

# Vitamin C's Battle Against Radicals

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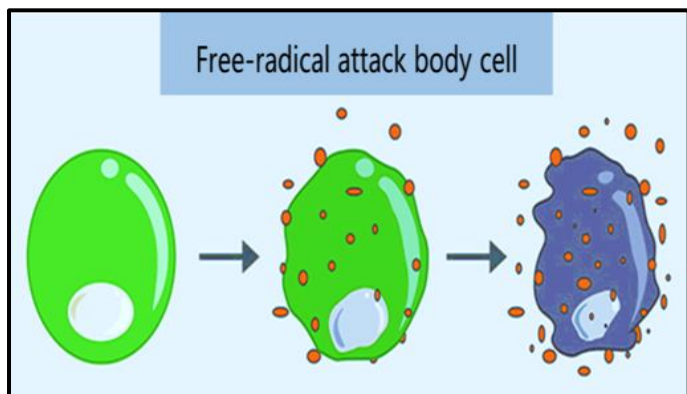
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Free radicals are highly reactive and unstable molecules that are made by the body naturally as a byproduct of normal metabolism. Free radicals are unstable atoms that can damage cells, causing illness and aging. Free radicals are missing an electron from their outer shell. That makes them unstable, so they go and steal an electron from the molecules in our skin cells, or from our blood cells or from wherever they can. Free radicals have a lifespan of only a fraction of a second, but during that time can damage DNA, sometimes causing mutations that can increase your risk of getting health conditions like heart disease and cancer.

Once free radicals are made, they're free to do damage to the body-whether they came from exposure to a carcinogen or the normal processes of the body. The availability of free radicals creates something called oxidative stress in the body. It's called "stress" because the chemical reactions that let free radicals get an electron occur in the presence of oxygen. There are several parts to this process. When one free radical "steals" an electron from a molecule, that molecule becomes a free radical because it's missing an electron. That cycle continues and makes more free radicals. Free radicals can damage the body's DNA. Our DNA contains our genes, proteins, lipids, cell membranes, and other important substances. Damaged DNA can lead to disease.

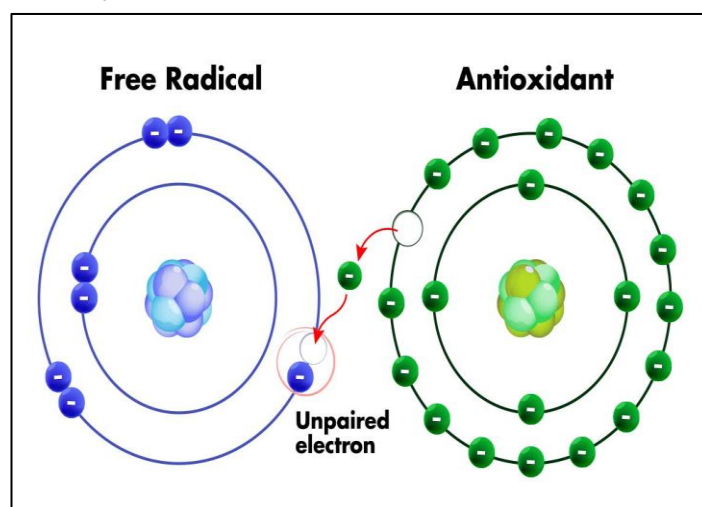


**Sources of free radicals:** Free radicals can also be made by the body after exposure to toxins in the environment such as

- \* Tobacco smoke and ultraviolet (UV) light,
- \* Exposure to toxic chemicals, such as pesticides and air pollution,
- \* Smoking,
- \* Alcohol and fried foods
- \* Stress
- \* Medical radiation

**How to reduce free radicals:**

Many of the plant chemicals (phytochemicals) in our foods are antioxidants. These nutrients stop the formation of free radicals and may reduce the damage they would cause in the body. Antioxidants are also unstable and looking for a partner. Like free radicals, antioxidants have an uneven number of electrons. Unlike free radicals, though, antioxidants don't typically steal from otherwise stable molecules to keep themselves in check. The power of antioxidants to fight free radicals is one reason why a diet rich in vegetables and fruits has been linked with a lower risk of many diseases.



## Vitamin C: An Essential Defender Against Free Radical Damage

Foods and substances that have antioxidant properties that come from outside the body (exogenous) include: Vitamins such as Vitamin A, C, E, Q, N (alpha-lipoic acid), P (bioflavonoids), B1, B3, B6, B9. In particular, our focus revolves around the provenance of Vitamin C present in fruits and vegetables that can be grown in home gardens amidst the Indian climate.

Vitamin C (l-ascorbic acid) is a water-soluble micronutrient required for multiple biological functions. It is necessary for normal growth and development, Vitamin C is one of the potent reducing agents and scavenger of free radicals in biological systems, working as a scavenger of oxidizing free radicals and harmful oxygen-derived species. To harness the antioxidant properties of vitamin C and help reduce the impact of free radicals, it's important to include an adequate amount of vitamin C-rich foods in your diet. The Recommended Dietary Allowance (RDA) for vitamin C varies based on factors such as age, sex, and life stage. the RDAs are as follows:

- Adult Men (aged 19 years and older): 90 mg per day
- Adult Women (aged 19 years and older): 75 mg per day

However, during certain conditions such as pregnancy and lactation, the recommended intake may be higher.

Many vitamins C-rich fruits and vegetables can be grown in a home garden/farm in the Indian climate. Here are some options given in Table 1.

In conclusion, the understanding of free radicals and their potential harm to the body

underscores the importance of incorporating antioxidants into our diets. It is essential to recognize the role of other antioxidants, such as Vitamins A, E, and various bioflavonoids, which complement the antioxidant spectrum. The sources of these exogenous antioxidants extend beyond vitamin C, providing a comprehensive approach to fortifying the body against free radical damage.

Vitamin C, a potent defender against free radical damage, plays a crucial role in neutralizing these unstable molecules. The discussion has shed light on the sources of vitamin C, emphasizing fruits and vegetables that can be cultivated in home gardens within the Indian climate. By exploring a variety of vitamin C-rich options, ranging from amla and guava to bell peppers and tomatoes, individuals can make informed choices to enhance their antioxidant intake. These homegrown solutions offer not only a sustainable approach to nutrition but also a practical means of combating oxidative stress. The versatility of vitamin C, found in both fruits and vegetables, allows for a diverse and enjoyable array of choices in promoting overall health

In implementing a diet rich in antioxidants, individuals can potentially reduce the impact of free radicals on their health, minimizing the risk of conditions like heart disease and cancer associated with oxidative stress. As we consider the interconnectedness of diet, health, and the environment, cultivating vitamin C-rich foods in home gardens not only contributes to personal well-being but also promotes a sustainable and resilient approach to nutrition. Ultimately, the pursuit of antioxidant-rich nutrition serves as a proactive step toward a healthier and more vibrant life.

Table 1: List of Fruits and vegetables rich in Vitamin C

Here are some vitamin C-rich fruits that you can grow in a home garden in the Indian climate	
<b>Amla (Indian Gooseberry)</b>	Amla is an excellent source of vitamin C and is well-suited to Indian climates. It is a small, green fruit that can be grown in pots or directly in the ground.
<b>Guava</b>	Guava trees thrive in the Indian climate, and they produce fruits with a high vitamin C content.
<b>Lemon</b>	Citrus trees, including lemon and lime, are excellent sources of vitamin C. They can be grown in pots or directly in the ground in various regions of India.
<b>Papaya</b>	Papaya plants are well-suited to tropical climates and can be grown in Indian gardens. They produce large, orange fruits rich in vitamin C.
<b>Strawberries</b>	While strawberries prefer a cooler climate, they can be grown in some parts of India, especially in the hills or during the winter season.
<b>Mango</b>	Mangoes not only taste delicious but also contain vitamin C. There are many varieties of mango trees that can be grown in different parts of India.
<b>Kiwi</b>	Kiwi plants can be grown in certain regions of India. They require a subtropical climate and well-drained soil.
Here are some vitamin C-rich vegetables that you can grow in a home garden in the Indian climate	
<b>Bell Peppers</b>	These colorful peppers, especially red and green varieties, are rich in vitamin C. They can be grown in pots or garden beds.
<b>Tomatoes</b>	Tomatoes are versatile and can be grown in various regions of India. There are numerous varieties to choose from, including cherry tomatoes.
<b>Broccoli</b>	Broccoli is a cool-season vegetable, and certain varieties can be cultivated in the winter season in parts of India with cooler temperatures.
<b>Cauliflower</b>	Similar to broccoli, cauliflower is another cruciferous vegetable that can be grown during the winter season in many regions of India
<b>Spinach</b>	Spinach is a leafy green that contains a good amount of vitamin C. It can be grown in pots or directly in the ground, especially during the cooler months.
<b>Cabbage</b>	Cabbage is a cool-season crop that can be grown in the winter months in regions with milder temperatures
<b>Radishes</b>	Radishes are quick-growing root vegetables that can be cultivated in the winter season in various parts of India
<b>Green Peas</b>	Peas are legumes that can be grown in cooler temperatures, making them suitable for the winter season in certain regions.
<b>Cucumber</b>	Cucumbers are refreshing vegetables with a moderate vitamin C content. They can be grown in pots with proper support or in garden beds.

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