



Quercetin

Common Indications

- Allergies
- Upper respiratory tract infections (URTIs)
- Asthma
- Diabetes complications
- Cataracts
- Metabolic syndrome
- Cardiovascular disease – hypertension, atherosclerosis
- Enhancing performance
- Chronic prostatitis
- Sarcoidosis
- Aphthous ulcers

General Comments

Quercetin is a polyphenolic bioflavonoid or more specifically a flavanol. Bioflavonoids are commonly found in many plants are well reported in the literature to have antioxidant properties. Quercetin and the other bioflavonoids cannot be synthesized by humans. It usually has poor solubility and instability so there are several research efforts to modify it into different forms, such as liposomes or nanoparticles, that increase solubility and bioavailability⁴⁰

Benefits & Mechanism of Action

Antioxidant/pro-oxidant

- Phenolic antioxidant that inhibits lipid peroxidation, which protects the lens of the eye² and renal tubular epithelial cells from antioxidant-induced injury⁵
- May be due to free radical scavenging, metal chelation, enzyme inhibition or the induction of protective enzymes
- Has a 3.5-fold higher antioxidant capacity than curcumin
- Antioxidant activity may be related to reducing glutathione (GSH) levels³. If GSH is absent, potentially harmful oxidation products may be produced, so it is important that GSH levels be maintained while supplementing with quercetin¹
- May help protect lungs from oxygen-derived free radicals released during an influenza

infection⁴

Anti-inflammatory

- Modulates neutrophil function, prostanoid synthesis, cytokine production and inducible nitric oxide synthase (iNOS) expression by inhibiting the neutrophil factor-kappa-B pathway^{6,8,9}
- Equally or more effective as trans-resveratrol in reducing TNF-alpha mediated inflammation and insulin resistance⁷

Antiviral

- Reduces infectivity and intracellular replication of herpes simplex virus-1, poliovirus type 1, parainfluenza virus type 3, and respiratory syncytial virus in vitro¹¹
- Can block the replication of rhinovirus, which is the virus responsible for the common cold¹⁰

Immunomodulation

- Induces Th1-derived cytokines, which promotes cellular immunity, and inhibits Th2-derived cytokines, which can have a negative effect on cellular immunity¹²

Antiallergy

- Inhibits IL-8 and TNF release from LAD2 mast cells stimulated by substance P¹⁸
- Stabilizes mast cells, neutrophils and basophils inhibiting antigen and mitogen-induced histamine release^{13,6, 5,14,16,17}

Cardioprotective

- Chronic treatment lowers blood pressure and restores endothelial function^{20,23}
- Related to the vasorelaxant, anti-inflammatory, and antioxidant properties and inhibition of vascular smooth-muscle cell proliferation and migration^{19,22}
- Inhibits platelet aggregation and signaling and thrombus formation²¹

Neuroprotective

- Protects neuronal cells from oxidative stress-induced neurotoxicity²⁶ and inflammatory-related neuronal injury²⁵
- Important that it is a low dose because higher doses may be neurotoxic²⁴

Gastroprotective

- In an animal model it inhibits hyperproliferation of gastric mucosal cells treated with chronic oral ethanol²⁸

- Reduces mast cells and size of gastric erosions²⁷
- Inhibits gastric tumor production by inducing cell cycle arrest and promotes cell death²⁹

Hepatoprotective

- Protects the liver from oxidative damage and may reduce biliary obstruction^{30,31}
- Protects hepatocytes from ethanol-induced oxidative stress³²

Antidiabetic

- Enhances bioavailability of endothelium-derived nitric oxide and reduces blood glucose levels and oxidative stress³³

Prevention of bone loss

- Affects osteoclastogenesis and regulates hormones and cytokines³⁵
- Can inhibit osteoblasts, so more research needs to be done to see if it increases or decreases bone mass³⁴

Dose:

Standard³⁶

- 200-1500 mg daily in divided doses

Specific

- Chronic prostatitis: 500 mg twice daily (with bromelain and papain)
- Acute allergies: 2 g every 2 hours x 2 days (most often with vitamin C)
- Chronic allergies: 2 g daily
- Asthma: 2 g daily as an adjunct
- Sarcoidosis: 2 g daily of the oral form
- Cardiovascular disease prevention: 3 x 200 mL of black tea/day or 2 medium sized apples/day
- Hypertension: 150 mg/day x 6 weeks
- Aphthous ulcers: topical cream 3 times a day

Food Sources

- Many foods including apples, berries (blackcurrants, lingonberries and bilberries), beans, black tea, broccoli, grapes, green tea, onions, and red wine^{37,39}

- The daily intake from food sources is 5-40 mg but can be up to 500 mg, especially if the peel of a fruit is consumed³⁸

Cautions & Side Effects:

May have some antithyroid properties that can inhibit thyroid cell growth by inhibiting insulin-modulated phosphatidylinositol 3-kinase-Akt kinase activity. Use with CAUTION in thyroid disease⁴⁰.

Generally well tolerated with low toxicity when administered orally or intravenously but there are some rare adverse effects of⁴¹:

- Nausea
- Dyspnea
- Headache
- Mild tingling of extremities

Interactions (mainly from CYP3A4 induction):

- | | |
|---------------|-------------------------|
| • Iron | • Haloperidol |
| • Adriamycin | • Paclitaxel |
| • Cisplatin | • Paracetamol |
| • Cyclosporin | • Pioglitazone |
| • Digoxin | • Quinolone antibiotics |
| • Diltiazem | • Saquinavir |
| • Doxorubicin | • Stibanate |

References:

Antioxidant/pro-oxidant

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Immunomodulation

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Antiallergy

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Cardioprotective

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Hepatoprotective

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Prevention of Bone Loss

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Dosing

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