

Letter to Editor

The Multimodal Properties of Quercetin in Chronic Pain Syndromes

Abhijit Nair¹

¹Department of Anesthesiology, Ibra Hospital, Ibra, North Sharqiya, Oman.

To the Editor,

Bioflavonoids are a family of polyphenolic molecules found in a variety of plants and reportedly have significant antioxidant and anti-inflammatory properties. Based on their chemical structure, flavonoids are broadly classified as flavones, isoflavones, flavanones, flavonols, flavan-3-ols (flavanols), and anthocyanins. Despite the difference in their chemical structure, the members of the flavonoid family share the same flavan nucleus. The recent interest in flavonoids for exploring their role in various chronic ailments is probably their anti-inflammatory and anti-oxidative properties mediated through various target molecules. Various flavonoid-containing products are available and marketed for topical and oral use. Flavonoids available in natural sources are subject to variable bioavailability when taken orally. To increase its oral bioavailability and water solubility, companies have introduced these formulations as microcapsules, nanoparticles, liposomes, cyclodextrin, and phospholipid inclusion complexes.^[1]

Quercetin (3,3',4',5,7-pentahydroxyflavone) is a flavonol that is the most common flavonoid which has been investigated in various pathologies in human and animal studies [Figure 1]. Quercetin is a member of bioflavonoids and is found in red wine, green tea and onions. It possesses potent free oxygen scavenging, antioxidant and anti-inflammatory properties. As an antioxidant, quercetin scavenges free radicals directly, chelates metal ions and inhibits lipid peroxidation. The antioxidant property demonstrated an increase if the concentration of quercetin used is more. Research has also demonstrated the anti-tumour properties of quercetin by preventing the cell cycle, promoting cell apoptosis and inhibiting angiogenesis.^[2-4]

Chemotherapy-induced peripheral neuropathy is a distressing condition that is difficult to manage. The use of quercetin provided favourable results in patients with platinum compounds and taxon-induced peripheral neuropathy in induced models and animal studies.^[5]

Several human and animal studies investigated the role of quercetin supplements in painful arthritis such as

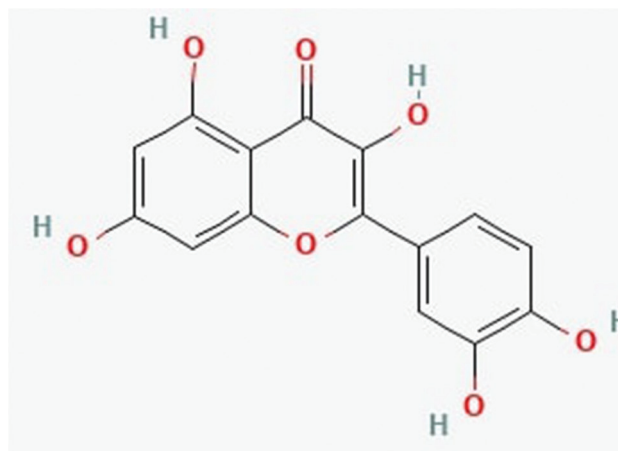


Figure 1: Chemical structure of quercetin (Image source: PubChem [Internet]. Bethesda (MD): National Library of Medicine (US), National Centre for Biotechnology Information; 2004-. PubChem Compound Summary for CID 5280343, Quercetin; [cited 2022 Apr. 29]. Available from: <https://pubchem.ncbi.nlm.nih.gov/compound/Quercetin> [Last accessed on 2022 Apr 29].

osteoarthritis and rheumatoid arthritis successfully. The plausible mechanisms responsible are cyclo-oxygenase 2 inhibition, reduction of tumour necrosis factor α , interleukin 1 β and 17, and monocyte chemoattractant protein-1 levels.^[6] The neuropathic pain associated with diabetic neuropathy is difficult to treat even with a combination of medications. Flavonoid compounds could be the next possible agent which could relieve the suffering of these patients incessantly suffering from excruciating pain. The regular use of flavonoids has been shown to decrease the reactive oxygen species level by increasing the level of antioxidative enzymes such as glutathione peroxidase, reduced glutathione peroxidase and superoxide dismutase, glutathione reductase and catalase in various tissues such as the liver, sciatic nerve and brain of experimental animals.^[7]

*Corresponding author: Abhijit Nair, Department of Anesthesiology, Ibra Hospital, Ibra, North Sharqiya, Oman. abhijitnair95@gmail.com

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Although the available literature supports the ever-growing, multimodal anti-inflammatory and anti-oxidative properties of flavonoids, to date, the U.S. Food and Drug Administration has not approved any of the commercially available products and formulations for clinical use. Further studies need to investigate the dosing, duration and type of flavonoid in various chronic pain conditions.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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