**ANTIOXIDANTS**

**About oxidation**

The process of oxidation in the human body damages cell membranes and other structures, including cellular proteins, lipids and DNA. When oxygen is metabolised, it creates unstable molecules called ‘free radicals’, which steal electrons from other molecules, causing damage to DNA and other cells.

The body can cope with some free radicals and needs them to function effectively. However, the damage caused by an overload of free radicals over time may become irreversible and lead to certain diseases (including heart and liver disease) and some cancers (such as oral, oesophageal, stomach and bowel cancers).

Oxidation can be accelerated by [**stress**](https://www.betterhealth.vic.gov.au/health/healthyliving/stress), [**cigarette smoking**](https://www.betterhealth.vic.gov.au/healthyliving/smoking-and-tobacco), [**alcohol**](https://www.betterhealth.vic.gov.au/healthyliving/alcohol), sunlight, [**pollution**](https://www.betterhealth.vic.gov.au/health/healthyliving/air-pollution) and other factors.

**Antioxidants and free radicals**

Antioxidants are found in certain foods and may prevent some of the damage caused by free radicals by neutralising them. These include the nutrient antioxidants, vitamins A, C and E, and the minerals copper, zinc and selenium.

Other dietary food compounds, such as the phytochemicals in plants, are believed to have greater antioxidant effects than [**vitamins or minerals**](https://www.betterhealth.vic.gov.au/health/healthyliving/Vitamins-and-minerals). These are called the non-nutrient antioxidants and include phytochemicals, (such as lycopenes in tomatoes and anthocyanins found in cranberries).

**The effect of free radicals**

Some conditions caused by free radicals include:

* deterioration of the eye lens, which contributes to [**vision loss**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/eyes-vision-loss)
* inflammation of the joints ([**arthritis**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/arthritis))
* damage to nerve cells in the brain, which contributes to conditions (such as [**Parkinson’s**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/parkinsons-disease) or [**Alzheimer’s disease**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/dementia))
* acceleration of the [**ageing**](https://www.betterhealth.vic.gov.au/health/servicesandsupport/healthy-and-active-ageing) process
* increased risk of [**coronary heart disease**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/heart-disease-risk-factors), since free radicals encourage low-density lipoprotein (LDL) cholesterol to stick to artery walls
* [**certain cancers**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/cancer) triggered by damaged cell DNA.

**Disease-fighting antioxidants**

A diet high in antioxidants may reduce the risk of many diseases (including heart disease and certain cancers). Antioxidants scavenge free radicals from the body cells and prevent or reduce the damage caused by oxidation.

The protective effect of antioxidants continues to be studied around the world. For instance, men who eat plenty of the antioxidant lycopene (found in red fruits and vegetables such as tomatoes, apricots, pink grapefruit and watermelon) may be less likely than other men to develop [**prostate cancer**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/prostate-cancer). Lycopene has also been linked to reduced risk of developing [**type 2 diabetes mellitus**](https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/diabetes-type-2).

Lutein, found in spinach and corn, has been linked to a lower incidence of eye lens degeneration and associated vision loss in the elderly. Research also suggests that dietary lutein may improve memory and prevent cognitive decline.

Studies show that flavonoid-rich foods prevent some diseases, including metabolic-related diseases and cancer. Apples, grapes, citrus fruits, berries, tea, onions, olive oil and red wine are the most common sources of flavonoids.

**Sources of antioxidants**

Plant foods are rich sources of antioxidants. They are most abundant in fruits and vegetables, as well as other foods including nuts, wholegrains and some meats, poultry and fish.  
  
[**Good sources of specific antioxidants**](https://www.betterhealth.vic.gov.au/health/healthyliving/fruit-and-vegetables) include:

* allium sulphur compounds – leeks, onions and garlic
* anthocyanins – eggplant, grapes and berries
* beta-carotene – pumpkin, mangoes, apricots, carrots, spinach and parsley
* catechins – red wine and tea
* copper – seafood, lean meat, milk and nuts
* cryptoxanthins – red capsicum, pumpkin and mangoes
* flavonoids – tea, green tea, citrus fruits, red wine, onion and apples
* indoles – cruciferous vegetables such as broccoli, cabbage and cauliflower
* isoflavonoids – soybeans, tofu, lentils, peas and milk
* lignans – sesame seeds, bran, whole grains and vegetables
* lutein – green, leafy vegetables like spinach, and corn
* lycopene – tomatoes, apricots, pink grapefruit and watermelon
* manganese – seafood, lean meat, milk and nuts
* polyphenols – herbs
* selenium – seafood, offal, lean meat and whole grains
* vitamin A – liver, sweet potatoes, carrots, milk, and egg yolks
* vitamin C – oranges, blackcurrants, kiwifruit, mangoes, broccoli, spinach, capsicum and strawberries
* vitamin E – vegetable oils (such as wheatgerm oil), avocados, nuts, seeds and whole grains
* zinc – seafood, lean meat, milk and nuts
* zoochemicals – red meat, offal and fish. Also derived from the plants that animals eat.