KIMS HOSPITALS™

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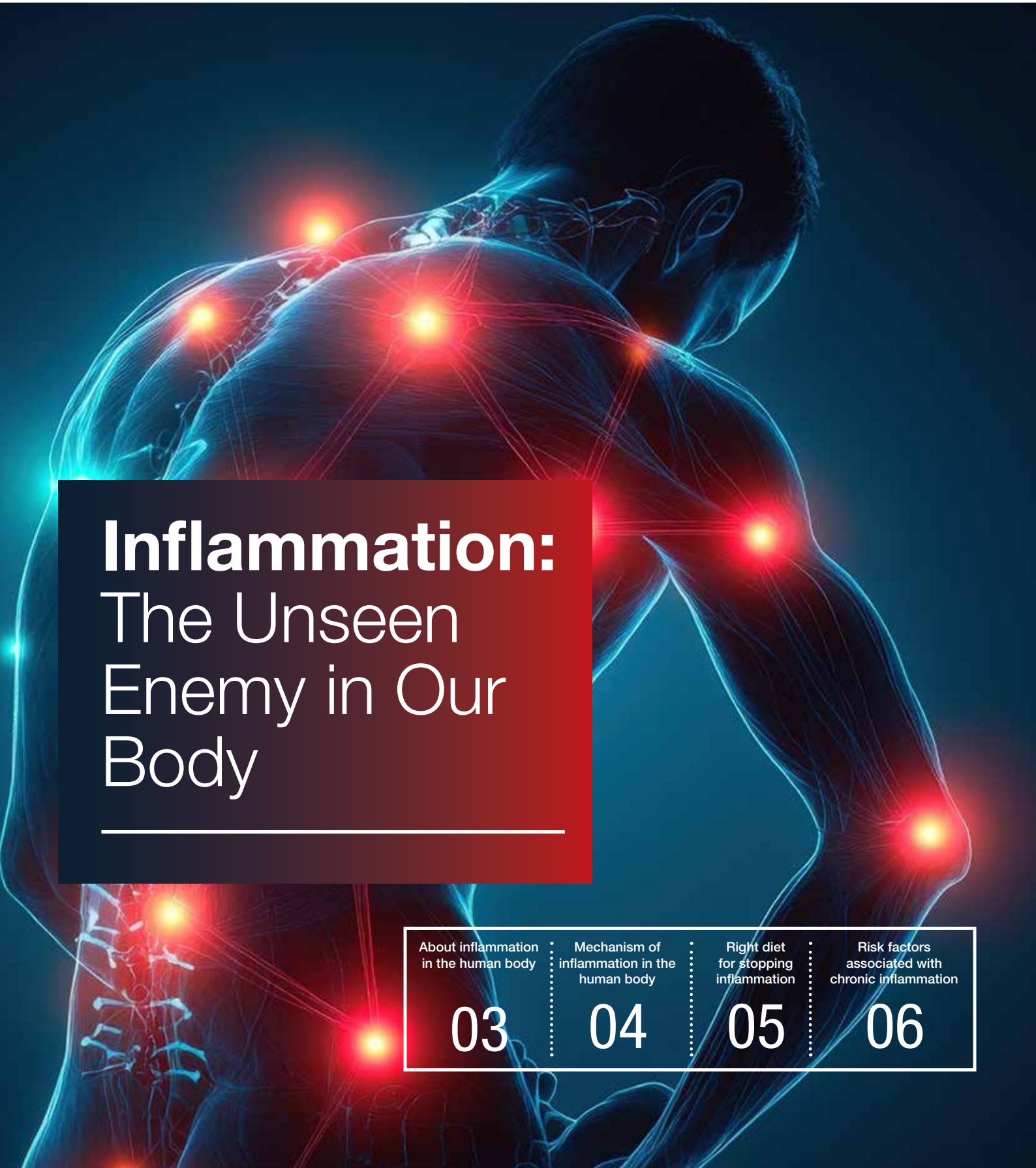


Inflammation: The Unseen Enemy in Our Body

Editor's Desk

Dear Reader,

Welcome to the 13th issue of the KIMS e-newsletter and hope this letter finds you in good health and high spirits. This issue addresses an important health topic that often goes unnoticed yet it cannot be ignored by any stretch. That topic is **"Inflammation: The Unseen Enemy in Our Body".**

Doctors confirm that inflammation is a normal reaction of the body to infection or injury. Research shows that acute inflammation is helpful for the body when sick, but chronic inflammation can lead to many health problems, like diabetes, heart disease, some types of cancer, rheumatoid arthritis. Today, factors like a busy lifestyle, lack of exercise, poor diet, stress, and environmental pollution can all trigger chronic inflammation, often without visible signs.

This newsletter aims to convey the importance of making healthy lifestyle choices, which promote a balanced immune response and help prevent inflammation. If you have any questions or concerns regarding this topic, please do not hesitate to reach out to a medical professional.

Thank you for your attention

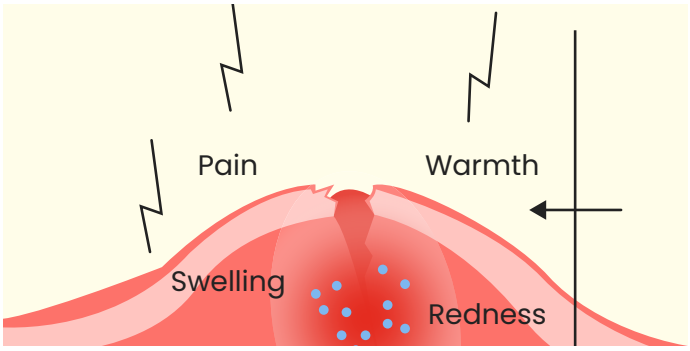
With regards

Dr. Bhujanga Rao Vepakomma
Chief Editor

About inflammation in the human body

Inflammation is a normal way for the body to protect itself. It is how the immune system recognises and gets rid of harmful substances and starts the mending process.

When the body comes across dangerous things like viruses, bacteria, toxins, or gets hurt, the immune system kicks in. It includes the release of chemicals such as cytokines and the stimulation of immune cells to protect the body from harm. This response works to trap pathogens and repair damaged tissue, often resulting in pain, swelling, redness, or bruising. Inflammation can also be triggered by factors such as poor diet, insect bites, lack of exercise, stress, and environmental toxins. If a cut gets swollen, red, and hurts, it shows inflammation. This means the body is trying to fight off something bothering it.



When the body detects damage or harmful microbes, the immune system responds in several ways, including:

- Collecting plasma proteins in tissues, which causes fluid to gather and results in swelling.
- Neutrophils, a kind of white blood cell, are released and they move towards the area that is damaged. These leukocytes carry molecules that help combat pathogens.
- Dilation of small blood vessels, allowing leukocytes and plasma proteins to reach the damage site more easily.
- Produces specific proteins that target and neutralise pathogens or toxins.
- Increases body temperature to create an internal body environment less favourable for pathogens while enhancing immune function.

Inflammation is both good and bad

Good because, it fights foreign invaders, heals injuries and clears dead cells.

Ongoing inflammation can lead to diseases such as arthritis, asthma, blindness, diabetes, mental illness, and even cancer. In these cases, it is seen as a bad thing.

Inflammation can be acute or chronic

There are two kinds of inflammation:

Acute Inflammation: Acute inflammation is how the body quickly reacts to damage or infection. It usually starts within a few minutes and can last for a few days as immune cells, especially neutrophils, move into the area to help with repair. This process is important for protecting cells and helping them heal from damage. Examples include acute pneumonia, bacterial illnesses like cellulitis, sore throat, and the flu.

Signs of acute inflammation are redness at the damage area, pain or tenderness, swelling, and warmth. Acute inflammation can be caused by diseases such as acute bronchitis and appendicitis, as well as other "-itis" illnesses and physical injuries.

Chronic Inflammation: Chronic inflammation is a slow and ongoing reaction that can last for months or even years. Chronic inflammation's severity and impact depend on what caused the harm and how well the body can heal itself. Chronic inflammation lasts longer than acute inflammation, and it can continue even after the main problem has been fixed.

Rheumatoid arthritis, as an illustration, is a condition where inflammation in the joints happens because of certain cells and substances. This inflammation can change in intensity and may result in serious joint damage, pain, and deformities.

Signs of chronic inflammation may include body aches like stomach or chest pain, tiredness, fever, joint pain or stiffness, ongoing skin infections like rashes in the mouth or on the skin, and digestive problems.

Sub-acute inflammation: Sub-acute inflammation happens between acute and chronic inflammation and usually lasts for 2 to 6 weeks.

Chronic inflammatory diseases are now known to be the leading cause of death worldwide, accounting for over 50% of all deaths. This includes diseases tied to inflammation, such as ischemic heart disease, stroke, cancer, diabetes mellitus, chronic kidney disease, non-alcoholic fatty liver disease (NAFLD) and autoimmune and neurodegenerative conditions. 6 out of 10 people had lost their lives while suffering from chronic inflammatory diseases (worldwide). The occurrence of some specific chronic inflammation caused diseases is explained here.

Diabetes: India has around 74 million adults suffering with diabetes, representing an 8.3% prevalence rate, with one in seven diabetics worldwide living in India, making it one of the countries with the highest number of diabetic patients globally.

Cardiovascular diseases: In India, coronary heart disease (CHD) occurrence ranges from 1.6% to 7.4% in rural areas and 1% to 13.2% in urban areas. CVD was responsible for 26.6% of total deaths and 13.6% of Disability-Adjusted Life Years (DALYs-a metric used to measure the health of population) in India as seen from 2017 data.

Arthritis and Joint Diseases: In India, Osteoarthritis (OA) is the second most common rheumatologic problem and it is the most frequent joint disease in the country with a prevalence of 22% to 39%. Around 62.35 million individuals in India are with OA by 2019.

Allergies: One of the leading causes of chronic human diseases in many countries. Asthma affects 37.5 million people in India, with rising rates of asthma and allergic rhinitis. Among children, asthma prevalence is 3.5% in 6–7-year-olds and 4.5% in 13–14-year-olds.

Chronic Obstructive Pulmonary Disease (COPD): It is the second leading cause of death in India, according to a world health report. This means that in India, there are about 556,000 deaths each year, which is more than 20% of the total 2,748,000 deaths worldwide.

According to recent statistics from the Centre for Disease Control (CDC), about 6.5% of US adults, which is around 14.2 million people, had COPD by 2021.

Acute inflammation plays a crucial role in healing, but chronic inflammation can raise the risk of various diseases, including certain cancers, rheumatoid arthritis, heart disease, gum disease, and hay fever.

Causes of inflammation

From the foregoing, many different things can cause inflammation and these include the following:

- Pathogens (germs) such as bacteria, viruses, or fungi
- Cuts from external, like a thorn in your finger.
- Impact of chemicals or radiation

Diseases or medical conditions that cause inflammation often have names ending in "-itis." These include cystitis (bladder inflammation), bronchitis (inflammation of the bronchial tubes), otitis media (inflammation of the middle ear), and eczema (skin inflammation).

Other aspects that can lead to long-term inflammation include:

Sensitivity: Inflammation happens when the body notices something unusual. If the body is highly sensitive to external factors, it may lead to allergies.

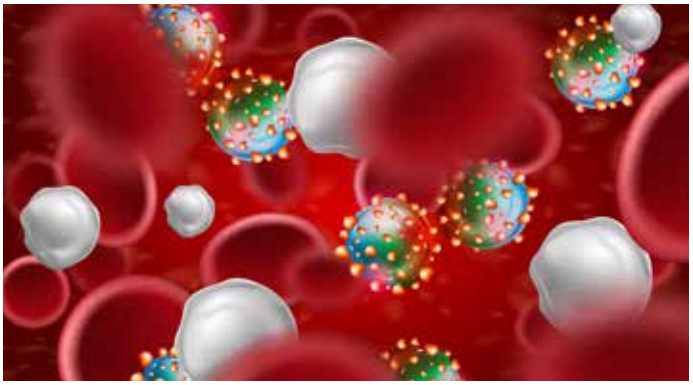
Exposure to toxins: Being around irritants like industrial chemicals, pollutants, or toxins for a long time, even at low levels, can lead to ongoing inflammation.

Autoimmune diseases: Occurs when the immune system mistakenly attacks healthy tissues in the body. Examples include psoriasis and lupus, where the body harms its own tissues.

Auto-inflammatory diseases: These are the conditions in which genetics influence how the immune system works, causing inflammation in blood vessels and organs, like in Behcet's disease (inflammation of the blood vessels causing multiple problems like ulcers).

Mechanism of inflammation in the human body

When inflammation happens in the body, different immune cells get involved and release substances called inflammatory cytokines. These include the cytokines (e.g., IL-1, TNF-α), prostaglandins and hormones like bradykinin and histamine, causing vasodilation, increased blood flow, and vascular permeability. This allows immune cells, proteins and hormones to migrate to the affected area, where they eliminate pathogens and debris through processes like phagocytosis. As a result, inflamed areas often turn red and feel warm. Once the threat is neutralized, anti-inflammatory signals promote resolution and tissue repair. Additionally, these hormones irritate nerves, sending pain signals to the brain. This pain serves a protective function by encouraging the individual to avoid further aggravation or injury to the affected area, thereby aiding the healing process.



Inflammatory mediators also facilitate the movement of immune cells out of small blood vessels into the affected tissue. This process allows immune cells to help clear the area of harmful agents. Furthermore, more fluid enters the inflamed tissue, which is why swelling occurs. The swelling typically subsides once the fluid is cleared from the tissue.

Mucous membranes also release more fluid during inflammation, as seen with a stuffy nose when the nasal lining is inflamed. This excess fluid helps flush out viruses from the body more quickly.

However, when inflammation becomes chronic due to persistent stimuli or dysregulation, it can lead to tissue damage and contribute to diseases like arthritis, diabetes, and cardiovascular disorders. These chronic inflammatory diseases can persist for years or even a lifetime. The severity and activity level of these diseases depend on various factors, including the site of infection, the extent of tissue damage, the individual's immune response, and their underlying medical conditions such as autoimmune diseases, cardiovascular diseases, gastrointestinal issues, and mental illnesses.

Severe inflammation can also lead to systemic reactions in the body, such as:

- General feeling of illness, exhaustion, and fever: These are signs that the immune system is highly active and consuming significant energy, which may reduce energy available for other bodily functions. The increased metabolism due to fever helps produce more immune cells and antibodies.
- Changes in the blood, such as an increased number of immune cells.
- Septicaemia, or blood poisoning, is a risky but rare condition that happens when bacteria grow quickly in one area of the body and then spread into the bloodstream. This can happen if the body can't fight off the illness, if the bacteria are very strong, or if the immune system is weak. Septicaemia is a serious medical issue that needs urgent care from a doctor.

Here are some treatments that doctors recommend for treating inflammation:

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs): NSAIDs, such as naproxen, ibuprofen, and aspirin, are commonly used to reduce symptoms like pain, swelling, fever but they do not attempt at mitigating the actual cause of inflammation. They work by inhibiting enzymes specifically COX-1 and COX-2 involved in the inflammatory process. These drugs are effective for short-term use, and should only be used for long-term under a doctor's guidance due to potential side effects.Aspirin kind of drugs should not be given to children, particularly due to the risk of Reye's syndrome (swelling in liver and brain).

Supplements: Certain vitamins such as vitamin A, vitamin C, vitamin D, and minerals such as zinc have shown to reduce inflammation and support the healing process. For example, your healthcare provider might recommend supplements like fish oil or vitamins.

Pain Relief: Acetaminophen (paracetamol or Tylenol) can provide pain relief, but unlike NSAIDs, this medication will not reduce inflammation. It is primarily used to manage pain while allowing the body to continue its healing process.

Corticosteroids: Corticosteroids, like prednisone, are artificial drugs that act like hormones such as cortisol, which help control

inflammation. Corticosteroids should be used with caution, as long-term use may lead to side effects. They work well for treating various inflammatory conditions, such as gout, skin issues, inflammatory bowel disease (IBD), asthma, autism, lupus, and allergies.

Right diet for stopping inflammation

An effective diet for managing inflammation focuses on nutrient-dense foods with scientifically proven anti-inflammatory properties, commonly referred to as an anti-inflammatory diet. It focuses on incorporating foods that help reduce inflammation in the body. An anti-inflammatory diet naturally reduces inflammation, promoting overall well-being. Here are some nutrient-rich foods that help combat inflammation.

i. Fruits and Vegetables:

Berries (blueberries, strawberries, cherries), citrus fruits (lemon, orange), pomegranate, apples are particularly high in antioxidants, vitamin C and fibre respectively.

Leafy Greens: Spinach, kale, and broccoli are excellent sources of vitamins and minerals.

Other Vegetables: Include bell peppers, brussels sprouts, and tomatoes for their anti-inflammatory properties. These foods are rich in antioxidants, vitamins, and fibre, which help reduce oxidative stress and inflammation.

ii. Healthy Fats: Salmon, sardines, and mackerel are rich in omega-3 fatty acids, which help mitigate inflammation.

Olive Oil: Extra virgin olive oil is a staple anti-inflammatory diet due to its healthy fat and anti-inflammatory compounds.

Avocados and avocado oil: High in monounsaturated fats and vitamin E, both of which have anti-inflammatory properties.

iii. Whole Grains and Legumes

Whole Grains: Brown rice, quinoa and bulgur wheat have been associated with decreased CRP levels. The fibre in whole grains can help mediate inflammatory processes by helping with weight loss, combating oxidative stress and feeding beneficial gut bacteria associated with lower levels of inflammation.

Beans and Legumes: Lentils, chickpeas, and black beans are very good sources of fibre and protein.

iv. Nuts and Seeds

Nuts: Almonds, walnuts, and pistachios offer healthy fats and antioxidants.

Seeds: Flaxseeds and chia seeds are also beneficial for their omega-3 content.

v. Spices and Herbs

Turmeric: Contains curcumin, which has potent anti-inflammatory effects.

Ginger: Known for its anti-inflammatory properties as well.

Also, rosemary, oregano, cayenne, cloves and nutmeg possess anti-inflammatory effects and can inhibit the biochemical process of inflammation.

vi. Beverages

Green Tea: Rich in polyphenols, particularly epigallocatechin gallate (EGCG), that has strong anti-inflammatory properties.

Black Tea: Contains polyphenols that can combat inflammation. While it has less EGCG than green tea, it still offers beneficial antioxidants.

Turmeric Tea: Made with turmeric, which contains curcumin, a powerful anti-inflammatory compound. Adding black pepper enhances curcumin absorption.

Herbal Teas: Varieties like ginger and chamomile have anti-inflammatory properties and can soothe digestive issues.

Other beverages also include:

Matcha: A concentrated form of Japanese origin green tea that provides higher levels of antioxidants compared to regular green tea, making it particularly effective against inflammation.

Beet Juice: Contains betalains, known for their anti-inflammatory effects, which can help reduce muscle soreness and improve exercise recovery.

Bone Broth: Provides collagen and amino acids that may help reduce inflammation in the gut and joints.

Coffee: Caffeine, which is a key component of coffee, has been shown to suppress the production of pro-inflammatory cytokines and reduce inflammation pathways in the body. Thus moderate coffee consumption has been linked to reduced levels of C-reactive protein (CRP), a marker of inflammation.

vii. Dairy products: These contain bioactive compounds, such as whey proteins and fermented components that may exert anti-inflammatory effects. However, individual responses to dairy products vary depending on their lactose tolerance levels.

Incorporating these anti-inflammatory foods while reducing inflammatory triggers can help maintain a balanced immune response and promote overall health.

Foods that may aggravate inflammation:

- Refined carbohydrates, such as sugar, pastries or white bread.
- Trans fat which is common in fast foods
- Added sugars found in sodas, candies and many packaged foods.
- Processed meats such as bacon, sausages, and hot dogs.
- Excessive alcohol

Diet alone will not control inflammation, but making suitable healthy life style choices may help controlling it from getting worse.

Preventing inflammation

Chronic inflammation can be mitigated by adopting healthy lifestyle habits. Here are some effective strategies:

- **Achieve and maintain a healthy weight**

  Excess body fat, especially around the abdomen, can contribute to inflammation.

  Maintaining a healthy weight reduces your risk of chronic inflammatory conditions.

- **Avoid or quit smoking**

  Smoking is a significant risk factor for inflammation. It triggers oxidative stress and disrupts immune system function, making it crucial to quit or avoid smoking to prevent inflammation.

- **Engage in regular exercise**

  Aim for at least 150 minutes of moderate exercise per week such as brisk walking, cycling, or swimming. Regular physical activity helps lower inflammation and supports overall health. Daily exercise provides even greater benefits.

- **Avoidance of alcohol consumption**

  Complete avoidance of alcohol or moderate alcohol intake particularly redwine is better as it contains antioxidants like resveratrol and other polyphenols, which have anti-inflammatory properties. Excessive alcohol consumption leads to increased inflammation.

  The effects of alcohol on inflammation can vary depending on factors such as genetics, existing health conditions, and lifestyle.

- **Manage stress effectively**

  Chronic stress can contribute to a long-term inflammation. Stress management techniques such as yoga, meditation, deep breathing, mindfulness, or journaling (emotional wellness) to calm the mind will help curtail inflammation.

Risk factors associated with chronic inflammation

There are several risk factors which generate a low-level inflammatory response. These include:

Age: Ageing is tied to higher levels of inflammatory molecules, probably due to malfunctioning mitochondria, free radical accumulation, and increased visceral fat.

Obesity: Fat tissue functions like a hormone-producing organ that releases substances that can cause inflammation. A higher body mass index (BMI) is linked to elevated levels of these inflammatory substances.

Diet: Eating a lot of saturated fats, trans fats, and processed sugars can raise inflammation in the body, especially for people who are obese or have diabetes.

Smoking: Smoking lowers the body's anti-inflammatory substances and increases inflammation.

Low sex hormones: Hormones such as estrogen and testosterone help reduce inflammation. Keeping these hormone levels balanced can lower the chance of inflammatory illnesses.

Stress and Sleep Problems: Stress and sleep problems can lead to inflammation in the body. Physical and mental stress causes this inflammation, and not sleeping well adds to it.

Test check if you have chronic inflammation

A C-reactive protein (CRP) test checks how much C-reactive protein is in your blood. This protein is made by the liver when there is inflammation in the body. High CRP results can show that there is inflammation in the body. Healthcare providers use this test to identify and keep track of different conditions that cause inflammation, such as

- Serious bacterial infections like sepsis.
- Fungal diseases
- Osteomyelitis (bone infection)
- Inflammatory bowel disease (IBD)
- Some types of arthritis
- Autoimmune diseases (like rheumatoid arthritis)

Individuals who consume diet rich in refined sugars, such as sugary drinks and processed foods, are at a greater risk of chronic inflammation. The World Health Organization (WHO) recommends limiting sugar intake to less than 10% of total daily energy intake to reduce this risk.This CRP test helps identify inflammation but does not specify the underlying cause.

Normal Range for a CRP Test

The reference range for normal C-reactive protein (CRP) levels can vary, but generally, a CRP level of less than 0.9 mg/dL is considered normal. There is no such thing as a "lower than normal" CRP level.

Several factors can influence CRP levels, including cigarette smoking, common cold, depression, diabetes, insomnia, gingivitis, obesity, periodontitis, pregnancy, and recent injury.

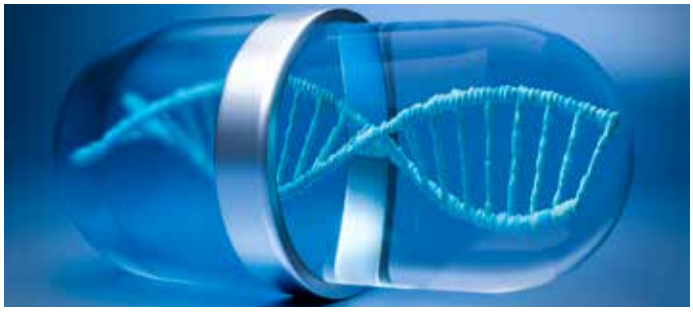
A CRP level above 10 mg/dL is typically considered significantly elevated and may indicate conditions such as:

- Acute bacterial or viral infections
- Systemic vasculitis
- Major injury or trauma

Inflammation can be hereditary

Genetic factors play a significant role in inflammation, suggesting that certain inflammatory conditions can indeed be hereditary. Research indicates that many inflammatory diseases, particularly autoimmune disorders, have a genetic basis, meaning individuals with specific genetic markers may have a higher risk of developing these conditions.

A recent study of genomic data from over 200,000 individuals identified 58 genetic locations linked to CRP levels, which are associated with inflammation. These genes are involved in immune and liver-metabolic pathways, further supporting the genetic influence on chronic inflammation.



Conditions such as rheumatoid arthritis (RA) demonstrate a clear hereditary component. Studies show that the prevalence of RA is higher among individuals with a family history of the disease. Genetic markers associated with RA include HLA-DR4 and others that influence immune responses, suggesting that genetics significantly contribute to the risk of developing RA.

Inflammation, a silent killer

Inflammation doesn't always show clear symptoms, and some types happen without any visible signs. Chronic inflammation is usually more difficult to notice than acute inflammation. Studies have found that ongoing, mild inflammation plays a big role in serious health issues like heart disease, cancer, type 2 diabetes, and inflammatory diseases. It's concerning that three out of every five deaths worldwide are related to illnesses caused by inflammation.

Inflammation is a normal and important part of how our immune system works. It helps the body to heal injuries and fight infections. However, it can become harmful if it stays active for too long. Things like being overweight, gum disease, long-term infections like herpes, and ongoing worry can put too much pressure on the immune system. Over time, this can harm healthy tissues and greatly raise the risk of serious health problems, like heart attacks, stroke, diabetes, and cancer.

Hydration is a key that fights inflammation

Hydration plays a crucial role in maintaining overall health and supporting the body's natural detoxification processes, primarily through the kidneys. Adequate water intake helps in keeping joints well-lubricated, reducing the risk of conditions like gout and promoting healthy joint function. Water also supports the elasticity and function of connective tissues such as tendons and ligaments. Dehydration can impair these functions and may exacerbate symptoms of inflammation and joint discomfort. To prevent dehydration, healthy individuals are generally advised to consume 2.5 to 3 litres of water, spread evenly throughout the day to ensure optimal absorption and utilization.

A case study of Rheumatoid arthritis (RA)

Rajani, a 48-year-old female, suddenly experienced severe pain and swelling in the joints of her hands and knees one fine morning. Although she had noticed some signs of rheumatoid arthritis (RA) over the past few months, this sudden flare-up was an unexpected event. Her symptoms included:

a. Redness and warmth around joints in her hands and feet
b. Tiredness and fever
c. Severe joint pain and swelling

She immediately consulted a rheumatologist, who recommended the necessary blood tests, including the C-reactive protein (CRP) and rheumatoid factor (RF) tests.The results showed a significant inflammatory response. The doctor prescribed the appropriate medication, recommended rest, advised the application of ice packs to the affected joints, and suggested required lifestyle changes. Within the next few days, Rajani's condition improved, and she returned to normal.

Rajani's case highlights the unpredictable nature of RA and underscores the importance of seeking timely and proper medical attention.

Takeaway

Inflammation has both beneficial and harmful effects. While acute inflammation is essential for the body's defence, aiding in the healing of injuries and fighting infections, chronic inflammation can contribute to serious conditions such as cardiovascular disease, diabetes, and arthritis.

The CRP test as mentioned earlier in this newsletter is a valuable tool for detecting and monitoring inflammation but it should be interpreted under the guidance of a qualified physician based on clinical findings.

It is time for people to prioritize a healthy diet, regular exercise, stress management, adequate sleep, proper hydration, and routine medical check-ups. Stay informed, make healthier choices, and take action today to manage inflammation before it becomes a silent threat.

Practical tips to practice Health & Wellness

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