



The Wellness Family

Dr. Greeley Keeps You Informed

Inflammation – The Good and the Bad

Inflammation is the term given to describe the body's response to tissue damage such as bacterial infections, trauma, chemical exposures and dying tissue. The problem is that there are times when the inflammation response isn't accurate and those chemicals, when released on a continuous basis, without any injury or infection to confront, go from healing damaged cells to harming healthy ones. Inflammation can be a good thing, but when wrong, it's very wrong.

Good Inflammation

In human physiology there are actually two forms of inflammation: acute and chronic. Acute inflammation is actually the good kind; this is what happens when the body responds to an injury by creating an environment that is conducive to healing and tissue repair. For instance, a sprained ankle will suddenly swell, turn pink and become warm to the touch. This is the body responding properly to this injury and sending proper fluids and blood to the area.

When the body senses that something is wrong, it sends white blood cells and inflammatory cytokines, like C-reactive protein (CRP) and interleukin-6 (IL-6) to the site of the injury to help repair the damage or fight off the invader. Certain pro-inflammatory enzymes, such as COX-2, produce prostaglandins on-site. This rapid, multipronged response usually generates the hot or inflamed feeling which is where "inflammation" gets its name.

This biological response is self-regulating and "turns off" when it is no longer needed.

Bad Inflammation

The problem arises when this response (this releasing of chemicals) happens on a continuous basis, when there is actually no injury or invader to face or oppose.

Christine McDonald, Ph.D., a member of the pathobiology department at the Cleveland Clinic Lerner Research Institute says, "Ideally we want inflammation to come in, hit hard, and go away. When it doesn't turn off, you get chronic, smoldering inflammation that can eventually cause tissue and cell damage."

Chronic inflammation has been known for years to be linked to diseases such as asthma, arthritis, inflammatory bowel disease, irritable bowel syndrome, heart disease and cancer. More recently, it's also been associated with dementia (Alzheimer's), migraines, colitis, diabetes and depression. In fact, in the past decade it's been connected with the development of at least half the diseases on the Centers for Disease Control and Prevention's top-ten causes of mortality.

Potential Causes of Bad Inflammation

Thus far, research has been unsuccessful in determining why this supposed "self-regulating" system will sometimes fail to stop or will engage when it's not needed. The built-in braking system doesn't apply and chronic inflammation is the result. While there is no clinically-proven reason, some studies have suggested a variety of causes and concerns that may be behind this problem.

Dr. McDonald has suggested that it could very well just be biological; a subpar inflammatory response to infection leaves some bacteria behind and when they grow the body over-responds to this left-behind-invader.



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In a recent study, researchers at Georgia State University's Institute for Biomedical Sciences found that a protein called CYLD actually acts like a brake-pedal to turn off this biological response. An uncontrolled inflammatory response could be the result of a problem with the body's production or use of this particular protein.

Catherine Duggan, Ph.D., a principal staff scientist at the Fred Hutchinson Cancer Research Center in Seattle has stated, "Excess adipose, or fatty, tissue generates inflammatory cytokines. So being overweight can mean your body is in a state of long-term, low-grade inflammation."

A recent study, published in the medical journal *Psychoneuroendocrinology*, proposed that being less conscientious may increase your risk of high CRP levels by as much as 50%. Angelina Sutin, Ph.D., an assistant professor at the Florida State University College of Medicine in Tallahassee said, "Those less conscientious are more likely to smoke, exercise less, and eat less healthy foods. The trait is also associated with greater stress-related activation of the hypothalamic-pituitary-adrenal axis, along with excess body weight – both of which contribute to inflammation." Another study suggested a link between being open to new experiences and lower levels of inflammation, confirming that personality traits may indeed have an effect.

Stress has been a known culprit in the battle with inflammation, as it's been known to increase cortisol levels and create other hormonal imbalances; however, more and more research is connecting stress to the body's immune response and chronic inflammation. A recent study revealed a surprisingly strong link between stress, higher inflammation levels and depression, showing that patients struggling with depression had 50% higher levels of CRP and IL-6. Victoria Maizes, M.D., the executive director of the university of Arizona Center for Integrative Medicine believes, "Chronic stress changes gene activity of immune cells before they enter the bloodstream." Basically, they think they're going in to fight an infection and even if there isn't one to fight they will spur inflammation.

Probably most surprising was the link found between loneliness and increased inflammation. Steve Cole, Ph.D., a professor of medicine at UCLA lead a study that revealed the body interprets loneliness as a threat and responds with norepinephrine (a fight-or-flight hormone), increasing the inflammatory genes. The study found that loneliness predicated inflammation even a year later and inflammation also predicated loneliness, indicating that they may propagate one another in a vicious cycle.

Finally, it won't come as a surprise to learn that the gut may play a major role in inflammation and its responses. About 70% of the immune system operates out of the gut, so an imbalance in gut bacteria may have an impact. If gut microbiome is off, the resulting inflammation may fuel conditions such as irritable bowel syndrome, colon cancer as well as conditions outside the realm of digestion. "Problems with the microbiome can contribute to inflammatory conditions such as arthritis, depression, and neurological disease," says Eamonn Quigley, M.D., the section chief of gastroenterology at Houston Methodist Hospital.

How to Stop Inflammation

The medical approach to chronic inflammation will be non-steroidal anti-inflammatory drugs (NSAID);

however, it's possible to relieve this problem with healthy lifestyle changes. Based on what we know to be the primary causes of chronic inflammation, diet and exercise with the wellness lifestyle may control chronic inflammation and help the body begin to properly regulate inflammation levels.

A recent study published in *Cancer Prevention Research*, showed that overweight women who had lower-than-recommended vitamin D levels that went on to lose 5 to 10% of their body weight, and began supplementing with 2,000 IU of vitamin D3 each day, saw a 37% higher reduction in the inflammatory cytokine IL-6 than those who lost weight without taking vitamin D.

The elimination diet which works on the principle that you eliminate one thing at a time until you find the culprit (what food or category of foods are creating an allergic or immune response) will be helpful in making dietary changes that may result in less chronic inflammation.

The typical food or food categories linked with chronic inflammation include: dairy, processed or refined sugars, refined grains, vegetable oils, transfats, nightshade vegetables (such as potatoes, peppers and eggplant), red meats high in omega-6, egg yolks, soft drinks, alcohol, high fructose corn syrup and chemical food additives.

Health with Wellness

Your Family Wellness Chiropractor will always make suggestions to increase your family's health through wellness. Choose healthier food items and be sure to cook them properly, avoid overcooking and choose healthier cooking options like grilling, baking, steaming and boiling. Find the most colorful foods, the darker and richer the color of your vegetables the higher the nutrition content. Increase physical activity and spend more times outdoors. The more you move the better you breathe, and increased oxygen to your cells will help your body function better and decrease inflammation.



Dear Patient,
Dr. Greeley is dedicated to providing you with the absolute best in family wellness care. So take a moment today to discuss with your Family Wellness Chiropractor any concerns you may have regarding your family's overall health and wellness.

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