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Study: The Anti-Inflammatory Properties of Ginger

Analysis by Dr. Joseph Mercola | January 26, 2024

STORY AT-A-GLANCE

- The bioactive compounds in ginger help counteract neutrophil hyperactivity in certain autoimmune diseases by increasing cyclic adenosine monophosphate (cAMP), which in turn inhibits neutrophil extracellular trap (NET) formation
- Researchers were encouraged to find a natural supplement that could help fight overactive neutrophils and may complement treatment programs to relieve symptoms of diseases like rheumatoid arthritis, lupus and antiphospholipid syndrome
- Ginger positively influences your gut by accelerating gastric emptying, and thus reduces the potential for heartburn. Alongside other spices, it can increase your gut microbiome diversity and, in turn, help to suppress long-term weight gain
- Ginger can modulate pain associated with menstruation, osteoarthritis, migraines and delayed onset muscle soreness. Research also finds cardioprotective properties, which may be attributed to antihypertensive and antiplatelet activity

Roughly 5,000 years ago, ginger (Zingiber officinale) was a luxury item.[1] The root can be eaten fresh, pickled, preserved, candied, powdered or ground and researchers have now found the mechanism through which ginger helps reduce the symptoms of autoimmune diseases.[2]

Ginger is from the same family as cardamom and turmeric and is indigenous to tropical Asia. However, since ginger does not grow in the wild, the exact origins are unclear. It has been used medicinally and in food for at least 5,000 years.[3]

When the Roman Empire fell, the ginger trade was taken up by Arab merchants and spread across Europe. It continues to be used in traditional medicine today. Ayurvedic practitioners promote ginger to improve digestion and destroy toxins but warn that pregnant women, people with high blood pressure, skin diseases, gallstones or peptic ulcers should limit their intake. Data also suggests that adding ginger to your diet can do more than impact autoimmune diseases.

Ginger May Help Inflammation in Autoimmune Diseases

In January 2021,[4] researchers from the University of Michigan demonstrated that a bioactive compound in ginger helped lower antibody production and stop disease progression in an animal model in which the animals had the autoimmune diseases antiphospholipid syndrome or lupus.

Ginger has traditionally been used to help lower inflammation, but until the most recent study published by the University of Colorado, the biological mechanism that underlies the anti-inflammatory properties had not been identified. In the paper[5] published in JCI Insight, the research team noted the previously reported activity against antiphospholipid syndrome and lupus.

In the current study,[6] they explored how taking a whole ginger extract could impact neutrophils in autoimmune mice and healthy humans. The study examined neutrophil extracellular trap (NET) formation and how that influenced inflammation. NET formation is also known as NETosis which, when restrained, could help reduce inflammation and symptoms in people with different types of autoimmune diseases.

NETs are microscopic structures that look like spider webs. They promote clotting and inflammation, which contributes to the development and progression of several autoimmune diseases such as rheumatoid arthritis, lupus and antiphospholipid syndrome.

In this trial, researchers gave 20 milligram supplements of gingerols to healthy volunteers over seven days. They found the supplementation increased cyclic adenosine

monophosphate (cAMP), which was responsible for inhibiting NETosis.

"Our research, for the first time, provides evidence for the biological mechanism that underlies ginger's apparent anti-inflammatory properties in people," said senior co-author Dr. Jason Knight, associate professor in the department of internal medicine, division of rheumatology, at the University of Michigan.

"There are not a lot of natural supplements, or prescription medications for that matter, that are known to fight overactive neutrophils. We, therefore, think ginger may have a real ability to complement treatment programs that are already underway. The goal is to be more strategic and personalized in terms of helping to relieve people's symptoms," he added.

The researchers hope the results of this study will help garner funding for clinical trials using ginger in people with inflammatory diseases where neutrophils play a prominent role, including in the treatment of COVID-19.

Known Effects on the Gastrointestinal Tract

What you eat and drink has an impact on the development of heartburn and data shows ginger offers a range of gastroprotective effects, including against dyspepsia (indigestion).[7] Ginger can reduce the pressure on the lower esophageal sphincter, which helps prevent heartburn. It also prevents dyspepsia, flatulence and bloating.

Clinical trials have demonstrated how ginger extract can increase gastrointestinal motility and accelerate gastric emptying, another factor that influences heartburn. Ginger is also one of the most popular home remedies used by people with irritable bowel syndrome (IBS) to help control their symptoms, although a small pilot study showed ginger was not more effective than a placebo.

Adding two or three slices of fresh ginger root to two cups of hot water and letting it steep for several minutes results in a delicious cup of ginger root tea. Try drinking it approximately 20 minutes before eating a meal to help lower your potential risk of heartburn.

In a 2022 study[8] the researchers noted that past data demonstrated that taking capsules of spices including cinnamon, oregano, ginger, black pepper and cayenne pepper could favorably affect the composition of your gut bacteria after just two weeks. They engaged 54 adults who were at risk of cardiovascular disease[9] to add a blend of herbs and spices, including cinnamon, ginger, cumin, turmeric, rosemary, oregano, basil and thyme, to a controlled diet.

The researchers evaluated three different doses — one-eighth teaspoon per day, three-fourth teaspoon per day or 1.5 teaspoons per day.[10] They tested gut bacteria diversity after four weeks of consuming herbs and spices and found those consuming three-fourths teaspoon or 1.5 teaspoon daily doses increased gut diversity, which represents a healthy change in the gut microbiome.

Decreased diversity has been linked to chronic conditions such as obesity and Type 2 diabetes. "Research has shown that people who have a lot of different microbes have better health and a better diet than those who don't have much bacterial diversity," study author Penny Kris-Etherton, Evan Pugh University professor of nutritional sciences at Penn State, said.[11]

Specifically, the researchers noted an increase in the Ruminococcaceae bacterial group, which is known to be beneficial for immune function and liver metabolism. The researchers noted that past studies had suggested enrichment of this family could suppress long-term weight gain and diet-induced obesity.

Data from a pilot study[12] also demonstrated that ginger could reduce the proliferation of colorectal epithelium and increase apoptosis and differentiation, especially of the colonic mucosa in the crypts. These results were consistent with other research data, suggesting that ginger has a chemoprotective property that lies in the ability to regulate cell function and viability.

Ginger and Pain Relief

Clinical trials have also demonstrated that ginger can modulate pain through a variety of mechanisms, including inhibiting prostaglandins.[13] Traditionally, ginger has been used to treat pain associated with menstruation, osteoarthritis, migraines and delayed onset muscle soreness.

More than 400 chemical substances have been identified in ginger root extracts, and researchers continue to find new ones. Recently, more patients who have diseases linked to chronic inflammation are considering natural pain relief options to protect themselves from drug side effects related to long-term use or as prophylactic treatment.

A narrative review of 10 years of randomized control trials[14] examined how ginger has been used to treat several conditions and the method by which the active compounds helped lower chronic inflammatory disease symptoms.

Evidence from six clinical trials evaluated the efficacy of ginger in symptoms of dysmenorrhea and found that the most common length of time ginger was taken was during the first three days of menstruation, all of which showed ginger was effective to some degree in decreasing pain in women with dysmenorrhea.

A review of the data[15] evaluating ginger against knee osteoarthritis looked at randomized clinical trials using either oral or topical ginger. Two studies suggested that ginger helped reduce pain and two assessed topical use of an aromatic essential oil, which the researchers believed had the potential as an alternative for short-term pain relief.

The review concluded[16] that while there is good evidence in vitro and in animal models to demonstrate that ginger has anti-inflammatory activities and could lower chronic inflammatory disease symptoms, especially pain, human studies were not numerous.

Many of the human clinical trials were conducted in Asia and the researchers theorized that the outcome expectancy could differ across ethnicities and cultures, so it was important to confirm the promising pain-relieving effects in a worldwide population.

Ginger and Your Heart

As the acknowledgment of the health benefits of herbs and spices continues to grow, researchers are finding even more health benefits from ginger. Two 2021 studies demonstrate how ginger could have a significantly positive effect on heart health.

In the first study,[17] the researchers chose to review the phytochemical properties of the bioactive components of ginger and the health benefits it has in several diseases with special attention paid to the cardiovascular system.

After a comprehensive search of the literature, researchers noted that ginger was among the herbs used to develop new drugs that have more potency and fewer side effects. They noted that the cardioprotective effects may be attributed to the antihypertensive, antiplatelet and antihyperlipidemic activities of ginger. They suggest that these biological activities offer new insight into the treatment of cardiovascular disease.[18]

The second study[19] analyzed the effects ginger extract could have on cardiomyocyte hypertrophy, cardiac fibrosis and the ultimate development of heart failure. The study began using cultured cardiomyocytes and cardiac fibroblasts in the lab. These were first treated with ginger extract and then stimulated with phenylephrine.

The lab data showed that ginger extract could suppress the increase in the surface area of cardiomyocytes that are commonly induced by the drug treatment. The extract also suppressed the mRNA levels of brain natriuretic peptide (BNP) and atrial natriuretic factor (ANF), which are upregulated in a variety of cardiac disorders, including congestive heart failure, hypertensive heart disease, and ischemic heart disease.[20]

Next, the researchers used mice who were surgically treated and then given a daily oral dose of ginger extract for eight weeks.[21] The mice then had echocardiographic analysis and, finally, the heart weight was measured and compared against the body weight. The researchers found that the mice taking the ginger extract had a reduction in the expected increased posterior wall thickness and a decrease in systolic dysfunction.

While the featured study demonstrated that ginger has a positive effect on those who have specific autoimmune diseases, it's apparent that the overall effects can also

positively influence your gut health, reduce pain and offer some protection to your cardiovascular system. Many of these effects are also related to the anti-inflammatory properties of the bioactive compounds in ginger.

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