Coenzyme Q10

The Antioxidant that Fuels Your Cells

- Supports cardiovascular health
- Maximizes cellular energy production and cell function
- An effective and clinically researched dosage

Gluten Free  Vegan  Non-GMO  Anti-Aging Headache/Migraines  Heart Health

AOR Code  Variant
AOR04244  60 VEGI-CAPS

Details
Coenzyme Q10 (CoQ10) is a fat-soluble, vitamin-like nutrient that helps produce energy in all cells of the body. It does so by supporting the mitochondria, the tiny power plants in each of the body’s cells. CoQ10 is in fact one of the most important and modifiable factors in the production of ATP (cellular energy) in the mitochondria. Mitochondrial dysfunction and CoQ10 deficiencies have been implicated in many conditions such as fatigue, fibromyalgia, cardiovascular problems, neurodegenerative diseases and more.

CoQ10 is also noted for its powerful antioxidant activity, and even “recharges” other antioxidants by keeping them in their reduced, active states. Doctors have been recommending CoQ10 to patients on standard heart medications for the last four decades, as statin medications are known to reduce CoQ10 levels in the body.

The aging and elderly would greatly benefit from adding CoQ10 to their diet. Those dealing with cardiovascular issues or taking statin medications should speak to their doctor about supplementing with CoQ10. Athletes or those dealing with fatigue would also benefit from CoQ10 to boost energy levels.

Label Info

Discussion
CoQ10 helps produce cellular energy in the mitochondria, is a powerful fat-soluble network
antioxidant and supports healthy cardiovascular function.

**Product Variation**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOR04244</td>
<td>60 VEGI-CAPS</td>
</tr>
</tbody>
</table>

**Supplements Facts**

<table>
<thead>
<tr>
<th>Serving Size: 1 Capsule</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coenzyme Q10 (ubiquinone-10)</td>
<td>100 mg</td>
</tr>
</tbody>
</table>

Non-medical ingredients:

**Guarantees**

AOR™ guarantees that all ingredients have been declared on the label. Contains no wheat, gluten, corn, nuts, peanuts, sesame seeds, sulphites, mustard, soy, dairy, eggs, fish, shellfish or any animal byproduct.

**Adult Dosage**

Take 1 capsule one to three times daily with fat containing meals, or as directed by a qualified health care practitioner.

**Cautions**

Consult a health care practitioner prior to use if you are taking blood pressure medication, blood thinners or if you are pregnant or breastfeeding.

**Source**

Pharmaceutical synthesis

**Main Application**

Heart conditions
Periodontal disease
Immune disorders
Blood sugar control
Energy/Fatigue
Anti-aging Antioxidant
Mitochondrial function
Disclaimer

The information and product descriptions appearing on this website are for information purposes only, and are not intended to provide or replace medical advice to individuals from a qualified health care professional. Consult with your physician if you have any health concerns, and before initiating any new diet, exercise, supplement, or other lifestyle changes.

Research

Background

What is CoQ10?

CoQ10 is a fat-soluble, crystalline compound with a Molecular weight of 338.44 Daltons. Co Q10 functions as a co-enzyme in the energy-producing metabolic pathways of every cell of the body with a powerful antioxidant activity.

Co-enzyme Q10 (Co-Q10) is a Vitamin-like substance that is found in virtually all cells of the human body, thus earning CoQ10 its other name, ubiquinone. In 1957, Dr. Fred L Carne noticed a frothy substance that consistently rose to the top of the test tubes of meshed beef heart. This yellow crystalline substance was identified by Karl Folkers (the “father” of Co enzyme Q10) at the Merck, Sharp & Dohme laboratories in New Jersey in 1958. Dr. R.A. Morten called this Q10 compound ubiquinone because of its widespread appearance in living organisms. Unlike vitamins, which by definition are not synthesized within the body, CoQ10 is synthesized in nearly every tissue of the body. It is also, in fact, not a vitamin at all but rather a co-enzyme – an organic molecule that activates a larger protein catalyst (an enzyme) that in turn facilitates a biological reaction without extinguishing itself within that reaction. Co-enzyme Q10 has a quinone-like group (hence the Q) with 10 isoprenoid units as the side-chain (hence the 10). Quinones are molecules that serve as electron receptors in essential biological functions such as photosynthesis and respiration. CoQ10’s quinone ring is synthesized from the amino acid tyrosine whilst the isoprenoid side chains are formed from acetyl CoA (of which pantethine is also a precursor). CoQ10 is very similar in structure to Vitamin K and Vitamin E, although its role is quite different.

Biological functions

The fact that Co-Q10 is able to accept electrons in such a ubiquitous manner means that it can serve several key biological functions pertinent to human health. These include:

The Generation of ATP

Co Q10 is critical in generating the synthesis of ATP (or adenosine triphosphate, the energy “currency” of all cells). This process takes place in the mitochondria and involves an intricate and complex cascade of enzymatic reactions called the “electron transfer chain”. Indeed, Co-Q10 is most notably found in the inner membrane of the mitochondrion.

Acts as a Redox agent

Co Q10 keeps other antioxidants (e.g. vitamins E and C) in their reduced active states. For example, as vitamins C and E perform their functions as antioxidants, they themselves become oxidized. Since these vitamins are active in their reduced forms, Co Q10 recharges them (reduces them) to their
active states by accepting electrons.

**Antioxidant activity**

Biological oxidation is a ubiquitous event that occurs continually in the body, causing havoc and numerous pathological conditions. Oxidation results from the breakdown of oxygen molecules as they combine with other molecules in the body. Such oxidation can be the result of the body’s normal metabolism of the foods we eat, or it can occur in the body as a result of external forces such as exercise, radiation, pollution, alcohol or heavy metal intoxication, infections etc. The resulting free radicals are highly reactive molecules, which interfere with enzymatic reactions and cause disruption of cell membranes and even DNA. Co-Q10 has a strong ability to give up electrons quickly and thus acts as a powerful antioxidant against free radicals, and affords protection against LDL oxidation, which is a pivotal step in the cause of atherosclerosis. Co-Q10 also stabilizes cell membranes and platelets.

**Research**

**Cardiovascular Function**

The use of Co-Q10 as adjunctive therapy in the treatment of cardiovascular problems goes back decades. In fact, Co-Q10 has been approved as a drug in Japan for the treatment of heart problems since 1974, with a number of other nations following suite. Placebo-controlled studies to date with Co-Q10 (including one study conducted in Italy which included 2,664 patients with life threatening cardiovascular problems have produced what scientists call ‘significantly positive results’. These results include diminished levels of fatigue, chest pain, dyspnea and palpitations. Treatment with Co-Q10 was even able to restore normal heart size and function in some patients who were diagnosed more recently.

There have also been many studies examining the effect of Co-Q10 as an addition to standard medical treatments, particularly those pertaining to irregular blood sugar and other manifestations of cardiovascular disorders. When Co-Q10 was added as a concurrent treatment alongside the standard drug therapies for these conditions, the result was a significant reduction in the required use of the aforementioned drug therapies in order to alleviate the conditions in question.

**Energy and Exercise**

CoQ10’s antioxidant and membrane stabilizing abilities have been shown to protect skeletal muscle cells from injury. A recent study found that young men training in the intense Japanese sport Kendo had lower serum activity of creatine kinase and lower serum myoglobin concentrations when they were given CoQ10 supplements. These two markers are associated with skeletal muscle damage, indicating that CoQ10 reduces exercise-induced muscular injury.

Another recent study tested the effects of CoQ10 on exercise-induced fatigue. In this double-blind, randomized, placebo-controlled, three crossover design, 17 healthy subjects were given 300 mg CoQ10 for a week before performing a workload trial on a bicycle ergometer to induce fatigue. To test their physical performance, they performed non-workload trials at maximum velocity for 10 seconds at 30 minutes and 210 minutes of the fatigue-inducing trial. The study found that the decrease in
physical performance due to physical fatigue was inhibited in the CoQ10 group compared to the placebo. Also, CoQ10 alleviated the sensation of fatigue compared to the placebo group.

Complications

None reported. Shown to be useful with Beta-blockers, psychotropic drugs including phenothiazines and tricyclic antidepressants. A 1994 Lancet study reported 3 cases where Co Q10 reduced the effect of coumadin. No other cases have been reported. It may be wise to monitor the prothrombin when supplementing with Co Q10.

Market Trends

Antioxidants are increasingly popular for their use in preventive health measures as well as for slowing the aging process. There are several options available on the market. Co-enzyme Q10 is one of the most proven and valued antioxidants available, and one of the most recognized by western medicine.

AOR Advantage

AOR’s Co-enzyme Q10 is a powerful antioxidant, protecting cells from the damaging actions of free radicals that are produced as waste products during energy metabolism. Not only does it have antioxidant activity itself, it also recharges other antioxidants to keep them active.

References


Abstract

Antifatigue effects of coenzyme Q10 during physical fatigue.


OBJECTIVE: This study examined the effects of coenzyme Q10 administration on physical fatigue.

METHODS: In a double-blinded, placebo-controlled, three crossover design, 17 healthy volunteers were randomized to oral coenzyme Q10 (100 or 300 mg/d) or placebo administration for 8 d. As a fatigue-inducing physical task, subjects performed workload trials on a bicycle ergometer at fixed
workloads twice for 2 h and then rested for 4 h. During the physical tasks, subjects performed non-workload trials with maximum velocity for 10 s at 30 min (30-min trial) after the start of physical tasks and 30 min before the end of the tasks (210-min trial).

RESULTS: The change in maximum velocity from the 30- to the 210-min trial in the 300-mg coenzyme Q10-administered group was higher than that in the placebo group. In addition, subjective fatigue sensation measured on a visual analog scale in the 300-mg coenzyme Q10-administered group after the fatigue-inducing physical task and recovery period was alleviated when compared with that in the placebo group.

CONCLUSION: Oral administration of coenzyme Q10 improved subjective fatigue sensation and physical performance during fatigue-inducing workload trials and might prevent unfavorable conditions as a result of physical fatigue.

Reducing exercise-induced muscular injury in kendo athletes with supplementation of coenzyme Q10.

Br J Nutr. 2008 Feb 20:1-7,


Intensive physical exercise may cause muscular injury and increase oxidative stress. The purpose of this study was to examine the effect of an antioxidant, coenzyme Q10 (CoQ10), on muscular injury and oxidative stress during exercise training. Eighteen male students, all elite Japanese kendo athletes, were randomly assigned to either a CoQ10 group (n 10) or a placebo group (n 8) in a double-blind manner. Subjects in the CoQ10 group took 300 mg CoQ10 per d for 20 d, while subjects in the placebo group took the same dosage of a placebo. All subjects practised kendo 5.5 h per d for 6 d during the experimental period. Blood samples were taken 2 weeks before, during (1 d, 3 d, 5 d) and 1 week after the training. Serum creatine kinase (CK) activity and myoglobin (Mb) concentration significantly increased in both groups (at 3 d and 5 d). Serum CK (at 3 d), Mb (at 3 d) and lipid peroxide (at 3 d and 5 d) of the CoQ10 group were lower than those of the placebo group. The leucocyte counts in the placebo group significantly increased (at 3 d) and neutrophils significantly increased in both groups (at 3 d and 5 d). Serum scavenging activity against superoxide anion did not change in either group. These results indicate that CoQ10 supplementation reduced exercise-induced muscular injury in athletes.

Coenzyme Q10 protects the aging heart against stress: studies in rats, human tissues, and patients.


With aging of the population, increasing numbers of elderly patients are presenting for cardiac surgery. However, the results in the elderly are inferior to those in the young. A likely contributing
factor is an age-related reduction in cellular energy production in the myocardium during surgery, which is known to induce aerobic and ischemic stress. The lipophilic antioxidant and mitochondrial respiratory chain redox coupler, coenzyme Q10 (CoQ10), has the potential to improve energy production in mitochondria by bypassing defective components in the respiratory chain as well as by reducing the effects of oxidative stress. We hypothesized that CoQ10 pretreatment prior to stress could improve the recovery of the myocardium after stress.


Singh RB, Wander GS, Rastogi A, Shukla PK, Mittal A, Sharma JP, Mehrotra SK, Kapoor R, Chopra RK.

The effects of oral treatment with coenzyme Q10 (120 mg/d) were compared for 28 days in 73 (intervention group A) and 71 (placebo group B) patients with acute myocardial infarction (AMI). After treatment, angina pectoris (9.5 vs. 28.1), total arrhythmias (9.5% vs. 25.3%), and poor left ventricular function (8.2% vs. 22.5%) were significantly (P < 0.05) reduced in the coenzyme Q group than placebo group. Total cardiac events, including cardiac deaths and nonfatal infarction, were also significantly reduced in the coenzyme Q10 group compared with the placebo group (15.0% vs. 30.9%, P < 0.02). The extent of cardiac disease, elevation in cardiac enzymes, and oxidative stress at entry to the study were comparable between the two groups. Lipid peroxides, diene conjugates, and malondialdehyde, which are indicators of oxidative stress, showed a greater reduction in the treatment group than in the placebo group. The antioxidants vitamin A, E, and C and beta-carotene, which were lower initially after AMI, increased more in the coenzyme Q10 group than in the placebo group. These findings suggest that coenzyme Q10 can provide rapid protective effects in patients with AMI if administered within 3 days of the onset of symptoms. More studies in a larger number of patients and long-term follow-up are needed to confirm our results.

**Protective effect of coenzyme Q10 in cardiotoxicity induced by Adriamycin.**


Okuma K, Furuta I, Ota K.
Cardiotoxicity induced by adriamycin and protective effect by coenzyme Q10 were studied in 80 closely-followed patients receiving chemotherapy with adriamycin. Serial electrocardiograms were recorded immediately before and after the administration of adriamycin each times. The electrocardiographic parameters (heart rate, P-Q duration, QRS-duration, QRS voltage and QTc-duration) were analyzed. In patients treated with adriamycin alone, QTc-duration was prolonged significantly. On the other hand, in patients treated with adriamycin plus coenzyme Q10, QTc-duration was not significantly prolonged. This suggests that coenzyme Q10 may reduce negative inotropic action induced by adriamycin. Further, the QRS voltage was also significantly decreased in patients treated with adriamycin alone, but was not decreased in patients treated with adriamycin plus coenzyme Q10. These findings suggest that some electrocardiographic changes due to adriamycin may be prevented by coenzyme Q10.

Effects of Coenzyme Q10 in Early Parkinson Disease: Evidence of Slowing of the Functional Decline.


Background: Parkinson disease (PD) is a degenerative neurological disorder for which no treatment has been shown to slow the progression.

Objective: To determine whether a range of dosages of coenzyme Q10 is safe and well tolerated and could slow the functional decline in PD.


Patients: Eighty subjects with early PD who did not require treatment for their disability.

Interventions: Random assignment to placebo or coenzyme Q10 at dosages of 300, 600, or 1200 mg/d.

Main Outcome Measure: The subjects underwent evaluation with the Unified Parkinson Disease Rating Scale (UPDRS) at the screening, baseline, and 1-, 4-, 8-, 12-, and 16-month visits. They were followed up for 16 months or until disability requiring treatment with levodopa had developed. The primary response variable was the change in the total score on the UPDRS from baseline to the last visit.

Results: The adjusted mean total UPDRS changes were 11.99 for the placebo group, 8.81 for the 300-mg/d group, 10.82 for the 600-mg/d group, and 6.69 for the 1200-mg/d group. The P value for the primary analysis, a test for a linear trend between the dosage and the mean change in the total UPDRS score, was .09, which met our prespecified criteria for a positive trend for the trial. A prespecified, secondary analysis was the comparison of each treatment group with the placebo...
group, and the difference between the 1200-mg/d and placebo groups was significant (P = .04).

Conclusions: Coenzyme Q10 was safe and well tolerated at dosages of up to 1200 mg/d. Less disability developed in subjects assigned to coenzyme Q10 than in those assigned to placebo, and the benefit was greatest in subjects receiving the highest dosage. Coenzyme Q10 appears to slow the progressive deterioration of function in PD, but these results need to be confirmed in a larger study.

Improved outcomes in coronary artery bypass graft surgery with preoperative coenzyme Q10: a randomized, double-blind, placebo controlled trial. (In: “Coenzyme Q10 protects the aging heart against stress: studies in rats, human tissues, and patients.”).


Introduction: On the basis of our previous studies we believed that CoQ10 should have a beneficial effect in patients undergoing cardiac surgery, especially those aged 70 years and over. We therefore set out to test in cardiac surgical patients whether oral CoQ10 therapy (1) increases CoQ10 content in atrial trabeculae and mitochondria, (2) improves mitochondrial respiration, (3) protects the myocardium against posthypoxic contractile dysfunction, and (4) attenuates operative myocardial injury and improves postoperative recovery.

Methods: Patients were randomized to receive orally either CoQ10 (300 mg/day) or placebo for seven days prior to elective cardiac surgery. Trabeculae were excised and mitochondria were isolated from discarded right atrial appendages. Biochemical and clinical parameters were measured postoperatively.

Results: Compared to placebo, therapy increased CoQ10 content of trabeculae (21 ± 4 to 40 ± 5 µg/g w.w., P < 0.001) and isolated mitochondria (5.7 ± 0.8 to 11.2 ± 0.9 µg CoQ10/mg protein, P < 0.0001). Mitochondrial respiration was more efficient after CoQ10 pretreatment (ADP:O, CoQ10 vs. placebo: 4.2 ± 0.2 vs. 2.9 ± 0.4, P < 0.05). After 30 min hypoxia, CoQ10-treated trabeculae exhibited a greater recovery of developed force compared to placebo (64.0 ± 18% vs. 46.2 ± 28%, P < 0.01). CoQ10 patients had a lower release of TnI than placebo patients (39.4 ± 8.5 vs. 64.5 ± 4.1 µg/L, P < 0.001) and a shorter length of hospital stay (6.8 ± 0.7 vs. 8.7 ± 2.1 days, P < 0.05).

Conclusions: Preoperative oral CoQ10 therapy (1) increases CoQ10 content in atrial trabeculae and cardiac mitochondria, (2) improves efficiency of mitochondrial energy production, (3) improves posthypoxic myocardial contractile function, and (4) reduces myocardial damage and shortens the hospital stay.

Protective effects of coenzyme Q10 on the adverse reactions of anthracycline antibiotics: using double blind method–with special reference to hair loss.
Akihama T, Nakamoto Y, Shindo T, Nakayama Y, Miura A.

It was clinically evaluated by double blind method whether co-enzyme Q10 has protective effects on hair loss caused by anthracycline antibiotics. Six cases of acute leukemia, 2 blastic crisis of CML and 11 malignant lymphoma were entered to this study. DCMP regimen for acute leukemia for VEPA for lymphoma were performed. Coenzyme Q10 (or placebo) of 120 mg/day was orally administered. The grade of hair loss was classified into five groups. Five cases were only given to DM and 3 cases receiving DM and CoQ10. ADM was 6 cases and 5 were combined with CoQ10. No significant difference in effect of CoQ10 administration rence was recognized between two groups statistically. Elevations of GOT and GPT were less frequent in the group receiving CoQ10.

Two successful double-blind trials with coenzyme Q10 (vitamin Q10) on muscular dystrophies and neurogenic atrophies.

Folkers K, Simonsen R.

Coenzyme Q10 (vitamin Q10) is biosynthesized in the human body and is functional in bioenergetics, anti-oxidation reactions, and in growth control, etc. It is indispensable to health and survival. The first double-blind trial was with twelve patients, ranging from 7-69 years of age, having diseases including the Duchenne, Becker, and the limb-girdle dystrophies, myotonic dystrophy, Charcot-Marie-Tooth disease, and the Welander disease. The control coenzyme Q10 (CoQ10) blood level was low and ranged from 0.5-0.84 microgram/ml. They were treated for three months with 100 mg daily of CoQ10 and a matching placebo. The second double-blind trial was similar with fifteen patients having the same categories of disease. Since cardiac disease is established to be associated with these muscle diseases, cardiac function was blindly monitored, and not one mistake was made in assigning CoQ10 and placebo to the patients in both trials. Definitely improved physical performance was recorded. In retrospect, a dosage of 100 mg was too low although effective and safe. Patients suffering from these muscle dystrophies and the like, should be treated with vitamin Q10 indefinitely.