

## **Bioactive Compounds In Food: Role In Prevention Of Cancer.**

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### **Abstract:**

*Cancer Is A Pathological Condition In Which There Is Unregulated Cell Growth And Cells Proliferate In An Out-Of-Control Manner And It Is One Of The Greatest Causes Of Death Worldwide. With The Development Of Surgery, Radiotherapy, And Medical Agents, The Outcomes Of Cancer Patients Have Greatly Improved. However, The Underlying Mechanisms Of Cancer Are Not Yet Fully Understood. Recently, Natural Products Have Been Proven To Be Beneficial For Various Conditions And Have Played Important Roles In The Development Of Novel Therapies. Bioactive Compounds Include Lycopene, Resveratrol, Lignan, Tannins, And Indoles Which Are Widely Present In Many Foods And Are Helpful In The Treatment Of Cancer. Here, We Review The Current Evidence Of The Presence Of Bioactive Compounds In Natural Products For The Treatment Of Cancer And Summarize The Various Bioactive Compounds Present In Foods And Their Role In The Prevention Of Cancer.*

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### **I. INTRODUCTION:**

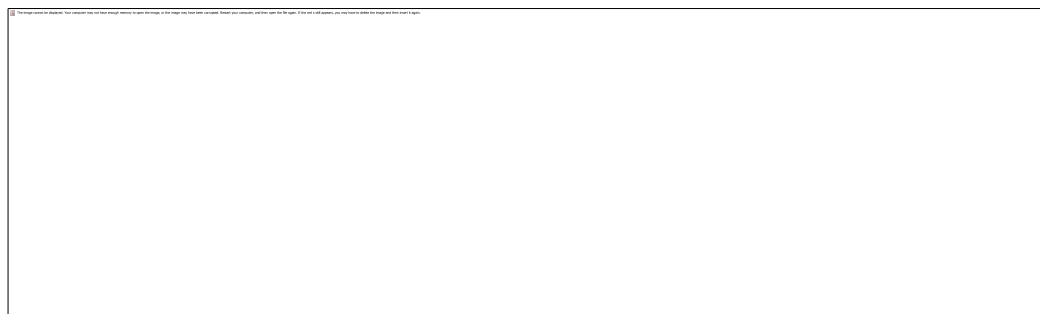
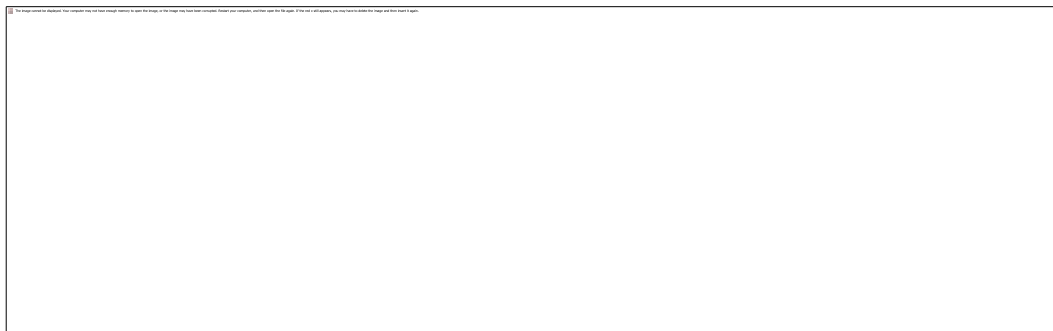
cancer is caused by changes in a cell's DNA – its heritable" design." Only 5- 10% of these changes may be inherited, while 90- 95 may be caused by outside exposures, which are constantly appertained to as environmental factors and also by life factors, including diet (30- 35%), tobacco smoking (25- 30%) and alcohol (4- 6%). Several lines of validation indicate that diet and nutrition can contribute to mortal cancer trouble. Foods and salutary conduct are allowed to increase cancer trouble, which is partly due to the consumption of food mutagens. These mutagens contribute to cancer along the route of exposure (oral depression, esophagus, gastrointestinal tract) and in organs that are distant from the route of exposure (e.g., liver).

Advances in logical technology, especially the Ames test have disclosed that in experimental systems an astonishing variety of mixes being naturally in the diet are carcinogenic or mutagenic. Ames concluded," Nature isn't benign; no mortal diet can be entirely free from mutagens and carcinogens."

Carcinogenesis: Carcinogens and mutagens Substances and exposures that can lead to cancer are called carcinogens. In genetics, a mutagen is a physical or chemical agent that changes the heritable material, generally the DNA of an organism, and thus increases the frequency of mutations above the natural background position. As multitudinous mutations can beget cancer, mutagens are therefore also likely to be carcinogens. Some carcinogens do not affect the DNA directly but lead to cancer in other ways. For illustration, they may replicate cells to divide at a faster-than-normal rate, which could increase the chances that DNA changes will do. Carcinogens do not reproduce cancer in every case, all the time. Substances labeled as carcinogens may have different situations of cancer-causing eventuality. Some may beget cancer only after prolonged and/ or high situations of exposure.

For any particular person, the trouble of developing cancer depends on multitudinous factors, including how they are exposed to a carcinogen, the length and intensity of the exposure, and the person's heritable makeup.

In recent decades, many types of food, including fruits, vegetables, and whole grains, have been determined to have positive effects on human health. Bioactive compounds are the second metabolites of foods and provide health protection in addition to their basic nutritional values. They vary widely in their structures and functions and have the potential to serve as chemotherapeutic and chemopreventive agents in the treatment of cancer. In this part, we enumerate the evidence that supports the chemo-preventive cancer potentials of these compounds.



## **APPLES**

There may be some truth to the saying “an apple a day keeps the doctor away.” Apples contain polyphenols that have promising anticancer properties.

Polyphenols are plant-based compounds that may prevent inflammation, cardiovascular disease, and infections. Polyphenols may modulate certain processes that can lead to cancer development.

In one 2018 study, it was found that Apple phloretin significantly inhibits the growth of breast cancer cells without affecting healthy cells.

This polyphenol inhibits a protein called glucose transporter 2 (GLUT2), which plays a role in advanced-stage cell growth in certain types of cancer.

Apples provide dietary fiber and polyphenol compounds that partner with gut microbes to create an environment that may help to reduce the risk of cancer. Observational population studies link apples with a lower risk of the estrogen receptor-negative (ER-) form of breast cancer.

## **BERRIES**

Berries are rich in vitamins, minerals, and dietary fiber. Their antioxidant content has many health benefits.

Anthocyanin, a compound present in blackberries, lowers biomarkers for colon cancer.

Blueberries contain many phytochemicals and nutrients which show potential anti-cancer effects in laboratory studies.

Several studies found that eating blueberries increases antioxidant activity in the blood as well as shows potential activity to prevent DNA damage.

The anti-inflammatory effects of blueberries can prevent the growth of breast cancer tumors in mice.

Anthocyanins, flavonoids, and other antioxidants in berries may mean they can help prevent cancer or even reverse the process of early cell changes. These bioactive components may help prevent or slow the development of various cancers, including breast cancer and cancers of the gastrointestinal tract.

## **CRUCIFEROUS VEGETABLES**

Cruciferous vegetables, such as broccoli, cauliflower, and kale, contain beneficial nutrients, including vitamin C, vitamin K, and manganese.

Cruciferous vegetables also contain sulforaphane, a plant compound with potential anticancer properties. Sulforaphane significantly inhibits cancer cell growth and stimulates cell death in colon cancer cells.

Sulforaphane in combination with genistein, a compound in soybeans can significantly inhibit breast cancer tumor development and size. Sulforaphane also inhibits histone deacetylase, an enzyme with links to cancer development.

3–5 servings of cruciferous vegetables per week may have cancer-preventive effects.

Lab studies showed several ways that sulforaphane, formed from glucosinolates in broccoli, could thwart the development and progression of prostate cancer.

## **CARROTS**

Carrots contain several essential nutrients, including vitamin K, vitamin A, and antioxidants.

Carrots also contain high amounts of beta-carotene, which is responsible for the distinct orange color.

Carrots' cancer-fighting potential comes from being a non-starchy vegetable as well as a source of carotenoids and other phytochemicals. Beta-carotene is a carotenoid that is essential in anti-cancer activity.

Beta-carotene also plays a vital role in supporting the immune system and may prevent the risk of breast and prostate cancer.

Higher consumption of carrots results in a 26% lower risk of developing stomach cancer.

## **FATTY FISH**

Fatty fish, including salmon, mackerel, and anchovies, is rich in essential nutrients, such as vitamin B, potassium, and omega-3 fatty acids.

One study found that people with diets high in freshwater fish had a 53% Trusted Source lower risk for colorectal cancer than those low in freshwater fish. Consuming fish oil later in life may be linked to a significantly lower risk for prostate cancer.

Finally, a review of data for 68,109 people found that those who consumed fish oil supplements at least four times a week were 63% Trusted Sources less likely to develop colon cancer.

## **WALNUTS**

All nuts appear to have cancer-preventing properties, but scientists have studied walnuts more than other types.

All nuts support a health-promoting diet, but they differ in the nutrients and plant compounds they provide. Walnuts are unique in several ways and have been studied more extensively than other nuts regarding cancer prevention.

Emerging research shows the potential for walnuts to contribute to a cancer-preventive diet through several compounds possibly working together. Ellagitannins, melatonin, and gamma-tocopherol may each work through different paths to reduce oxidative stress, inflammation, and gene expression that can lead to cancer.

Walnuts contain a substance called pedunculagin, which the body metabolizes into urolithins. Urolithins are compounds that bind to estrogen receptors and may play a role in preventing breast cancer.

In one animal study Trusted Source, mice receiving whole walnuts and walnut oil had higher levels of tumor-suppressing genes than the mice receiving vegetable oil.

## **LEGUMES**

Legumes, such as beans, peas, and lentils, are high in fiber, which may help lower the risk of some types of cancer. Higher legume consumption and a lower risk of colorectal cancer.

Dietary fiber, resistant starch, and phenolic compounds in pulses all may support the growth of health-promoting gut bacteria (the microbiome). Intake of bean fiber reduces the risk of breast cancer.

## **GRAPES**

Resveratrol, an antioxidant in red grape skins, has shown promise to Trusted Source as a tool for fighting cancer. Some scientists believe that, with further research, it could be harnessed as a cancer therapy.

Proanthocyanidin and its compounds from grape gut microbes produce them and may influence the expression of genes related to cancer development.

As well as resveratrol, grapes, and grape seeds also contain the following nutrients, which have antioxidant and possibly cancer-fighting properties:

- flavanols
- phenolic acids
- anthocyanins (in red and purple grapes)
- proanthocyanidins and other tannins
- catechins

## **II. CONCLUSION**

Cancer is a ruinous complaint that has claimed multitudinous lives. Natural bioactive agents from shops are gaining wide attention for their anticancer exertion. Several studies have set up that natural plant-predicated bioactive mixes can enhance the efficacy of chemotherapy. Natural products have the eventuality to serve as chemotherapeutic as well as chemo preventive agents in the treatment of cancer. The bioactive mixes derived from multitudinous natural plant sources could be a possible means to give protection against cancer or used as a treatment approach against cancer. Curcumin and tocotrienols show important pledge to be developed as chemo preventive and/ or new remedial agents in the fight against cancer as there are multitudinous studies

that show that these bioactive agents retain potent anticancer exertion. Although there are some studies that have demonstrated how these mixes ply anticancer goods, the exact target remains fugitive. Hence, farther work needs to be carried out to know to understand exactly how these mixes act as this information would be useful in developing remedial combinations made up of various bioactive agents that can target different molecules.

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