

Research Article

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Protective effect of Flavonoids in Multiple Sclerosis

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Flavonoids (also known as Bioflavonoids) play an important role in the management of MS. They are colourful antioxidants found in plants and group of polyphenolic compounds that are ubiquitous in nature and are categorized, according to chemical structure, into flavonols, flavones, flavanones, isoflavones, catechins, anthocyanidins and chalcones. They are responsible for the colours of fruits (eg the red or blue of grape and berry skins) and vegetables. Over 4,000 naturally occurring compounds have been identified as flavonoids, many of which occur in fruits, vegetables and beverages (tea, coffee, beer, wine and fruit drinks). The Flavonoids have aroused considerable interest recently because of their potential beneficial effects on human health. Epidemiological studies have shown that high intake of fruit and vegetables, rich in flavonoids, is work as antiviral, anti-allergic, antiplatelet, anti-inflammatory, antitumor and antioxidant activities. Luteolin, 3', 4', 5, 7-tetrahydroxyflavone, an important member of the flavonoid family has shown to exert immunomodulatory effects that may be beneficial in the treatment of neurodegenerative diseases such as multiple sclerosis (MS), which has an underlying T-cell mediated autoimmune pathology.¹

In the human diet, they are most concentrated in fruits, vegetables, wines, teas and cocoa. Their cardioprotective effects stem from the ability to inhibit lipid peroxidation, chelate redox-active metals, and attenuate other processes involving reactive oxygen species. Flavonoids occur in foods primarily as glycosides and polymers that are degraded to variable extents in the digestive tract. Although metabolism of these compounds remains elusive, enteric absorption occurs sufficiently to reduce plasma indices of oxidant status. The propensity of a flavonoid to inhibit free-radical mediated events is governed by its chemical structure. Since these compounds are based on the flavan nucleus, the number, positions, and types of substitutions influence radical scavenging and chelating activity. The diversity and multiple mechanisms of flavonoid action, together with the numerous methods of initiation, detection and measurement of oxidative processes in vitro and in vivo offer plausible explanations for existing discrepancies in structure-activity relationships.^{2, 3}

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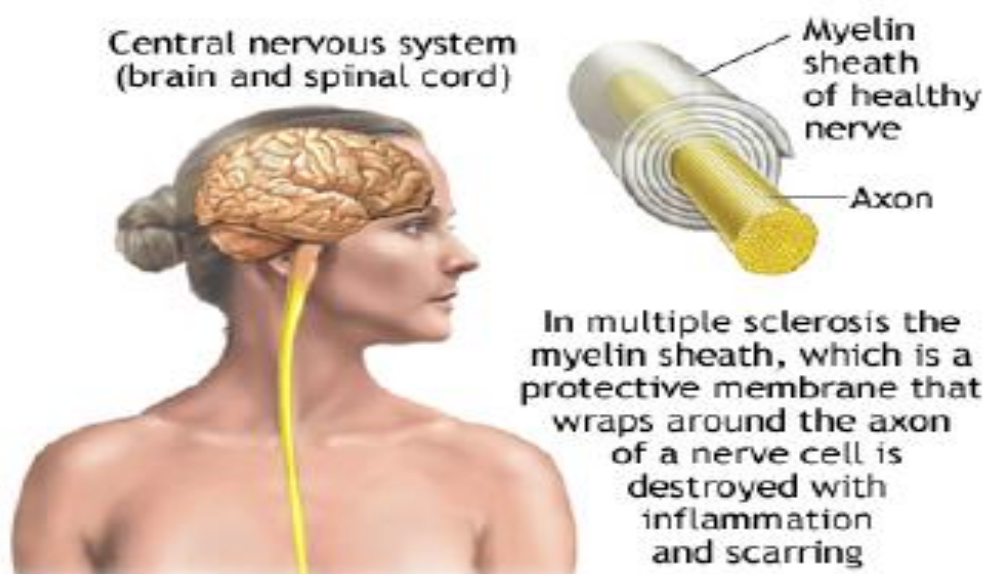
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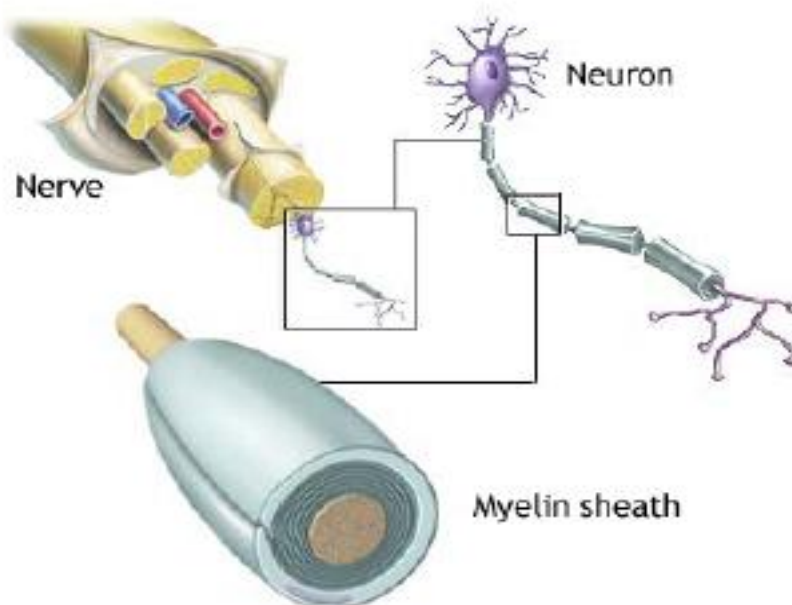
In plants, Flavonoids afford protection against ultraviolet radiation, pathogens, and herbivores.¹ The anthocyanin copigments in flowers attract pollinating insects and are responsible for the characteristic red and blue colors of berries, wines, and certain vegetables—major sources of flavonoids in the human diet. ²Although dietary intake varies considerably among geographic regions and cultures; it is estimated to be 23 mg daily in the Netherlands. Most of the beneficial health effects of flavonoids are attributed to their antioxidant and chelating abilities. By virtue of their capacity to inhibit LDL oxidation, Flavonoids have demonstrated unique cardioprotective effects. Flavonoid-rich diets have been shown to reduce myocardial post-ischemic damage in rats. A protective role in the diet of humans has also been indicated in some large, prospective studies. For example, high flavonoid intake predicted lower mortality from coronary heart disease and lower incidence of myocardial infarction in older men and reduced the risk of coronary heart disease by 38% in postmenopausal women.^{2,4}

Quercetin is a flavonoid found in onions, apple peel, cabbage, ginkgo biloba, tea and red wine. Luteolin: Suppresses inflammatory response. Found in artichoke leaves (and supplement Cyanara), the herbs rosemary, thyme, chamomile, yarrow and common horsetail. Also in bee propolis. Fisetin Found in the Brazilian Peppertree and bodybuilding supplements such as Xenadrine. Curcumin: The yellow pigment of the Indian spice turmeric. (Turmeric is the main component of curry.) Silymarin: Also known as Milk Thistle, and available in supplements. An immune system modulator and liver protector. Rutin: A flavonoid found in buckwheat. Polyphenols: Powerful antioxidants related to tannins. Found in tea, red grapes, red wine.¹

Multiple Sclerosis (MS) is an autoimmune disease that affects the brain and spinal cord (central nervous system). It affects women more than men. The disorder is most commonly diagnosed between ages 20 and 40, but can be seen at any age.



MS is caused by damage to the myelin sheath, the protective covering that surrounds nerve cells. When this nerve covering is damaged, nerve signals slow down or stop.



The nerve damage is caused by inflammation. Inflammation occurs when the body's own immune cells attack the nervous system. This can occur along any area of the brain, optic nerve, and spinal cord. It is unknown what exactly causes this to happen. The most common thought is that a virus or gene defect, or both, is to blame. Environmental factors may play a role.³

Flavonoids have been suggested to be beneficial for the course of neurodegenerative diseases, like Parkinson's disease, Alzheimer's disease and amyotrophic lateral sclerosis. It is thought that one of the most curative effects of flavonoids is their scavenging property of ROS. Oxygen radical also play a predominant role in the MS. Flavonoids inhibits myelin phagocytosis, one of the crucial events in MS.

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