

Exploring the Cancer-Fighting Capabilities of Onions

Analysis by [Dr. Joseph Mercola](#)

October 24, 2024

STORY AT-A-GLANCE

- › Onions contain powerful antioxidants that help lower the risk of various cancers, including brain, breast, liver, lung and stomach cancers, through mechanisms like inducing cell death and inhibiting tumor growth
- › The bioactive compounds in onions, such as allicin, flavonoids and organosulfur compounds, work together to combat oxidative stress and cancer at the cellular level
- › Apigenin, a compound found in onions and other plants, shows promise in reducing brain inflammation and may benefit neurodegenerative conditions like Alzheimer's and Parkinson's disease
- › Onions and other alliums like garlic offer additional health benefits, including protecting cardiovascular health, improving sleep quality and detoxifying the body from harmful trace metals and chemicals
- › Incorporating more onions and garlic into your diet is easy — add raw onions to salads, and cook with them often. Consider growing your own herbs as well

According to research, the humble onion packs a powerful punch against cancer. Studies have found that regularly eating it helps lower your risk of developing cancers of the brain,¹ breast, liver, lung and stomach. A diverse antioxidants profile works together to provide these benefits.

The best part is, you don't need to spend money on fancy supplements or prescriptions to harness these health benefits. Simply incorporating more onions into your daily diet

will do the trick.

A Closer Look at the Bioactive Compounds of Onions

In a paper² published in the International Journal of Molecular Sciences, South Korean researchers conducted an extensive review on the antioxidant and anticancer properties of allium vegetables like onions and garlic. Their findings shed light on how these everyday foods combat oxidative stress and cancer at the cellular level.

What makes onions such potent cancer-fighters? They're rich in bioactive compounds, such as allicin, flavonoids and organosulfur compounds. These compounds work together, inducing a series of mechanisms that fight this dreaded disease:³

- **Induction of apoptosis** – The organosulfur compounds in onion have been found to induce cell death in cancer cells through intrinsic and extrinsic pathways.
- **Inhibition of cell proliferation** – The phytochemicals in allium halt the spread of cancer cells by stopping the cell cycle at different phases, such as downregulating protein expression.
- **Suppression of angiogenesis** – Angiogenesis refers to your body's ability to generate new blood vessels, which is needed by tumors to grow and eventually metastasize. Allium phytochemicals have been shown to prevent this process by downregulating vascular endothelial growth factor (VEGF) and its receptor (VEGFR). This results in loss of nutrients and oxygen to the tumor.
- **Modulation of immune responses** – Allium phytochemicals strengthen your body's immune system to fight cancer by stimulating the production of various immune cells.

Aside from these benefits, onion stimulates your body's own defenses, increasing its general disease-fighting capabilities. As noted by the authors:⁴

"Allium phytochemicals can modulate cellular signaling pathways associated with oxidative stress. For instance, SAC has been shown to activate the nuclear

factor erythroid 2-related factor 2 (Nrf2) pathway, leading to the upregulation of various antioxidant genes. This pathway plays a critical role in maintaining cellular redox homeostasis and protecting cells from oxidative damage.”

Apigenin – Another Notable Antioxidant in Onions and Other Alliums

Fighting cancer isn't the only the claim to fame of onion. It also contains apigenin, a compound with published evidence in reducing brain inflammation. Apigenin is also found in other plant-based foods such as celery and parsley.⁵ Research into this area carries plenty of potential for improving the quality of life of many who suffer from neurodegenerative conditions, such as Alzheimer's and Parkinson's disease.

Structurally, apigenin belongs to the flavones class of polyphenols, and is theorized to arise from the post-harvest degradation process. Aside from being present in veggies, it's also found in non-edible plants, such as propolis, *Scutellaria barbata* D. Don (commonly known as barbed skullcap or "ban zhi lian" in Traditional Chinese Medicine) and chamomile.⁶

In the context of Alzheimer's disease, research has shown that apigenin helps preserve neuron and astrocyte integrity, as well as modulating cytokine mRNA expression. The researchers concluded:

“These elements support the use of apigenin as an important neuroimmunomodulator agent for the treatment of neurodegenerative diseases via neuroprotective and anti-inflammatory effects.”⁷

The researchers added that apigenin also has positive effects on cognition. Using animal test models, administration of high doses improved long-term memory while also decreasing cognitive impairment. In addition, incorporating exercise with increased apigenin intake also led to “improved anxiety, memory loss and aggression, and increased levels of antioxidant enzymes and acetylcholinesterase (AChE) activity.”⁸

Interestingly, apigenin has also been shown to protect cardiovascular health, especially in the context of neuroinflammation. According to the researchers, “apigenin can inhibit nitric oxide production and thus protect neurons from injury in middle cerebral artery occlusion.”⁹ Apigenin also helps boost sleep quality, which is another crucial factor in neuronal health.¹⁰

Other Benefits of Apigenin

Research has shown that apigenin benefits other diseases as well, such as multiple sclerosis, an autoimmune condition that targets the myelin sheath surrounding your nervous system. In the case of apigenin, it's able to protect the nervous system through various factors:

“Apigenin has been shown to inhibit cell surface expression of co-stimulatory molecules as well as certain dendritic cell functions such as proinflammatory cytokine production and T-cell differentiation ...

Apigenin also inhibits COX-2 enzyme activity and monocyte adhesion to the human umbilical vein endothelium by reducing the presence of cell adhesion molecules such as Vascular cell adhesion protein 1 (VCAM-1), Intercellular adhesion molecule 1 (ICAM-1), and E-selectin.

Apigenin would thus have the capacity to inhibit the entry of immune cells into the CNS (central nervous system) and prevent neuroinflammation, given that the molecules play an essential role in controlling leukocyte migration through endothelial cells, including those of the blood-brain barrier.”

Other studies have shown that apigenin fights cancer, too. Similar to the phytochemicals found in onions, apigenin exhibits properties that fight against angiogenesis:¹¹

“In the same cellular model, fisetin, apigenin, and luteolin inhibited both gene expression and protein secretion of MMP-9 and the gene and protein expression of COX-2, both induced by carcinogens.

The signaling pathway involved in these two processes is thought to be the nuclear factor-kappa B (NF-κB) pathway. The use of apigenin could therefore reduce the disruption of the blood-brain barrier during neuroinflammation induced by the development of brain tumors.”

Apigenin also helps detox your body from trace metals and other chemicals that eventually hamper your cognitive function. Some toxic substances include cadmium, chromium, lead and arsenic, and these cause DNA damage, oxidative stress and neuronal damage. Not only that, but they also harm the endocrine, renal and reproductive systems. As noted by the researchers, apigenin was able to counteract the toxic effects of arsenic and protect against neuroinflammation:

“A model using PC12 cells and inorganic arsenic salt (iAs) was used to determine the ability of apigenin to counteract the effects of arsenic. They were able to show that pre-treatment of cells with apigenin offered exceptional protection against iAs-induced neuroinflammation, but also against oxidative stress and cell death. Nrf-2 appears to be involved in this neuroprotection.”

Easy Ways to Add Onions to Your Diet

Are you ready to harness the power of onions for better health? The simplest way to get its benefits is by adding them to your diet. But before you do, here’s a nifty tip – conserve as much of the onion’s outer layers as much as possible, as this is where most of the antioxidants are located.¹² With this in mind, here are ways you can use onions, and other alliums, into your diet:

Add raw onions to salads and sandwiches. Raw onions pack the biggest nutritional punch, preserving their beneficial compounds. Try thinly sliced red onions on your next salad or burger for a flavorful crunch and health boost.

Cook with onions more often. Sauté onions as a base for soups, stews, and stir-fries. Their flavor mellows with cooking while still retaining many health benefits. Aim to include onions in at least one meal per day.

Don't forget about garlic. As part of the allium family, garlic shares many of onions' cancer-fighting properties.¹³ Use fresh garlic liberally in your cooking for added flavor and protection.

Incorporate more parsley into your meals. Parsley is an excellent source of apigenin. Use it as more than just a garnish – add generous amounts to salads, soups and sauces.

Brew chamomile tea. Another rich source of apigenin, chamomile tea makes a soothing evening drink that supports brain health.¹⁴

Grow your own herb garden. Freshly harvested herbs will always be healthier and cleaner since you're in control throughout the whole process. Onions, despite their bulbous size, will grow indoors.¹⁵

Make herb-infused coconut oil. To do this, combine coconut oil with chopped parsley, oregano or other alliums. Use this flavorful oil for cooking.

While there are different onion varieties, research shows that red ones (preferably grown organic) are the healthiest. To learn more about the science behind this, read my article [“Why You Should Always Use Organic Onions.”](#)

Sources and References

- ¹ [Int J Mol Sci. 2024 Jul 24;25\(15\):8079, Conclusion](#)
- ² [Int J Mol Sci. 2024 Jul 24;25\(15\):8079, Abstract](#)
- ³ [Int J Mol Sci. 2024 Jul 24;25\(15\):8079, Anticancer Mechanism](#)
- ⁴ [Int J Mol Sci. 2024 Jul 24;25\(15\):8079, Antioxidant Mechanism](#)
- ⁵ [Int. J. Mol. Sci. 2024, 25, 5041, Abstract](#)
- ⁶ [Int. J. Mol. Sci. 2024, 25, 5041, Sources](#)
- ^{7, 8} [Int. J. Mol. Sci. 2024, 25, 5041, Alzheimer's Disease](#)

- ⁹ Int. J. Mol. Sci. 2024, 25, 5041, Cardiovascular Diseases
- ¹⁰ Int. J. Mol. Sci. 2024, 25, 5041, Cognitive and Memory Disorders
- ¹¹ Int. J. Mol. Sci. 2024, 25, 5041, Cancer
- ¹² Front Nutr. 2024; 11: 1350534, Peeling Cutting Processes
- ¹³ Front Nutr. 2021; 8: 746944, Introduction
- ¹⁴ Life 2022, 12(4), 479, Antioxidant Activity
- ¹⁵ Gardening Know How, "Growing Onions in Container Gardens"