

The Longwood Herbal Task Force
(<http://www.mcp.edu/herbal/default.htm>) and
The Center for Holistic Pediatric Education and Research

Clinician Information Summary

COENZYME Q10 (CoQ10 or Ubiquinone)

SUMMARY

The major use for CoQ10 is in the treatment of cardiovascular diseases including chronic heart failure, atherosclerotic and ischemic heart disease, toxin-induced cardiomyopathies, hypertension and ischemia associated with cardiac surgery. Other popular uses include adjunctive therapy for periodontal disease, cancer and diabetes and to enhance athletic performance. CoQ10 is a natural ubiquinone, but it can be chemically synthesized. It has an important role in mitochondrial metabolism and functions as an antioxidant. Data from animal studies, case series, open-label trials and comparison studies support its use in treating ischemic heart disease, chronic heart failure, hypertension, ventricular arrhythmias and ischemia associated with cardiac surgery at doses of approximately 100 milligrams daily. Additional studies are needed to define its precise role in the treatment of these conditions and to evaluate its use as an adjunctive therapy for cancer and periodontal disease. Data do not support its use as a therapy for diabetes or as an aid to athletic performance. CoQ10 is very safe, though its use in pregnancy, lactation and childhood has not been evaluated.

POPULAR USES

Primary uses: Heart disease (chronic heart failure, ischemic heart disease, toxin-induced cardiomyopathy and ischemia associated with cardiac surgery); hypertension.

Other proposed uses: Adjunctive therapy for cancer and diabetes, enhancement of athletic performance, periodontal disease.

CHEMICAL CONSTITUENTS: Ubiquinone (CoQ10), a fat soluble quinone.

SCIENTIFIC DATA

In vitro data: CoQ10 is protective against ischemic and chemical-induced injury and enhances myocardial contractility in vitro. CoQ10 is a potent antioxidant.

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Animal data: CoQ10 protects against ischemic and chemical-induced (adriamycin) damage to myocardium. In hypertensive rats, CoQ10 normalizes blood pressure. CoQ10 increases phagocytic activity and the maturation of myeloid cells.

Human data: Several double blind studies support CoQ10's ability to protect myocardium against ischemia-induced injury (including cardiac surgery) and to reduce angina, improve exercise tolerance and reduce arrhythmias. Case series and double blind studies also support CoQ10's ability to enhance left ventricular function in patients with moderate to severe chronic heart disease. Open label studies support its use as a protective agent for patients exposed to cardiotoxic drugs such as adriamycin, but randomized trials are needed to better assess the extent of protection. Open label trials and controlled studies suggest that CoQ10 can normalize blood pressure in hypertensive adults. There are no controlled trials evaluating CoQ10 as a treatment for any immune disorder or cancer or suggesting any benefit for patients with diabetes. Two controlled trials failed to demonstrate any improvement in athletic performance among young, healthy athletes who took CoQ10 supplements. In a double-blind trial in patients with muscular dystrophy, CoQ10 improved well being, stroke volume and cardiac output. Case reports suggest CoQ10 may improve periodontal disease, but controlled trials are necessary to determine the extent of benefit compared with other treatments.

PHARMACOLOGY

Normal blood levels of CoQ10 are approximately 1 mcg/ml. Ubiquinone is synthesized from tyrosine in an eight-step process. It is well absorbed after oral administration, reaching peak levels within 5 – 10 hours; its serum half life is 34 hours. It is incorporated into the liver, heart, kidney and pancreas, with the highest concentrations in the mitochondrial membrane.

TOXICITY AND SIDE EFFECTS

Allergic reactions have not been reported.

Side effects: CoQ10 has no genotoxic, mutagenic or carcinogenic activity in animal models. Acute side effects have been reported in less than 2% of patients in large trials: upset stomach, nausea, anorexia, abdominal pain, diarrhea, skin rash, irritability.

Interactions with other medications: None known.

Contraindications: None known.

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Pregnancy and lactation: No safety studies.

Pediatric use: No safety studies.

ADDITIONAL REFERENCES OR RESOURCES

- Longwood Herbal Task Force
- <http://www.sph.uth.tmc.edu:8052/utcam/agents/coq10.htm>