Tea isn't just a refreshing drink anymore. Numerous stories have appeared in the popular press touting the health benefits of green tea, including anti-cancer effects, weight loss and antioxidant properties.

There is a lot of confusion about the differences between white tea, green tea, oolong tea, and black tea. They are all derived from the same tea plant, Camellia sinesis, and for all of them, only the tip of the plant is picked. The differences among these teas lie in the processing, mainly in relation to the degree of oxidation. In most teas, enzymes in the more mature leaves trigger oxidation after picking, and to arrest this, the leaves are heated.

White Tea is composed of new growth buds from the tips of the tea plants. This tea undergoes the least amount of processing. Since it doesn't undergo oxidation, it is never heated or fermented.

Green Tea, a favourite drink among millions of people, makes up 20 percent of the world’s production, undergoes minimal oxidation (fermentation) by applying heat early in the processing. This inactivates the fermentation enzyme, phenolase. Its health benefits are numerous and have much scientific documentation.

Oolong Tea is oxidised to a degree somewhere between green and black tea, usually within two to three days of picking. The Chinese call this ‘blue tea’.

Black Tea is what most people consider ‘tea’. The leaves are black because they are fully oxidised, usually for two weeks to a month. This process releases a group of compounds called tannins, which have anti-cancer effects, especially for colon cancer. The levels of catechins, which are responsible for most of the medicinal benefits, are substantially lower in black tea.

A SUMMARY OF THE BENEFITS OF TEAS

- Tea has been tapped for its medicinal properties for ages
- Tea has proven strong in combating stroke, heart failure, cancer, and diabetes
- Among the different teas, white tea offers the greatest benefits, as it undergoes the least amount of processing, which is what distinguishes teas
- Do not use lemon in tea — lemon increases absorption of the naturally occurring aluminium in tea
- Tea can help with losing weight
- Tea is a great digestive aid
- Tea can help protect the retina from free radical damage that causes macular degeneration and glaucoma
In addition, studies have shown tea has some benefit in preventing prostate cancers in humans and animals. Studies using a combination of the amino acids, lysine, proline, arginine, as well as vitamin C and EGCG, found that they inhibited the invasion and growth of prostate cancer and, at high doses, increased the killing of cancer cells (apoptosis). Of particular interest is the discovery that green tea extract inhibits hormone-sensitive cancers, including breast and prostate cancers. A number of studies have shown that green tea extract, and especially EGCG, inhibits haematological cancers like leukaemia and multiple myeloma, a particularly nasty malignancy. These studies show that EGCG inhibits the growth of leukaemia cells and triggers their death. Another study found that EGCG stimulates the killing of multiple myeloma cells. Likewise, a number of studies have shown EGCG curbs the invasion of bladder cancer and also reduces the cancer growth. Studies have also found that EGCG inhibits the development of lung cancer and reduces the growth of existing lung cancers. Ovarian cancers are also sensitive to the suppressive effects of EGCG. It has been found to inhibit ovarian cancer in numerous ways, making it superior to chemotherapy. In relation to melanomas, recent studies have shown that green tea may inhibit their formation. When the skin is sunburned, it releases a large amount of nitric oxide which forms nasty free-radicals that trigger the development of melanomas. Green tea extract, taken orally and applied topically, can interfere with the production of nitric oxide. The potent antioxidants in green tea, including high levels of quercetin, are a powerful weapon against the growth and spread of melanomas.

POWDERFUL LIVER PROTECTION
A concern with any flavonoid is its ability to alter detoxification, which is a key function of the liver. Some flavonoids, such as those in grapefruit, can inhibit detoxification of certain prescription drugs and caffeine. This can increase the toxicity of the drug and prolong the effects of caffeine. Studies of green tea extract have shown no evidence that it changes the liver's ability to detoxify chemicals. EGCG can protect liver cells from the toxic effects of alcohol, mainly by its antioxidant and anti-inflammatory activity.

In addition, EGCG has been shown to protect the liver from autoimmune hepatitis by lowering the level of a critical chemical and suppressing the overactive immune system. It has also been shown to lower blood cholesterol levels, primarily by inhibiting the absorption of cholesterol from the gut and by reducing the synthesis of cholesterol by the liver. Not all reports endorse the use of green tea extract, especially its concentrations of EGCG. One study found that high doses of extract (much higher than can be obtained by drinking tea) interfered with the mitochondrial (energy producing) function in liver cells, which could have the effect of toxicity. Even though they admit that connections to EGCG are not very strong, the United States Pharmacopoeia has asked that supplements containing concentrated EGCG be labelled with a warning that the product should be stopped if abdominal pain, dark coloured urine or jaundice occurs. People with a history of liver disease or damage should use the product with caution. To put benefits versus harm into perspective, it has been shown that, at low to moderate doses, white and green tea extracts (as with tea drinking) act as powerful antioxidants, but at very high concentrations they can actually promote dangerous oxidation. Combining the tea extracts with other antioxidants, such as vitamins E, C, K and D3, helps prevent this toxic effect.

DRINK TEA — REDUCE FAT
When it was reported that green tea caused a reduction in fat, commercial products began to appear on shop shelves extolling the virtues of green tea extract as an aid for weight loss. The studies show a reduction in fat due to inhibiting the growth of fat cells and to inhibiting fat absorption from the gut. However, the doses required to get this effect are generally higher than those contained in the weight-loss products or by drinking green or white tea. Green tea also dramatically reverses insulin resistance, the cause of type-2 diabetes. It has been found that EGCG acts like insulin and that green tea extracts have a strong protective effect in diabetic animals from diabetic nephropathy.

HEART PROTECTION
EGCG has been shown to protect the heart in many ways:
- In cases of hypertension, from enlarging;
- From free-radical damage;
- It reduces heart inflammation;
- Green tea extract reduces high levels of free-iron in the heart, free iron being associated with heart failure.

EGCG has been shown to relax arteries, thereby improving blood flow and lowering blood pressure. It has also been shown to reduce atherosclerosis that is strongly associated with oxidized LDL-cholesterol. Green tea extract improves the health of red blood cells without the side effects of medications. This allows blood to flow through arteries more easily. Several studies have shown that EGCG helps prevent strokes, and when strokes do occur, they are much less severe when green tea extract is given.

Finally, EGCG from green tea has been shown to inhibit an enzyme called collagenase. In excess, this enzyme weakens the collagen that gives strength to blood vessels and other tissues. Inhibiting it reduces the risk of varicose veins, haemorrhoids and leg oedema.

OTHER PROTECTION
A recent study using cells from people with rheumatoid arthritis found that EGCG inhibited the inflammatory cytokines associated with the disease. The researchers concluded that green tea extract holds promise in reducing the joint and tissue destruction associated with rheumatoid arthritis. Other studies have shown that green tea extract suppresses the chemical that triggers the inflammation associated with rheumatoid arthritis. Green tea can reduce the pain, swelling and disability associated with inflammation. EGCG has been shown to reduce inflammation in the intestines, which would be helpful with inflammatory bowel diseases, such as ulcerative colitis.
Other studies have shown that EGCG significantly reduces the inflammation in the lungs associated with smoking. One would expect white and green tea to reduce the incidence of autoimmune diseases as well. Two recent studies have shown that green tea extract can significantly reduce the severity and damage associated with two autoimmune diseases, Sjogren's syndrome and Lupus.\(^\text{25}\) A growing number of studies show that green tea and white tea have powerful antibacterial, antiviral, and antifungal activity. Tea has been shown to inhibit growth of the malaria organism, a leading cause of death in the Third World.\(^\text{26}\)

Another study looked at the ability of EGCG to inhibit the growth of several organisms associated with food-borne infections, such as *E. coli*, *Staphylococcus aureus*, *Listeria monocytogenes* and *Bacillus cereus*. While being active against all bacteria, EGCG showed the greatest ability in fighting antibiotic-resistant *Staphylococcus aureus*. Thus flavonoids may have the potential to treat antibiotic-resistant organisms.

Newer studies confirm that green tea extract and EGCG enhance the effectiveness of antibiotics against a number of disease-causing organisms.\(^\text{27}\) Drinking several cups of strong white tea daily while taking antibiotics can make the drugs more effective.

Green tea extract has even been found to inhibit HIV infections,\(^\text{28}\) and EGCG has been shown to reduce the risk of HIV-induced dementia.\(^\text{29}\)

Flu in the elderly is significantly reduced by gargling with concentrated green tea extract.\(^\text{30}\)

If all this isn't impressive enough, recent studies have shown that the catechins from white and green teas can suppress the growth of Candida organisms. In some cases, tea worked even better than prescription antifungal medications.\(^\text{31}\)

**BRAIN PROTECTION**

As a neurosurgeon who works in the field of neurodegenerative brain disorders, such as Alzheimer's dementia, Parkinson's disease and ALS, I find the powerful protective effects of tea compounds very interesting. A considerable amount of research has shown that green tea extract is highly protective of the brain. It has been proven that EGCG reduces the brain's generation of toxic beta amyloid, the main feature in the Alzheimer's brain.\(^\text{32}\)

Alzheimer's brains accumulate considerable amounts of free iron. This iron tends to cause the beta amyloid to mass together and form highly toxic microscopic crudes in the brain as well as accumulate tremendous amounts of free radicals. EGCG not only reduces the toxic iron, it also binds the iron (a process called chelation), rendering it non-toxic.

Free iron also plays a major role in Parkinson's disease and tends to accumulate in the brain long before clinical signs develop. EGCG has been shown to reduce the incidence of Parkinson's disease in experimental models of the disease.\(^\text{33}\) The antioxidant effect of green tea extract is 10 times more potent than that of vitamin E.

One of the most destructive free radicals found in all neurodegenerative diseases, such as Alzheimer's dementia, is peroxynitrite. EGCG has been shown to be a strong suppressor of peroxynitrite.\(^\text{34}\)

EGCG has also been shown to stimulate DNA repair, which is essential in protecting brain cells. Excitotoxicity, the process by which nerve cells are damaged or killed, plays a central role in virtually all neurodegenerative diseases, including multiple sclerosis, Alzheimer's, Parkinson's and ALS. EGCG has been shown to significantly impede excitotoxicity.

EGCG is also useful in protecting the brain in cases of stroke, brain trauma and infections. Closely linked to excitotoxicity is chronic activation of the brain's immune system, which, when occurring for prolonged periods, slowly destroys brain cells. This appears in Alzheimer's disease, autism, Parkinson's disease, strokes, brain trauma, encephalitis and ALS. Green tea represses the activation of the brain's immune system, which can help protect against liver injury.\(^\text{35}\)

**KIDNEY STONES, SKIN AGEING**

A recent study found that EGCG significantly reduces the formation of calcium oxalate kidney stones by lowering oxalate crystals in the urine.\(^\text{36}\) These stones are common. If you have a problem with kidney stones you may want to drink several cups of strong white tea a day.

Not only can green tea protect against UVB-triggered skin cancers, it also significantly protects against skin ageing by protecting the DNA and promoting DNA repair in skin cells. The UVB rays from the sun suppress immunity within the skin, a major process in skin ageing. It has been shown that EGCG restores this lost immunity when applied topically or taken orally. It has also been shown that EGCG can protect the lens of the eye against UVB damage.

**PROTECTECTION FOR THE EYES**

A number of eye diseases, including macular degeneration and glaucoma, are associated with oxidative stress (caused by free-radicals and lipid peroxidation) within the retina at the back of the eye where light falls. EGCG protects these nerve cells against free-radical damage.

It has been shown that EGCG is 10 times more potent as an antioxidant than either vitamin E or vitamin C. The best results are obtained by drinking white tea several times a day – as the Chinese and Japanese do.

**WHY DRINK WHITE TEA?**

White tea stands out among the different teas because it contains more catechins than the other teas, including green tea, and also contains far less fluoride and aluminium. I would recommend using two to three bags of white tea per cup, and let simmer for at least 10 minutes. Squeeze the bags repeatedly during simmering. Then remove the bags and squeeze all the tea from the bags.

Long-simmered tea may be bitter, but the more bitter, the better, because the bitterness is caused by the beneficial catechins. Add some natural sweetener if you wish and maybe a few leaves of mint.

Drink two to three cups a day. Because the catechins stay in the blood for about five hours, three cups will cover most of one day. You would want to drink more if you are treating a disease, such as Parkinson's or an infection.

Several companies make a concentrated green tea extract. In some supplements, this is equivalent to 20 cups of tea. As stated, recent warnings of the risk of liver damage suggest taking the supplement with a meal and watching for signs of liver damage, such as abdominal pain, dark urine and jaundice (yellow skin). Taking other antioxidants with the extract may help protect against liver injury.

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**References**

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