



designs for health®

CoQnol™

A REVOLUTIONARY CONCEPT IN COMBINING EXTRACELLULAR WITH INTRACELLULAR DELIVERY OF UBIQUINOL

COQnol™ 100 | 60 SOFTGELS | NPN80110743 | COQ100-CN

COQnol™ 200 | 60 SOFTGELS | NPN80110774 | COQ200-CN

Unique Physical Properties of **CoQnol™** Softgels: The proprietary blend of ubiquinol, GG, ascorbyl palmitate, quillaja extract, medium chain triglycerides, and glycerine creates a stable solution that prevents crystallization and oxidation of ubiquinol, and is a natural patent pending formulation from ARN. Quillaja is an extract from the bark of the Quillaja saponaria tree, commonly used as an emulsifier in foods. The unique composition of CoQnol formula in a softgel enables ubiquinol absorption to be approximately 100% higher than the individual compound and 18% to 19% higher than other leading brands of solubilized ubiquinol. Gastrointestinal (GI) absorption is determined by the following factors: (1) bioaccessibility, which estimates the percent of the nutrient solubilized/micellized for absorption in the GI cells, (2) transport coefficient in the GI cells, and (3) transport coefficient into the general circulation, which accounts for loss due to liver metabolism.¹ Bioaccessibility of ubiquinol in the DuoQuinol™ matrix was estimated at 1.73%, with a protocol defined by McClements, et. al,¹ which uses three processing chambers with distinct environments specific to human digestion in the mouth, stomach, and intestine.

Ubiquinol is the reduced form of coenzyme Q10 (CoQ10) and is provided as DuoQuinol™, an innovative, patent-pending form of this molecule from American River Nutrition (ARN).

Endogenous Synthesis and Dietary Intake of CoQ10

CoQ10 is synthesized as ubiquinone in peroxisomes and possibly other organelles, depending on the cell type. This process utilizes downstream metabolites from GG and tyrosine (or phenylalanine), along with vitamin B6 as a cofactor (see Fig. 1).⁸ Many Americans have suboptimal protein intake and, as a result, also of tyrosine and its precursor, phenylalanine. Total endogenous production of ubiquinone has been estimated at approximately 500 mg/day (depending on body size) with a turnover of 4 days.⁴ Total ingested CoQ10 from eating food averages 5 mg/day.⁴

Tissue Content of CoQ10 Declines with Aging and Certain Conditions

A 10% decline in aerobic cellular respiration has been observed every decade, possibly due to the natural decline in ubiquinol synthesis and increased degradation due to aging.⁸ In part, this may explain the difficulty in maintaining a healthy weight and physical activity. The following aerobic cellular respiration declines were observed at age 80 versus age 20: heart (-58%), pancreas (-83%), adrenal (-50%), liver (-17%), kidney (-45%) and skin (-75%). A severe deficiency was found in individuals with diabetes (-65%), pancreatic cancer (-30%) and those treated with statins (-20% to -26%).¹²

Advantages of Supplementing CoQ10 as Ubiquinol versus Ubiquinone

Supplemental CoQ10, whether in the form of ubiquinol or ubiquinone, is absorbed from the GI tract and transferred into lymph, where it is transported by chylomicrons. Subsequently, CoQ10 is delivered to the bloodstream and transported to the liver, where it is transferred to lipoproteins and returned to the blood circulation.⁴ CoQ10 distribution in the blood seems relatively stable, with approximately 80% to 98% as ubiquinol, and the rest coming from ubiquinone.^{8,13}

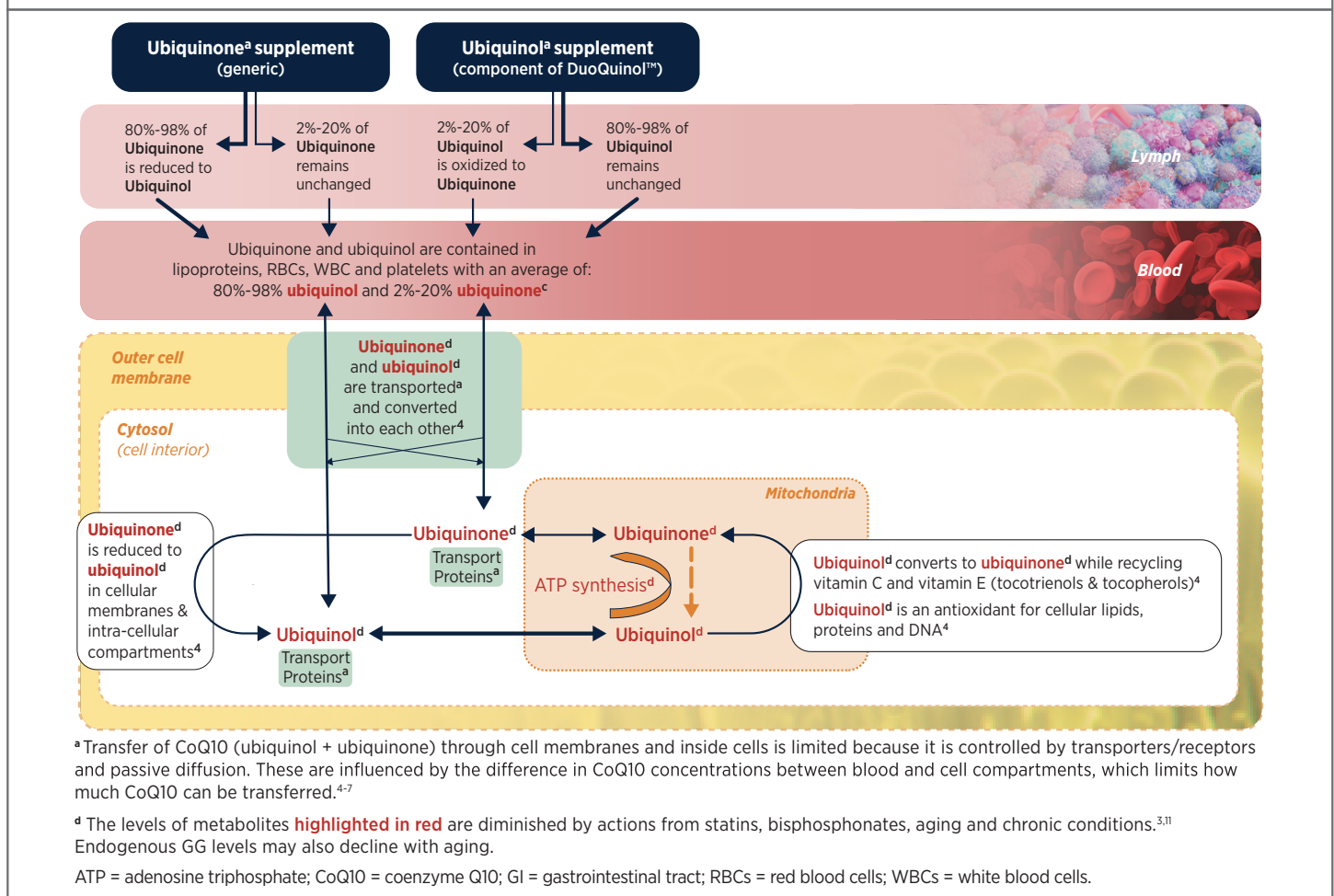
Figure 1 illustrates the conversions that take place for ubiquinol and ubiquinone during absorption. These conversions emphasize the potential superiority of supplemental ubiquinol versus ubiquinone, as it contributes to the body's antioxidant reserve rather than depleting it.^{4,13} This occurs because the majority of ubiquinol (80% to 98%) is absorbed unchanged, with only a small portion getting oxidized (2% to 20%) while recycling other antioxidants. In contrast, the majority of ubiquinone (80% to 98%) is reduced, thus decreasing the body's antioxidant reserve. This difference may be especially beneficial in states of high oxidative stress (aging, diabetes, exercise, and excessive toxin load) or in those whose gut cells need greater antioxidant protection. As depicted in Figure 1, the two forms of CoQ10 (ubiquinone and ubiquinol) are interconverting while supporting various metabolic pathways until they are metabolized for excretion. Thus, all the benefits observed in clinical trials with the ubiquinone form would likely be obtained when supplementing with ubiquinol, too, when the total amount of CoQ10 absorbed was the same. It is also possible that additional benefits may be observed due to ubiquinol's contribution to the body's antioxidant reserve.

Designs for Health and logo are trademarks of Designs for Health, Inc. © 2021 Designs for Health, Inc. All rights reserved. GG-Gold™ and DuoQuinol™ are trademarks of American River Nutrition, LLC and protected by US Patents 6,350,453; 7,989,006; and other patents pending.

Biological actions of CoQ10^{4,8,22}:

- Ubiquinone may be reduced to ubiquinol** by alpha-lipoic acid or glutathione reductase or as part of the following reactions:
 - Participation in the mitochondrial electron transport chain, where 95% of the body's ATP is produced
 - As a cofactor for nicotinamide adenine dinucleotide (NAD⁺) plus hydrogen (NADH)-oxidase regulation of the cytosolic ratio of NAD⁺/NADH and ascorbate reduction involved in the regulation of cell growth and differentiation
- Ubiquinone is required for activation of mitochondrial uncoupling proteins**, which are responsible for fat metabolism and thermogenesis.
- Ubiquinone regulates mitochondrial permeability transition pores**, which affect apoptosis and DNA damage.
- Ubiquinol is the only endogenous lipid-soluble antioxidant and it occurs in all body cells.** It protects lipids, proteins, nuclear and especially mitochondrial DNA, which has poor repair mechanisms. It recycles vitamins E and C while converting to ubiquinone.
- Ubiquinone and ubiquinol contribute to the control of membrane fluidity**, as they intersperse in cell and organelle membranes.
- CoQ10 affects more than a hundred genes, including those involved in mitochondrial biogenesis¹⁴** which stimulates SIRT1, SIRT3 and PGC-1alpha.
- CoQ10 is involved in mitochondrial calcium homeostasis²⁵**.

Fig. 1 DuoQuinol™, a synergistic combination of geranylgeraniol (GG) & ubiquinol to maximize energy & support healthy aging



CoQnol™ 100 Medicinal Ingredient (per softgel):

Ubiquinol100 mg

Non-Medicinal Ingredients: Annatto Extract, Medium chain triglycerides, Bovine Gelatin, Glycerine, Purified water, Quillaja extract, Ascorbyl palmitate. **Recommended Dose:** Adults 18 years and older: Take 1 softgel 1 to 3 times per day with a meal or as recommended by your health care practitioner.

CoQnol™ 200 Medicinal Ingredient (per softgel):

Ubiquinol200 mg

Non-Medicinal Ingredients: Annatto Extract, Medium chain triglycerides, Bovine Gelatin, Glycerine, Purified water, Quillaja extract, Ascorbyl palmitate. **Recommended Dose:** Adults 18 years and older: Take 1 softgel per day with a meal or as recommended by your health care practitioner.

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Health care practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

REFERENCES

For a list of references cited in this document, please visit: <https://www.designsforhealth.com/techsheet-references/coqno1-references.pdf>