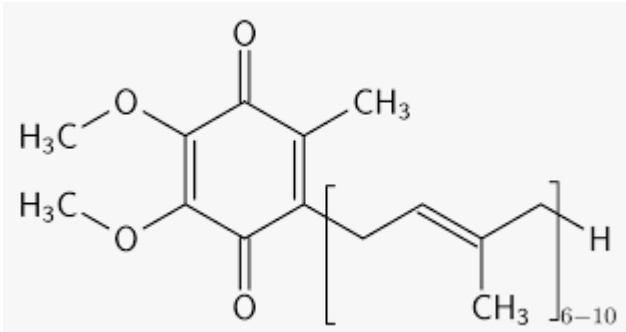


## CoQ<sub>10</sub> 200 mg

### TECHNICAL SUMMARY

Coenzyme Q<sub>10</sub> (CoQ<sub>10</sub>) is a vitamin-like compound present in almost all cells, where it is necessary for cellular energy production.\* CoQ<sub>10</sub> concentrations are highest in the heart, where chemical energy availability is critical. CoQ<sub>10</sub> also functions as a powerful fat-soluble free radical scavenger within cell membranes and vascular structures.\*

#### Structure formula:



**Chemical name:** 2,3-dimethoxy-5-methyl-6-decaprenylbenzoquinone also known as ubiquinone.

**Allergen and Additive Disclosure:** Not manufactured with wheat, gluten, soy, corn, milk, egg, fish, shellfish, tree nut or sesame ingredients. Produced in a GMP facility that processes other ingredients containing these allergens. PEG-free.

**Delivery Form:** Vegetarian capsule.

### ROLE AS NUTRIENT/FUNCTION

CoQ<sub>10</sub> has multiple biological functions, primarily based on its ability to undergo redox cycling.\* CoQ<sub>10</sub> is involved in ATP synthesis (as part of the electron transport chain of the inner membrane of the mitochondrion) and has the ability to act as a free radical scavenger in response to oxidative stress.\* CoQ<sub>10</sub> in its reduced form (ubiquinol) is a potent lipophilic free radical quencher capable of recycling and regenerating other antioxidants such as vitamins C and E. Other important functions of CoQ<sub>10</sub> such as cell signaling and gene expression have also been described.\* CoQ<sub>10</sub> is especially important for heart muscle function where its concentration is higher than in any other tissue in the body.\*

### NATUROKINETICS®

**Liberation:** Dissolution of the vegetable capsule is measured in water using a USP testing method with dissolution between zero and 60 minutes.

**Absorption:** CoQ<sub>10</sub> is a lipophilic substance that is absorbed in the intestines. Its uptake is similar to that of other lipid substances and is enhanced by the presence of other fats upon ingestion. Once absorbed, it is incorporated into chylomicrons and transported through the lymphatic system before reaching the bloodstream. CoQ<sub>10</sub> is reduced to ubiquinol either during or following absorption in the intestine.

**Distribution:** CoQ<sub>10</sub>'s distribution depends on the metabolic activity of tissues and organs. Typically, tissues with high-energy requirements of

## Supplement Facts

Serving Size 1 Veg Capsule

### Amount Per Serving

Coenzyme Q <sub>10</sub> (CoQ <sub>10</sub> )	200 mg**
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\*\* Daily Value not established.

Other ingredients: Rice Flour, Hypromellose (cellulose capsule) and Magnesium Stearate (vegetable source).

- Cardiovascular Support\*
- Promotes Cellular Energy Production\*

**SUGGESTED USAGE:** Take 1 capsule daily with a meal, or as directed by your healthcare practitioner.

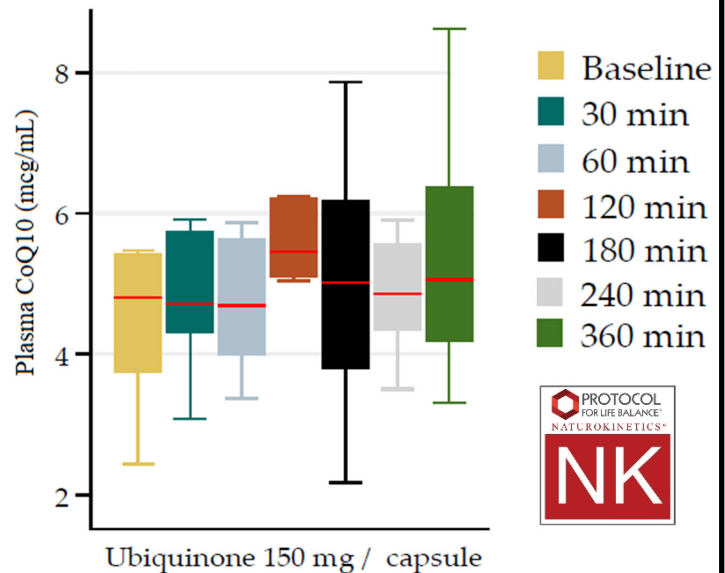


Fig. 1: Median (thin red line) and interquartile range of CoQ<sub>10</sub> plasma levels from baseline to 6 hours after ingestion of 150 mg CoQ<sub>10</sub> in capsule form. Adapted from Vitetta et al.

metabolic activity contain relatively high concentrations of CoQ<sub>10</sub>. It is primarily found in the heart, kidney, liver and muscles with other smaller reserves present in the brain, intestines, lungs and blood cells (except red blood cells).

**Metabolism:** Within cells, CoQ<sub>10</sub> is a part of the Q cycle located in the inner membrane of mitochondria.\* As part of a redox reaction, it is recycled during energy production by donating its electrons.\* Data from animal models suggest that CoQ<sub>10</sub> is metabolized in all tissues; the metabolites are phosphorylated in the cells.

**Elimination:** Unabsorbed CoQ<sub>10</sub> is eliminated in feces and absorbed CoQ<sub>10</sub> is excreted in the GI tract via the bile where it can be partially reabsorbed into the body for reuse. CoQ<sub>10</sub> metabolites resulting from intracellular phosphorylation are excreted into urine. However, it should be noted that the urinary metabolites of CoQ<sub>10</sub> only account for a small fraction of the

\*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

body pool of CoQ<sub>10</sub>, and that the major route of elimination of CoQ<sub>10</sub> is by way of biliary and fecal excretion.

### CLINICAL VALIDATION

#### Supports physical performance & lessens subjective fatigue sensation.\*

In a randomized, double-blind, placebo-controlled study, 17 healthy volunteers were administered 100 mg or 300 mg CoQ<sub>10</sub> or a placebo for 8 days leading up to a fatigue-inducing physical task involving workload trials on a bicycle ergometer. The change in maximum velocity from the 30- to the 210-min trial in the 300 mg CoQ<sub>10</sub> group was higher than that in the placebo group.\* In addition, subjective fatigue sensation measured on a visual analog scale in the 300 mg CoQ<sub>10</sub> group after the fatigue-inducing physical task and recovery period was alleviated when compared to the placebo group.\*

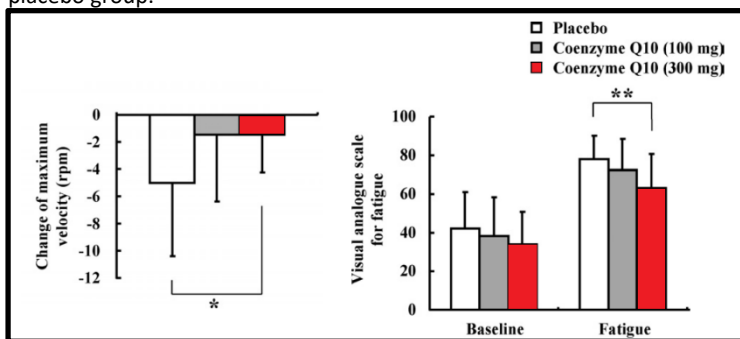


Fig. 2: (Left) Change of maximum velocity. \*P<0.05. (Right). Study subjects' subjective fatigue sensation before (baseline) and after (fatigue) the fatigue-inducing physical tasks. Subjects were asked to rate their subjective sensation of fatigue level on a visual analog scale from 0 (no fatigue) to 100 (total exhaustion). \*\*P < 0.01. Adapted from Mizuno *et al.*

**Free radical scavenger.\*** In a randomized, placebo-controlled study, 10 highly trained male athletes were administered 50 mg CoQ<sub>10</sub> or a placebo leading up to a 50 km mountain race. Administration occurred two days prior with dinner; one day prior with each meal; the day of and one hour before the race. Several blood markers of oxidative stress and immune function were measured before and after the event.

As expected, intense exercise was associated with an increase in TNF- $\alpha$ , IL-6, 8-hydroxy-20-deoxyguanosine (8-OHdG), and isoprostane levels which are biological signs of the generation of oxidative stress and of a healthy immune response to intense exercise. In the CoQ<sub>10</sub> group, modifications of biological markers of oxidative stress (membrane hydroperoxides, 8-OHdG and isoprostane generation, increased catalase, and total antioxidant status) were less pronounced than in the placebo group after exercise.\* Results also indicated that CoQ<sub>10</sub> supplementation led to less over-expression of TNF- $\alpha$  after exercise.\* Moreover, CoQ<sub>10</sub> supplementation lessened exercise induced creatinine production.\*

### SAFETY INFORMATION

**Tolerability:** CoQ<sub>10</sub> is generally well tolerated. Some adverse effects that have been reported include minor GI disturbances.

**Contraindications:** None known.

### INTERACTIONS

**Drug Interactions:** Concomitant use of CoQ<sub>10</sub> with warfarin may affect its anticoagulant effects.

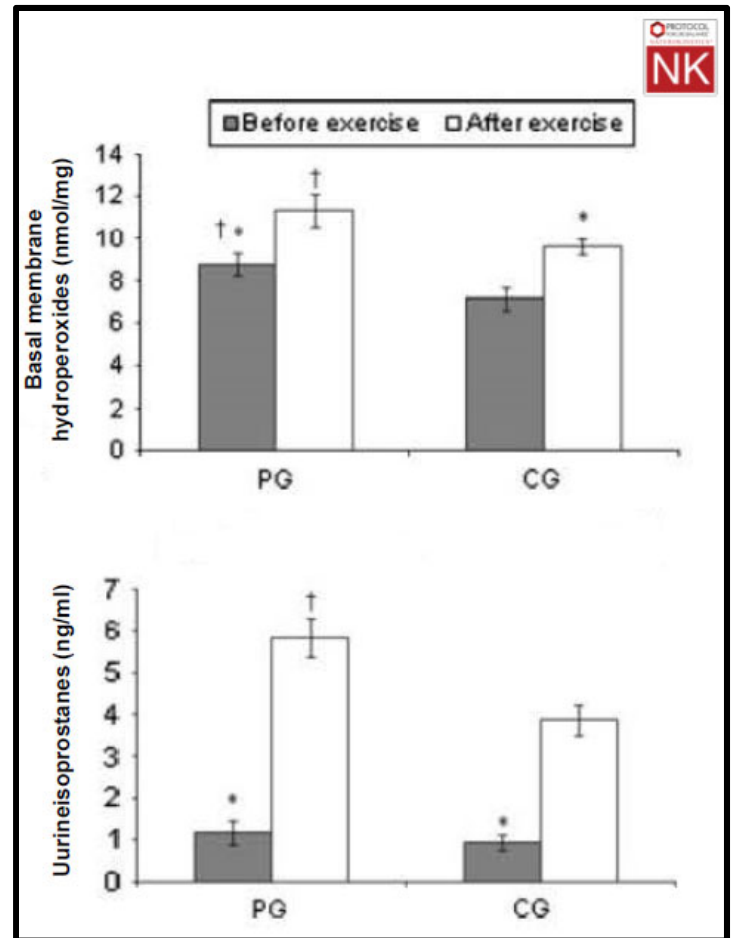


Fig. 3: Biomarkers for oxidative stress was measured from blood samples taken before and after strenuous exercise for both placebo and supplemental groups.

**Supplement Interactions:** Acacia gum may increase the absorption of CoQ<sub>10</sub>. CoQ<sub>10</sub> may increase beta-carotene levels. CoQ<sub>10</sub> has vitamin K-like activity and may increase its effects. CoQ<sub>10</sub> can affect blood pressure and may have additive effects with other herbs and supplements that have hypotensive effects.

**Interaction with Lab Tests:** CoQ<sub>10</sub> may affect results of prostate-specific antigen (PSA) tests.

### STORAGE

Store in a cool, dry place.