

# CoQ10 For a Strong and Healthy Heart

## HIGHLIGHTS

- › CoQ10 supplementation shows significant benefits in heart failure patients, leading to lower cardiovascular death rates and improved cardiac function, making it more effective than the reduced form, ubiquinol
- › CoQ10 aids in the early recovery of cardiac function post-myocardial infarction by reducing inflammation through the inhibition of CCR2+ macrophage recruitment and suppression of the NLRP3/IL1 $\beta$  inflammatory pathway
- › Intravenous administration of CoQ10 demonstrates promise in emergency ischemic conditions by rapidly increasing tissue penetration, reducing infarct size, and enhancing antioxidant capacity, offering protection during acute ischemia and reperfusion
- › CoQ10 reduces inflammation via the NLRP3/IL1 $\beta$  pathway, which is crucial for heart health, and its anti-inflammatory properties help improve cardiac function and reduce fibrosis and hypertrophy
- › CoQ10's antioxidant properties protect against oxidative stress, providing a promising alternative to conventional heart failure treatments with fewer side effects and long-term benefits

Heart failure is a significant health concern, especially among older adults. The average one-year case fatality rate for heart failure patients is 33%, highlighting the serious nature of this condition. Prevalence rates vary widely however, from as low as 0.2% in a Hong Kong hospital study to as high as 17.7% in a U.S. Medicare population aged 65 and older between 2002 and 2013.

Coenzyme Q10 (CoQ10) has been extensively researched for its role in heart health, and numerous studies suggest CoQ10 supplementation can significantly reduce cardiovascular mortality and improve cardiac function. These benefits are crucial, given the high prevalence and mortality rates associated with heart failure.

Interestingly, in a surprising reversal of long-held beliefs, recent research suggests that CoQ10 (ubiquinone) is more effective for heart health than its reduced form, ubiquinol. For years, health experts and supplement manufacturers have advocated for ubiquinol, claiming its superior bioavailability made it the obvious choice for those seeking cardiovascular benefits.

Their recommendation seemed logical: since ubiquinol is the active form of CoQ10 in the body, taking it directly should provide better results. However, emerging evidence challenges this conventional wisdom, indicating that the body may actually use standard CoQ10 more effectively for cardiac function. As noted by the authors:

*"A slightly better water solubility and a lack of understanding absorption and transfer of CoQ10 and CoQH2 have led to misleading interpretations pushing CoQH2 as more bioactive form."*

This finding not only questions our understanding of CoQ10 supplementation but also highlights how assumptions about bioavailability don't always translate to real-world therapeutic benefits.

I was absolutely thrilled to come across this new study, which confirms what I concluded after delving into Ray Peat's work. It has helped me recognize that reductive stress is a significant factor contributing to reverse electron flow in the electron transport chain (ETC). The solution to reductive stress lies in the use of oxidants. Examples of effective oxidants that can help remove excess electrons include quinones such as vitamin K2, methylene blue, and ubiquinone (CoQ10).

When we were selling ubiquinol, the studies seemed to support its use, so I took the initiative to confront the company about it. After three months, their chief scientists produced a 30-page PowerPoint presentation in an attempt to convince me that

ubiquinol was superior.

## **CoQ10 Mechanisms of Action**

CoQ10 is a vital supplement for cardiovascular health, known for its role in energy production and antioxidant protection. This compound is essential for the production of ATP, the energy currency of cells, and plays a crucial role in maintaining mitochondrial function.

Mitochondria, often referred to as the powerhouses of the cell, rely on CoQ10 to shuttle electrons during the process of energy generation. This function is particularly important in heart cells, which have high energy demands.

Conventional treatments for heart failure often fall short, leaving patients with limited options and significant side effects. CoQ10 offers a promising alternative, providing cardiovascular benefits with fewer adverse effects. Its ability to reduce heart failure mortality and improve cardiac function makes it a key player in heart health management.

By improving mitochondrial function and energy production, CoQ10 supports the heart's ability to pump efficiently. Additionally, its antioxidant properties protect against oxidative stress, a major contributor to heart disease. This dual action not only aids in the prevention of heart failure but also supports recovery in those already affected.

CoQ10 has also been shown to aid in the early recovery of cardiac function following a myocardial infarction, commonly known as a heart attack. By reducing inflammation and oxidative stress, CoQ10 helps to preserve heart tissue and improve overall cardiac health. This makes it an important supplement for those at risk of or recovering from heart-related events.

## **CoQ10 Proven Superior in Lowering Heart-Related Deaths**

Importantly, a recent scientific review of 28 studies found that CoQ10 is more effective than its reduced form, ubiquinol, in reducing deaths related to heart diseases. Participants who took CoQ10 supplements showed significantly lower rates of cardiovascular mortality compared to those who took ubiquinol.

CoQ10 enhances mitochondrial function, which is crucial for energy production in heart cells. By improving how mitochondria operate, CoQ10 ensures that the heart muscle gets the energy it needs to pump blood efficiently. This improvement in energy production directly contributes to better heart health and reduced mortality rates.

Moreover, CoQ10 is more stable and bioavailable than ubiquinol. This means that CoQ10 is easier for the body to absorb and use effectively. Higher bioavailability ensures that more of the supplement reaches the heart cells where it is needed most, providing greater benefits.

Long-term studies have shown that the positive effects of CoQ10 persist over time, offering sustained protection against heart failure. In contrast, ubiquinol does not demonstrate the same level of long-term benefits, making CoQ10 the preferred choice for ongoing heart health management.

CoQ10 supplementation is particularly important if you're on a statin drug. Statins block HMG coenzyme A reductase in your liver, which is how they reduce cholesterol. But this is also the same enzyme that makes CoQ10, making deficiency highly likely. Statin-induced CoQ10 deficiency is in many cases responsible for the myopathic side effects attributed to these drugs (i.e., side effects involving loss of muscle control).

## **CoQ10 Aids in Early Recovery of Cardiac Function Post-Myocardial Infarction**

Other recent research found that CoQ10 significantly reduces inflammation by inhibiting the recruitment of CCR2+ macrophages. CCR2+ macrophages are a type of immune cell

that contribute to inflammation in the heart after a myocardial infarction, making their reduction crucial for recovery.

Additionally, CoQ10 suppresses the NLRP3/IL1 $\beta$  inflammatory pathway. This pathway plays a key role in the body's inflammatory response, and its inhibition by CoQ10 helps decrease overall inflammation, promoting better heart function after an infarction.

The research also demonstrated that CoQ10 improves cardiac function and reduces both fibrosis and hypertrophy. Fibrosis refers to the stiffening of heart tissue, while hypertrophy is the enlargement of heart muscle cells. By mitigating these factors, CoQ10 supports a healthier heart structure and more efficient pumping action.

Furthermore, CoQ10 enhances survival rates in models of myocardial infarction. This improvement in survival underscores the compound's potential to not only aid in recovery but also to increase the likelihood of long-term survival following a heart attack.

CoQ10's anti-inflammatory properties are therefore crucial for heart health. By targeting specific inflammatory pathways and reducing harmful immune cell activity, CoQ10 helps maintain a balanced inflammatory state, which is essential for the heart's healing process and overall function after ischemic injury.

## **Intravenous CoQ10 Administration Shows Promise in Emergency Ischemic Conditions**

Yet another 2024 study found that administering CoQ10 directly into the bloodstream can quickly boost its levels in vital organs. This rapid increase is crucial because it allows CoQ10 to act swiftly during emergencies like heart attacks or strokes.

When CoQ10 is given intravenously, it reaches the affected tissues much faster than when taken orally. This speedy delivery ensures that organs under stress from a lack of blood flow receive the necessary protection immediately. By enhancing the heart's

ability to function during acute ischemia, CoQ10 helps maintain essential energy production and prevents further damage.

In emergency situations, CoQ10 plays a significant role in reducing the size of the damaged area, known as the infarct. Smaller infarct sizes mean that less heart muscle is lost, which directly improves the heart's overall function and the patient's chances of recovery. This reduction in damage is a key factor in improving long-term outcomes for patients experiencing severe heart conditions.

Additionally, intravenous CoQ10 boosts the body's antioxidant defenses, which help neutralize harmful free radicals created during ischemic events. By reducing oxidative stress, CoQ10 protects cells from further injury and supports the healing process. This enhanced antioxidant capacity is vital for minimizing the overall impact of the ischemic event on the body.

Given these benefits, intravenous CoQ10 stands out as a valuable treatment option in acute medical settings. Its ability to rapidly increase tissue concentrations, protect against immediate damage, and support long-term heart function makes it an essential tool for managing emergency ischemic conditions.

## **CoQ10 Counteracts Reductive Stress**

As mentioned earlier, reductive stress is a major factor that contributes to reverse electron flow in the electron transport chain, and CoQ10, being a potent oxidant, helps remove excess electrons.

Reductive stress is an important topic because it's fundamental to optimizing your biology. In a nutshell, reductive stress means you have too many mobile electrons in the cell. Think of your body's cells as tiny engines that need to process fuel (from the food you eat) efficiently.

Just like a car needs the right mixture of fuel and air to run smoothly, your cells need the right balance of electrons (which come from breaking down food) and carriers (like

NAD) to transport these electrons. These carriers work like taxis moving passengers (electrons) around the city (your cell).

Reductive stress happens when there's too much fuel coming in. When all the electron carriers are full, new electrons have nowhere to go, creating a traffic jam in your cells. This typically occurs when we flood our system with too many calories. Just as a car engine runs poorly with too much fuel and not enough air (called a "rich" mixture), your cells can't function properly when overwhelmed with too much energy input.

This cellular traffic jam is what scientists call reductive stress, and it's a key feature of metabolic syndrome and other health issues.

To understand how oxidants like CoQ10 helps in this instance, think of it as a traffic controller for those electrons. When you have reductive stress, oxidants open up new routes to help move the traffic along.

CoQ10 specifically has a unique ability to accept backed-up electrons and safely transport them through the cellular machinery, helping to clear the congestion. By providing these alternative pathways for electron flow, oxidants like CoQ10 help restore balance to the system. They essentially help convert those backed-up electron carriers back into their empty form (NAD<sup>+</sup>), making them available to transport more electrons again.

## **Optimizing Your Heart Health with CoQ10**

If you're new to CoQ10 supplementation, an initial dose of 200 to 300 mg per day is recommended. After about three weeks, when plasma levels typically reach their optimal plateau, you can transition to a maintenance dose of 100 mg daily, which is sufficient for most healthy individuals. However, if you maintain an active lifestyle, exercise frequently, or experience high stress levels, you might benefit from continuing with 200 to 300 mg daily.

Special consideration must be given to certain health conditions. Those taking statin medications should supplement with at least 100 to 200 mg of CoQ10 daily, and

possibly more. Similarly, individuals managing chronic conditions such as heart disease, diabetes, ALS, chronic fatigue, or autism may require higher doses.

For optimal absorption, split your daily dose into two or three portions rather than taking it all at once, and take it with a healthy source of fat since CoQ10 is fat-soluble. While these guidelines provide a general framework, working with an integrative physician can help determine the most appropriate dosage for your specific needs.

Additionally, given the varying quality of supplements available in the market, it's crucial to select a CoQ10 product specifically formulated for maximum absorption and bioavailability.