



Cognitive Vitality Reports® are reports written by neuroscientists at the Alzheimer's Drug Discovery Foundation (ADDF). These scientific reports include analysis of drugs, drugs-in-development, drug targets, supplements, nutraceuticals, food/drink, non-pharmacologic interventions, and risk factors. Neuroscientists evaluate the potential benefit (or harm) for brain health, as well as for age-related health concerns that can affect brain health (e.g., cardiovascular diseases, cancers, diabetes/metabolic syndrome). In addition, these reports include evaluation of safety data, from clinical trials if available, and from preclinical models.

Kaempferol

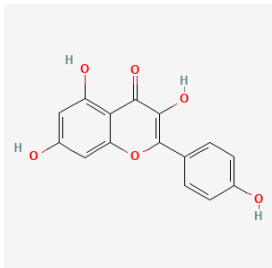
Evidence Summary

Kaempferol has antioxidant and anti-inflammatory actions, and epidemiological work suggests higher intake of kaempferol may be linked to lower incidence of some diseases. Clinical data is lacking

Neuroprotective Benefit: There are no clinical studies testing the effects of kaempferol for neurological benefit. Observational studies suggest intake of kaempferol may be associated with less cognitive decline and/or dementia diagnosis.

Aging and related health concerns: No clinical studies have tested the effects of kaempferol for age-related diseases. Observational work suggests higher intake of kaempferol is associated with lower risk of cancer, cardiovascular disease, and T2D.

Safety: Kaempferol is consumed as part of the diet, and higher intake is associated with positive health outcomes. The effects of kaempferol supplementation are poorly studied; no clinical safety concerns have been identified, but there are few clinical trials to assess.

<p>Availability: OTC or through diet</p>	<p>Dose: Optimal dose for supplementation is not known. In the US, the average daily dietary intake has been estimated at approximately 3.5 to 5 mg per day.</p>	<p>Chemical formula: C₁₅H₁₅O₆ MW: 286.24 g/mol</p>  <p>Source: PubChem</p>
<p>Half-life: ~1.5 hours</p>	<p>BBB: Penetrant</p>	
<p>Clinical trials: The largest clinical trial of kaempferol supplementation identified included 48 adults.</p>	<p>Observational studies: The largest observational studies identified included dietary information from over 1.5 million participants.</p>	

What is it?

Polyphenols are compounds that are found in fruits, vegetables, and grains; these compounds are classified according to their chemical structures. Polyphenols can be divided into flavonoids and nonflavonoids. There are over 6,000 flavonoid compounds. These can be further subdivided into twelve subclasses, including anthocyanins, flavan-3-ols, flavones, flavanones, isoflavones, and flavonols. Kaempferol is one of the most prominent flavonols, along with quercetin and myricetin ([Jomova et al., 2025](#)). Kaempferol is found in leafy green vegetables, fruits, and tea; notable sources include spinach, broccoli, kale, black tea, and onions, among others. It is also found in other sources such as ginkgo biloba ([Holland et al., 2020](#); [Chaubey & Singh, 2025](#); [Kalu & Ray, 2025](#))

Kaempferol has antioxidant and anti-inflammatory properties; preclinical studies also highlight anti-apoptotic and anti-metastatic actions. These biological activities suggest that kaempferol may have a beneficial role to play in a variety of conditions, including cancer, cardiovascular disease, general aging, and neurodegenerative diseases. Epidemiological studies suggest that higher intake of flavonols, including kaempferol, is associated with lower incidence of several diseases ([Holland et al., 2020](#); [Micek et al., 2021](#); [Rostampour et al., 2025](#)).

While there are several epidemiological studies that find associations between intake levels and lower incidence of diseases, clinical trial information on kaempferol supplementation is lacking. Few clinical



trials of kaempferol have been completed, and there are several outstanding questions regarding dosing, formulations, bioavailability, and clinical effects.

Neuroprotective Benefit: There are no clinical studies testing the effects of kaempferol for neurological benefit. Observational studies suggest intake of kaempferol may be associated with less cognitive decline and/or dementia diagnosis.

Types of evidence:

- 1 meta-analysis and systematic review
- 2 observational studies
- 7 reviews

Human research to suggest prevention of dementia, prevention of decline, or improved cognitive function:

No clinical trial has assessed the effects of kaempferol on cognitive function or directly tested whether kaempferol can reduce or prevent cognitive decline or dementia.

There are several epidemiological studies that report associations between flavonol intake, including kaempferol, and less cognitive decline and/or lower incidence of dementia.

A study looked at participants from the Rush Memory and Aging Project, which is a community-based prospective cohort study. The study enrolls participants who do not have dementia and conduct annual assessments, including diet and neurological status assessments. The researchers looked at the reported intake of leafy green vegetables and cognitive decline. They found that those in the highest quintile of intake had slower cognitive decline than those in the lowest quintile ($p=0.0001$); the effect was estimated as equivalent to an 11-year age difference. They then analyzed the rate of cognitive decline based on reported intake of specific nutrients, including kaempferol. Compared to those in the lowest quartile of intake of kaempferol, those in the highest quartile of intake had significantly slower cognitive decline ($p=0.003$). Participants who ate more leafy green vegetables were also more likely to be more educated, male, more frequently engage in cognitive and physical activities, and to have fewer co-morbidities such as cardiovascular conditions and depressive symptoms. While the authors statistically



controlled for these and other variables, it is not possible to eliminate these potential confounding factors without a randomized controlled trial ([Morris et al., 2018](#)).

[Holland et al., 2020](#) also assessed data from participants in the Rush Memory and Aging Project. The researchers looked at 921 eligible participants and compared the incidence of dementia diagnosis over time based on reported diet. After statistical adjustments for health and lifestyle factors, they found that intake levels of total flavonols was statistically associated with lower incidence of dementia diagnosis; the highest intake quartile had a 48% lower rate of AD diagnosis (HR=0.52; 95% CI 0.33 to 0.84). Intake of kaempferol specifically was also associated with lower incidence of dementia diagnosis; those in the highest quartile of intake had a 50% lower rate of dementia than those in the lowest quartile (HR=0.49; 95% CI 0.31 to 0.77). Kaempferol had the strongest statistical association with lower incidence of dementia among the individual flavonols; most, but not all, flavonols had a statistical association with lower incidence of dementia. It should be noted that those with highest intake of flavonols were also more educated and more likely to participate in physical and cognitive activities; as in the above study, the authors statistically controlled for these variables.

A third study from the Rush Memory and Aging Project found that higher dietary intakes of total flavonols was associated with a lower rate of decline in global cognition, episodic memory, semantic memory, perceptual speed, and working memory. When they looked at individual flavonols, they also found that intake of kaempferol was associated with lower rate of global cognitive decline ($\beta=0.01$; 95% CI 0.006 to 0.02) ([Holland et al., 2023](#)).

Other studies looked at flavonols as a broad category, which would include but not be limited to kaempferol. [Godos et al., 2024](#) performed a systematic review and meta-analysis of observational studies of intake of certain compounds and incidence of cognitive decline and / or dementia. Their review of 37 trials and meta-analysis of 13 trials focused on polyphenols, including flavonols. The studies that looked at flavonol intake, among other nutrients, included approximately 170,000 participants in total. In their meta-analysis of 6 studies, they found that higher intake of flavonols was associated with lower incidence of cognitive impairment / dementia (RR=0.88; 95% CI 0.80 to 0.96). The systematic review revealed that several of the studies that looked at flavonols had looked specifically at kaempferol and found some association between higher intake of kaempferol and lower rates of cognitive decline.

This systematic review and meta-analysis included both [Morris et al., 2018](#), [Holland et al., 2020](#), and [Holland et al., 2023](#), among several other trials. [Kesse-Guyot et al., 2012](#), also included in [Godos et al.,](#)



[2024](#), examined data from a study known as SU.VI.MAX, which involved collecting dietary diaries from middle aged adults and then assessing cognitive function 13 years later, among other study activities. The researchers found that those who reported the highest intake of flavonols, including kaempferol, had significantly better language and verbal memory performance at the 13-year follow up. In one statistical model, those with higher intakes of flavonols, among other nutrients like catechins, had a negative association with executive functioning.

Human research to suggest benefits to patients with dementia:

There are no clinical trials testing kaempferol in patients with dementia.

Mechanisms of action for neuroprotection identified from laboratory and clinical research:

There are many pathogenic processes that may or do contribute to dementia, including oxidative stress and inflammation – both neuroinflammation and systemic inflammation. Kaempferol is an antioxidant through its reactive oxygen species (ROS) scavenging as well as through promoting the activity of endogenous antioxidant systems, such as promoting the Nrf2 pathway ([Hussain et al., 2024](#); [Kalu & Ray, 2025](#)). Additionally, kaempferol is thought to play an anti-inflammatory role through mechanisms such as reducing the production of pro-inflammatory cytokines such as IL-6 and TNF α , among others, and modulating signal transduction pathways such as NF- κ B ([Jin et al., 2023](#); [Hussain et al., 2024](#); [Kalu & Ray, 2025](#)). Kaempferol has been suggested to be anti-amyloidogenic and/or promote autophagy ([Jin et al., 2023](#); [Cichon et al., 2024](#); [Hussain et al., 2024](#); [Kalu & Ray, 2025](#)). Preclinical work has reported neuronal anti-apoptotic activity of kaempferol, as well as promotion of pro-survival BDNF expression ([Jin et al., 2023](#); [Cichon et al., 2024](#); [Hussain et al., 2024](#)). Kaempferol may also act as an acetylcholinesterase inhibitor, thus potentially increasing cholinergic signaling ([Cichon et al., 2024](#)). These activities could have beneficial effects not just in AD but also in other neurodegenerative diseases such as Parkinson's disease (PD) ([Kalu & Ray, 2025](#)).

Animal studies have reported potential benefits of kaempferol for ischemia-reperfusion injury and traumatic brain injury, in part through protecting against mitochondrial dysfunction ([López-Sánchez et al., 2024](#)). Kaempferol also was neuroprotective in a mouse model of inflammation (induced by LPS); the kaempferol-treated mice had less neuronal loss, reduced levels of pro-inflammatory cytokines, and protected blood-brain barrier integrity ([Yang et al., 2019](#)). Kaempferol has also been reported to

improve spatial memory in an animal model of sporadic dementia and increase brain levels of antioxidant enzymes (reviewed by [Zhang & Yan, 2023](#)).

There are also potential indirect mechanisms of action for neuroprotection, Kaempferol has been suggested to be cardioprotective ([Micek et al., 2021](#)) and anti-diabetic ([Zamora-Ros et al., 2014](#)); as cardiovascular disease and diabetes are both risk factors for dementia, any pro-cardiac or anti-diabetic activity that kaempferol has could be neuroprotective. These potential actions will be discussed in more detail in the 'Aging and related health concerns' section; if any of these actions played a clinically meaningful role in humans, then they could be indirectly neuroprotective.

One potential issue is that kaempferol is not thought to be very bioavailable and is rapidly metabolized. It is hypothesized that kaempferol may have effects even at small doses, or that kaempferol metabolite(s) may have biological effects. More work is needed to elucidate whether kaempferol does have clinically meaningful effects and if so, how the effect(s) are impacted by the bioavailability and/or metabolism of kaempferol ([Jin et al., 2023](#)).

APOE4 interactions:

It is not known whether kaempferol intake or supplementation interacts with APOE status.

In studies of the Rush Memory and Aging Project, including [Morris et al., 2018](#) and [Holland et al., 2020](#) among others, the researchers assessed the level of intake of foods rich in kaempferol and whether there was an association between less cognitive decline and/or incidence of dementia. These studies also assessed APOE status. Both reported that higher intake of food rich in kaempferol was associated with less cognitive decline and/or incidence of dementia, and this was not affected by APOE status. Much more work is needed to confirm whether this reflects a true lack of interaction between APOE isoform and kaempferol.



Aging and related health concerns: No clinical studies have tested the effects of kaempferol for age-related diseases. Observational work suggests intake of kaempferol may be associated with lower incidence of cancer, cardiovascular disease, and T2D.

Types of evidence:

- 4 meta-analyses or systematic reviews
- 1 clinical trial
- 4 observational studies
- 7 reviews

Clinical trials on kaempferol supplementation are lacking. There are several indications for which there is observational data suggesting reduced incidence of a particular disease in those with higher intakes of kaempferol compared to those with lower intakes of kaempferol. There are also several diseases for which there is preclinical evidence of potential benefit. Well-designed clinical trials are necessary to confirm whether there is, in fact, a direct benefit of kaempferol for any / all of these disorders.

Cancer: THEORETICAL BASIS FOR BENEFIT

No clinical trial has assessed whether kaempferol has any clinical benefit in prevention or treatment of cancer. However, many preclinical studies have suggested potential anti-cancer activities, and epidemiological studies have found associations between higher intake of kaempferol and lower incidence of cancers compared to lower intake of kaempferol.

A systematic review and meta-analysis of observational studies reported that higher intake of total flavonoids (OR=0.81; 95% CI 0.67 to 0.98; p=0.03) as well as kaempferol specifically (OR=0.78; 95% CI 0.64 to 0.96; p=0.02) were associated with lower incidence of diagnosis of lung cancer ([Rostampour et al., 2025](#)), though some earlier studies found this was specific to smokers rather than non-smokers ([Woo & Kim, 2013](#)). Compared to lower intake of kaempferol, higher intake has also been associated with lower incidence of other cancers, like ovarian cancer ([Gates et al., 2007](#)). Preclinical studies suggest that kaempferol may induce apoptosis in tumor cells, inhibit proliferation, migration, and invasion of neoplasms, and act in synergistic ways with certain cancer drugs. The anti-inflammatory and anti-oxidant properties of kaempferol could also play a beneficial role for cancer prevention or treatment. These preclinical studies have suggested potential for benefit in a variety of cancer types, including

bone, breast, colon, pancreatic, lung, ovarian, and gastrointestinal cancer, among others ([de Morais et al., 2024](#); [Hao et al., 2024](#)).

Cardiovascular and Cerebrovascular Disease: THEORETICAL BASIS FOR BENEFIT

Observational studies have also found that compared to participants with the lowest intake of kaempferol, participants with the highest intake of kaempferol had a lower incidence of cardiovascular disease (RR=0.75; 95% CI 0.56 to 1.0) and stroke (RR=0.72; 95% CI 0.59 to 0.88) ([Micek et al., 2021](#)). Another observational study found a trend towards lower mortality from ischemic heart disease with those in the highest quartile of intake of kaempferol compared to the lowest intake quartile (RR=0.79; 95% CI 0.63 to 0.99; p=0.02) ([Knekt et al., 2002](#)).

Preclinical work has suggested a number of mechanisms by which kaempferol may be cardioprotective, such as through modulation of apoptosis, mitochondrial function, inflammation, and oxidative stress, and on cardiac structure and function ([Kamisah et al., 2023](#)). More work is needed to explore these findings in clinical contexts.

Metabolic Syndromes: THEORETICAL BASIS OF BENEFIT

An observational study of over 340,000 participants found that intake of kaempferol could be associated with a lower incidence of type 2 diabetes, with a trend towards lower incidence of diabetes in those in the highest quintile of intake compared to the lowest quintile of intake (HR=0.91; 95% CI 0.78 to 1.05, p-trend=0.013), though not all observational studies have replicated this finding ([Zamora-Ros et al., 2014](#)). This may be due to a lack of true biologically meaningful connection between kaempferol and diabetes, or different associations based on participant populations.

Preclinical work suggests that kaempferol administration improved insulin resistance and blood glucose metabolism and measures. Laboratory studies also suggest the anti-inflammatory and antioxidant roles of kaempferol could also have benefit in a variety of metabolic syndromes, including type 2 diabetes and MASH/MASLD ([Aryal et al., 2024](#); [Yao et al., 2024](#); [Martiniakova et al., 2025](#))

Preclinical studies have suggested potential roles for kaempferol for other health issues, such as aging and/or senescence ([Della Vedova et al., 2025](#)), intestinal health ([Chen et al., 2023](#)), osteoporosis, and heart failure ([Hussain et al., 2024](#)). Clinical work has found that total flavonoid intake, as well as

kaempferol intake, is inversely associated with C-reactive protein, a marker of chronic inflammation ([Chun et al., 2008](#)). Significant work is required to fully assess these possible effects of kaempferol and their clinical meaningfulness.

Safety: Kaempferol is consumed as part of the diet, and higher intake is associated with positive health outcomes. The effects of kaempferol supplementation are poorly studied; no clinical safety concerns have been identified, but there are few clinical trials to assess.

Types of evidence:

- 1 clinical trial
- 1 observational study
- 4 reviews

Kaempferol is regularly consumed in the diet; it is thought that the average intake of kaempferol is somewhere in the range of 3.5 to 5 mg daily in the United States ([Bai et al., 2014](#); [Jin et al., 2023](#)).

A 2023 RCT assessed the safety of kaempferol aglycone in healthy participants. Kaempferol aglycone is a formulation of kaempferol that may be more readily absorbed than other formulations such as kaempferol glycosides. The study enrolled 48 healthy adult participants; these participants were randomized to receive either kaempferol aglycone (50 mg) or placebo daily for 4 weeks. This kaempferol dose is thought to be approximately five times higher than the estimated daily intake. There were no changes on physical exam in the kaempferol group. While there were changes in blood biochemistry and hematological parameters in both groups over the trial and some statistically significant differences between groups at the end of the trial, all parameters were within reference ranges and none of these were deemed to be clinically meaningful. All adverse events were mild or moderate and all were considered unrelated to the study drug ([Akiyama et al., 2023](#)).

Laboratory studies of kaempferol have reached disparate conclusions as to the safety of kaempferol. While some *in vitro* experiments using cell lines or cell extracts have reported potential concerns such as reducing iron bioavailability, potentially reducing uptake of folic acid, increasing bioavailability and toxicity of certain anti-cancer drugs, or pro-oxidant capacity that can cause cellular damage including potential genotoxicity or carcinogenic activity, these effects have not been recapitulated in animal models ([Jin et al., 2023](#)).

Drug interactions:

The drug interactions of kaempferol are poorly understood.

Some *in vitro* studies suggest a potential for interaction with iron or folic acid, and other preclinical work has suggested that flavonols could affect cytochrome P450 activity ([Jin et al., 2023](#); [Li et al., 2023](#)). Whether this has *in vivo* effects or is clinically meaningful in humans at therapeutic doses is not yet known.

Research underway:

There are no ongoing studies on the effects of kaempferol that are registered on clinicaltrials.gov.

Search terms:

Pubmed, Google: kaempferol

- Cognition, dementia, Alzheimer's disease, diabetes, cardiovascular disease, stroke, safety, APOE4

Websites visited for kaempferol:

- [Clinicaltrials.gov](https://clinicaltrials.gov) (0)
- [Examine.com](https://examine.com)
- [PubChem](https://pubchem.ncbi.nlm.nih.gov)
- [DrugBank.ca](https://drugbank.ca)



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