



Coenzyme Q10

Nataly Martini BPharm, MSc, PhD

School of Pharmacy, The University of Auckland, PB 92019, Auckland, New Zealand. Email: n.martini@auckland.ac.nz

J PRIM HEALTH CARE
2019;11(3):290–291.
doi:10.1071/HC15944
Published 30 September 2019

Coenzyme Q10 is an endogenously produced, fat-soluble antioxidant. It is situated primarily in the mitochondria of respiring eukaryotic cells, and is an essential component of cellular energy production; it acts as coenzyme in the electron transport chain generating energy in the form of ATP. First identified in 1957, the molecule appears to be concentrated in organs with higher energy requirements such as the heart, liver, kidney, and pancreas. Supplementary coenzyme Q10 has been used for a multitude of diseases, most commonly congestive heart failure, coronary artery disease, and hypertension. It is also used for preventing migraine headache, and Parkinson's disease, among others.

PREPARATIONS: Oral preparations include softgels, tablets, capsules, chewable lozenges, gummies, and powder. It is also available topically as a serum and as an ingredient in several cosmetic preparations.

COMMON NAMES: Coenzyme Q, CoQ10, CoQ, Q10, vitamin Q10, ubiquinone.

ACTIVE CONSTITUENTS: Ubidecarenone/ubiquinone (oxidised form), ubiquinol (reduced form). Due to

the low oral bioavailability of CoQ10, several formulation strategies have been adopted to maximise intracellular delivery and mitochondrial targeting (eg mitoquinone).

MEDICAL CLAIMS: Claimed to be a potent antioxidant and cofactor in the production of cellular energy, CoQ10 is said to support cardiovascular health, assist with energy levels, cell metabolism, musculoskeletal health and periodontal health, as well as provide cellular protection during the aging process.

EVIDENCE: Compared with healthy individuals, patients with cardiovascular disease (CVD) are found to have significantly lower levels of CoQ10. Hence, several randomised controlled trials have focused on evaluating the evidence for CoQ10 in hypertension, primary prevention of cardiovascular disease, and heart failure. Systematic reviews have found no clear effect of CoQ10 on left ventricular ejection fraction and exercise capacity in heart failure, and in three of four trials on primary prevention of CVD, no significant change in lipid levels were evident with simultaneous administration of CoQ10 with statins. Furthermore, a recent

Summary message

Systematic reviews have found inconclusive evidence in support of the cardiovascular health claims of coenzyme Q10. While some trials demonstrated statistical and clinical significance of CoQ10 in reducing blood pressure, no conclusions can be drawn due to poorly designed studies with small sample sizes and high risk of bias. High quality trails of longer-term use are needed to determine the effects with confidence.

Considered safe to use, CoQ10 may cause mild gastrointestinal side effects, which may be alleviated by reducing the dose, and insomnia if taken in the evening. Concomitant use with warfarin should be avoided due to risk of bleeding. Use should be discouraged in pregnancy and lactation due to insufficient evidence of safety.

Herbal medicines are a popular health care choice, but few have been tested to contemporary standards. **POTION OR POISON?** summarises the evidence for the potential benefits and possible harms of well-known herbal medicines.

Cochrane review showed that, compared to placebo, CoQ10 did not demonstrate a clinically or statistically significant reduction in either systolic or diastolic BP after 12 weeks of treatment. However, due to small number of included studies and sample sizes in this systematic review, the evidence is deemed moderate-quality, suggesting that further research is required to estimate the effect with confidence.

There is some evidence to suggest CoQ10 causes improvement in insulin metabolism, statin-related fatigue, and reduces migraine days/month and duration but not severity and frequency. More evidence is needed to rate coenzyme Q10 for these uses.

ADVERSE EFFECTS: No serious toxicity has been associated with coenzyme Q10. The evidence of safety is strong at intakes up to 1200 mg/day, although 3600 mg was found to be tolerated in some studies. Less than 1% of people taking coenzyme Q10 experience epigastric discomfort, loss of

appetite, nausea, and diarrhoea. It may cause dizziness, headaches, fatigue and irritability, and mild insomnia if taken in high doses in the evening. Allergic skin rashes have been reported. It is recommended to avoid use in pregnancy and breastfeeding as safety has not been established.

DRUG INTERACTIONS: Coenzyme Q10 may decrease anticoagulant effects of warfarin, and should be used with caution with insulin, blood lowering medicines, and alkylating agents.

Key references

1. Ho MJ, Li ECK, Wright JM. Blood pressure lowering efficacy of coenzyme Q10 for primary hypertension. *Cochrane Database Syst Rev.* 2016;(3):CD007435.
2. Flowers N, Hartley L, Todkill D, et al. Co-enzyme Q10 supplementation for the primary prevention of cardiovascular disease. *Cochrane Database Syst Rev.* 2014;(12):CD010405.
3. Mehrabani S, Askari G, Miraghajani M, et al. Effect of coenzyme Q10 supplementation on fatigue: A systematic review of interventional studies. *Complement Ther Med.* 2019;43:181–7. doi:10.1016/J.CTIM.2019.01.022