is a critical and often overlooked component of the inflammatory response to tissue injury, acute and chronic disease or infection. Behavioral studies have shown that prolonged psychological stress can activate the same pro-inflammatory pathways well known to the medical community. As chronic psychological stress promotes over-expression of pro-inflammatory mediators, it can also promote overeating calorie-dense, nutrient-poor foods which in turn exacerbates psychological distress and creates a vicious cycle of stress-eating. Also, over time, this cycle produces fat weight gain which in and of itself is a pro-inflammatory state.

Much research suggests that consistent and targeted activity and exercise programs, consisting of both aerobic and strength and conditioning component, greatly helps in reducing cellular oxidative stress as well as mediating behavioral stress. Beyond these anti-inflammatory perspectives, chronic activity and exercise will also improve the quality of life, both in the short term and when considering the concept of longevity.

The above mentioned communication between the brain and body suggests that strictly dietary or strictly behavioral interventions are not enough to reduce inflammation on their own. We must instead consider integrative diet and lifestyle interventions simultaneously so that as many pieces of the puzzle combine to create an outcome of human existence characterized by minimal acute and long term illness, increased overall health and vitality that spans an entire lifetime.