

All about inflammation

Few medical terms are as commonly used or misunderstood. Breathe turns to the experts to find out more about this biological response

If you're health-conscious, you might be familiar with references to inflammation, but are you clear on what it means? Perhaps you've read advice about lowering inflammatory lifestyle habits or your doctor has talked to you about it. Maybe you've heard that too much inflammation is a bad thing and linked to autoimmune disorders, stroke, cancer and depression. Or you might be aware that, in the case of injuries or infections, inflammation is the body's natural response and aids the healing process.

It's a nuanced area, and when it comes to understanding chronic inflammatory and autoimmune conditions, research is ongoing. So, what is inflammation and when does it become a problem? Read on to find out.

COMMON QUESTIONS ANSWERED

1 What is inflammation?

Put simply, inflammation is the body's way of defending itself against illness, injury, toxins or germs. It promotes healing by releasing inflammatory cells, along with proteins called cytokines, which stimulate more inflammatory cells and increased blood flow carrying white blood cells to an area – such as a cut on your knee or the back of your sore throat – which can make it look red or swollen. Inflammation sometimes causes a rise in body temperature, too.

Dr Jason Liebowitz, from New York, is assistant professor of medicine in the rheumatology division at Columbia University's Vagelos College of Physicians and Surgeons in the US. He explains: 'Inflammation can be the body's natural helpful response. It develops the scab at the site of a wound or the fever that makes it harder for a pathogen to survive in the body.' This type of inflammation is sometimes called acute inflammation and is sudden and temporary. Symptoms can include red or flushed skin, pain or tenderness, swelling or heat.

2 When does it become chronic?

Inflammation sometimes attacks the body's own healthy tissues. Dr Gui Tran, a consultant rheumatologist at Harrogate District Hospital in North Yorkshire, UK, has a special interest in treating all forms of arthritis, gout, polymyalgia rheumatica, muscle and tendon pain. He explains that inflammation becomes problematic when the immune system starts attacking the body. 'Inflammation of this type is caused by an overactive immune system, so we treat it by trying to reduce the immune system's activity and bring it back into balance,' he says.

This is sometimes referred to as chronic inflammation, and is seen in conditions such as rheumatoid arthritis, lupus, psoriasis, Crohn's disease, inflammatory bowel disease and gout. The body's immune system remains in a constant state of alert, producing inflammatory cells even when there's no danger. These then attack parts of the body instead, such as the joints and connective tissues. Patients with autoimmune

disorders – where the immune system mistakenly attacks healthy tissues – might find that their health deteriorates over time, or they experience flare-ups that cause a spike in symptoms. Dr Liebowitz adds: 'Autoimmune diseases perturb the equilibrium of the body.'

3 What causes the associated conditions?

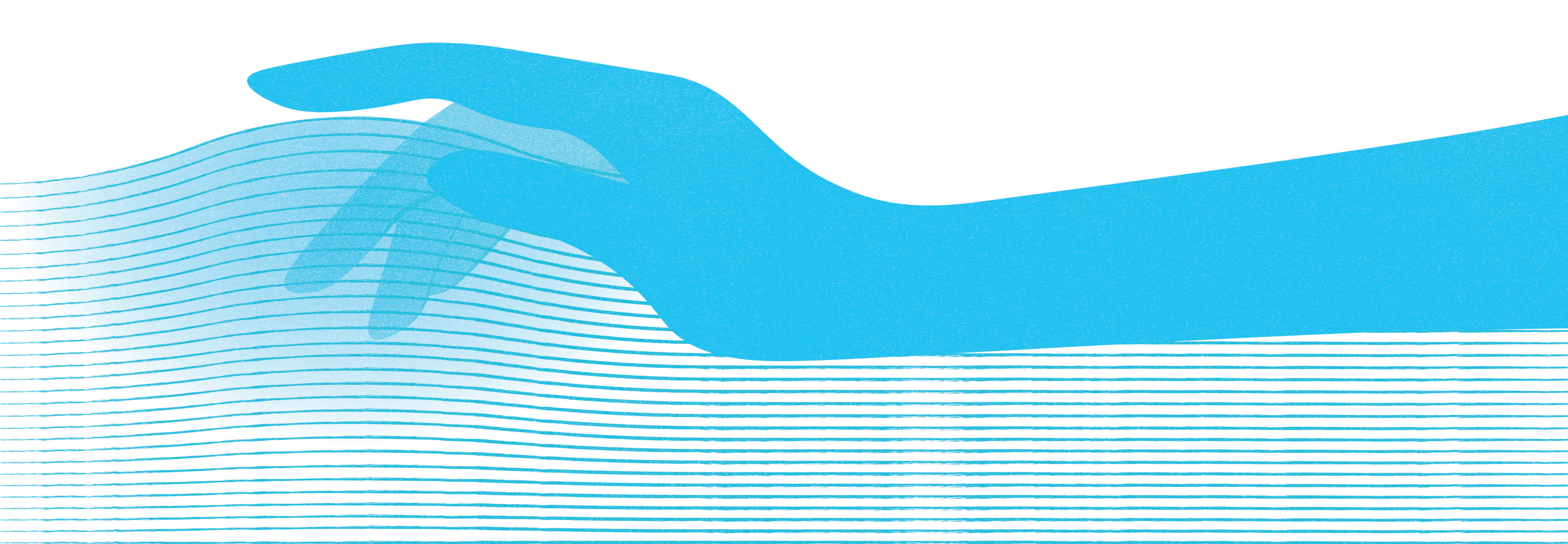
Like many aspects of inflammation, the cause is 'not black and white', according to Dr Tran. You might have a genetic predisposition to inflammation. He says the risk of developing rheumatoid arthritis, for example, increases if a direct relative has the condition. 'Environmental factors also play a role,' he adds. 'We know that gut flora can play a role, as can dentition [the condition of your teeth and mouth], and smoking. Physical and mental trauma can [also] cause an immune response.'

Dr Tran says that women are more likely to experience inflammatory conditions than men – which could be down to hormones – and age can also be a factor. Clinicians and researchers are still working to fully understand the causes of chronic inflammation, but studies have also revealed links to poor diet, obesity, exposure to toxins, such as air pollution, sleep disorders and stress.

Dr Liebowitz agrees that 'in the vast majority of cases, we do not fully understand what causes autoimmune diseases'. He says patients often want to know what they've done or what they can change, but the cause is a complex combination of different factors.

4 How does it harm the body?

If inflammation is out of control, it can cause lasting damage to tissues and organs. There's research to suggest that untreated chronic inflammation can increase the risk of stroke, type 2 diabetes, heart problems and some cancers, among other diseases. Dr Liebowitz says: 'Inflammation can cause lasting damage if it is left unchecked.'



5 Can it affect mental wellbeing?

An overactive immune system sometimes has an adverse effect on brain health. Dr Tran says: 'People are more likely to be depressed and fatigued – especially if things like joint pain mean they don't sleep so well.'

In the case of mental health, when the immune system is activated, it can affect the body's central nervous system, which includes the brain. Inflammation has been linked to changes in the brain's chemistry and structure, with studies suggesting that it can disrupt levels of chemicals like serotonin and dopamine, affect stress and sex hormones, and even reduce neuroplasticity, which can limit the brain's ability to learn and adapt. In addition, inflammatory conditions can cause chronic pain, which itself has an impact on mood.

When it comes to cognitive decline, research is also starting to point to the role that inflammation can play, and it's an area that scientists and clinicians are still working to understand.

6 What are the symptoms?

If you think inflammation is affecting your health, Dr Tran says it's important to seek help to bring the immune system back into balance. Chronic inflammatory conditions can take many different forms, depending on how the immune system is attacking the body. You might have a combination of any of the following: abdominal or chest pain, fatigue,

insomnia, joint pain and stiffness, mouth ulcers, a rash on your skin, depression, anxiety and changes in mood, diarrhoea or constipation, acid reflux, unexplained weight gain or loss, or experience frequent illnesses and infections. Diagnostic testing will depend on your symptoms and might include blood tests, scans and biopsies.

Dr Liebowitz adds: 'Stiff, painful, swollen joints, unusual rashes, weight loss and fatigue could all be an indication that the immune system is attacking the body in a way it wasn't meant to.'

7 How are they treated?

If you're diagnosed with chronic inflammation or an autoimmune condition, you might see a rheumatologist, who will look at a range of treatments. 'It's about balancing the immune system,' says Dr Tran. There are several different medications that might be appropriate, depending on your condition, and Dr Liebowitz says the aim is to 'interrupt the cycle of inflammation'.

Your treatment might involve some trial and error, as there are different medications and therapies available, and what works for one patient isn't always effective for another. Biological medications can target the parts of the immune system that are causing the problem, to slow or stop inflammation. Steroid medications are another option.

Dr Liebowitz says it's 'a very hopeful time' to be working in rheumatology and that when a patient 'truly has an autoimmune disease' there are lots of different tools and treatments that clinicians can explore.

8 Can lifestyle changes help restore balance?

Many patients with chronic inflammatory conditions take steps to improve their health. 'Environmental factors can be changed,' says Dr Tran. 'You can stop smoking and reduce stress.' He says many rheumatologists believe that diet can play a role, suggesting that patients research anti-inflammatory foods. He also says that some patients find it helpful to avoid processed foods and trans fats. It can be a case of trial and error, or elimination, as you work to understand your individual inflammatory triggers.

Studies have shown success for some patients who follow diets rich in plant foods, particularly leafy greens, while others recommend a Mediterranean diet. You could also try the DASH diet, which stands for 'Dietary Approaches to Stop Hypertension'. Most of these variations have a focus on whole plant foods and avoiding ultra-processed food.

Moderate exercise is also helpful, especially for keeping joints mobile, as is trying to manage stress levels through meditation, walking in nature and relaxation techniques, for example. Other patients explore alternative therapies like acupuncture,

massage and reiki. Dr Liebowitz says he's 'very open-minded' to his patients exploring alternative, complementary or holistic therapies 'as long as there is no risk of harm', and suggests general lifestyle changes that improve overall health are a good place to start.

9 And what about acute inflammation?

Remember, not all inflammation is bad. If you have an acute response to a throat infection, stomach bug, skin burn, insect bite or wound, inflammation is your immune system's way of coming to the body's aid. You can support yourself by keeping cuts, scrapes or burns clean, applying an ice pack to a swollen joint, resting the affected part of your body, or taking a short course of over-the-counter, non-steroidal, anti-inflammatory painkillers. But remember that infections, viruses and injuries can be serious and need to be monitored. Seek medical advice for worsening symptoms, fevers and rashes that don't go away or increasing pain. Inflammation that hangs around for too long can be a sign that all is not well.

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Follow Dr Tran on X @gui_tran or visit doctortran.co.uk. For more information about Jason's work, visit rheumatologyatcolumbia.org/profile/jason-e-liebowitz-md