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For Physicians Only

New treatment

IMPROVES SURVIVAL

in patients with weak hearts

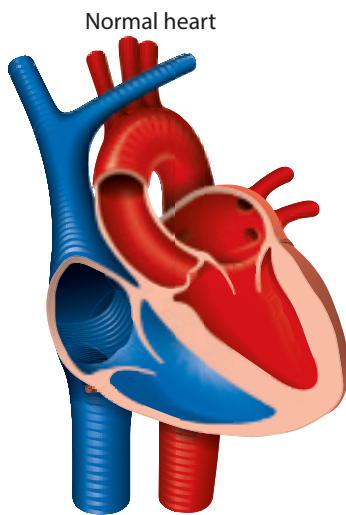


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 Pharma Nord

New Treatment IMPROVES SURVIVAL in patients with chronic heart failure

Is it possible to protect heart patients against premature death by boosting the energy production of their heart muscle cells? The results of a recently published international study, headed by Danish researchers, lend support to this new strategy.



With results showing an improvement of heart failure symptoms, fewer hospital visits, and nearly half as many deaths, Danish heart research may

have paved the way to improved treatment of chronic heart failure.

The Danish cardiologist and researcher, Chief Physician Svend Aage Mortensen of Copenhagen University Hospital, headed the randomized, double-blind, placebo-controlled international Q-Symbio study. He described the study results as both exciting and promising. The Q-Symbio study was published recently in the esteemed *Journal of the American College of Cardiology*, *HEART FAILURE*.

Strengthening the Heart

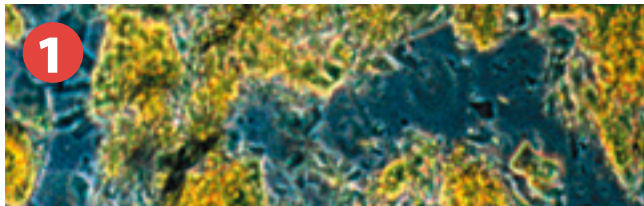
The compound that was tested on a large group of patients with chronic heart failure is CoQ10, a naturally occurring coenzyme that all cells need in order to produce energy. The cells of the heart muscle are particularly dependent on this compound in order to function optimally, and studies have found that CoQ10 levels are lower in tissue from chronically failing hearts.

The results of the Q-Symbio study clearly indicate that the adjuvant CoQ10 treatment works. Those patients who were given CoQ10 had substantially lower mortality risk. In addition, there were fewer hospitalizations among the CoQ10-treated patients, and their heart failure symptoms were significantly improved.

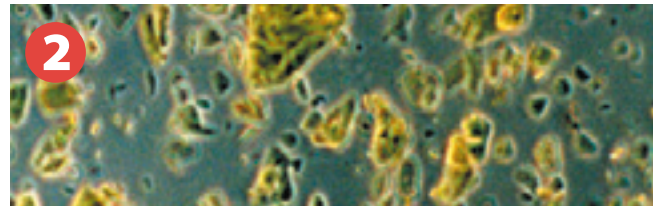
Nearly Half as Many Deaths

A total of 420 patients with chronic heart failure participated in the Q-Symbio study, with each patient undergoing two years of treatment. Half of the patients were randomly assigned to take three daily 100 mg capsules of CoQ10 Myoqinon, while the other half receives the same amount of identical placebo capsules. The patients in both groups continued with their conventional regimen of medicine that is prescribed for heart failure.

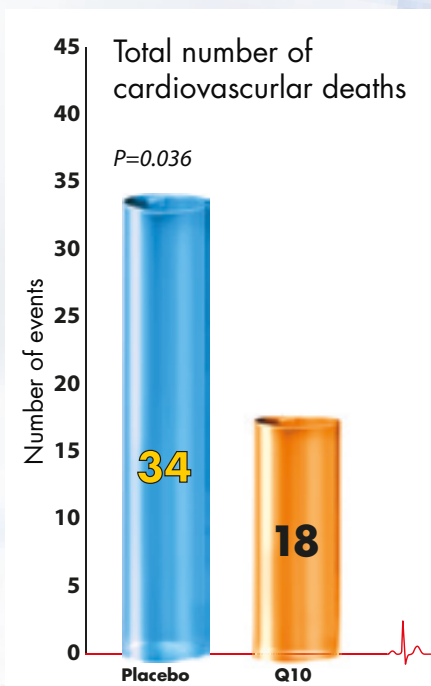
Superior Absorption at Body Temperature



One of the main reasons for the superior bioavailability of Myoqinon is the unique process used to dissolve the CoQ10 in oil. Unprocessed CoQ10 is in crystal form that hinders effective absorption.*



An inferior preparation is more like a mixture of CoQ10 crystals and oil, resulting in poor bioavailability of the active CoQ10.



Q-Symbio is one of the most convincing studies of a natural compound. By adding a nutrient, ubiquinone CoQ10, to the standard medicine regimen for chronic heart failure, it is possible to lower mortality rates by 43%.



It is possible to reclaim the energy of youth, even at a ripe age. CoQ10 is a key to cellular energy production, and studies show that supplementing with this compound increases the energy turnover in all cells.

After two years, there were 43% fewer heart-related deaths in the CoQ10 group compared with the placebo group. In addition, there were 43% fewer heart-related complications among the CoQ10-treated participants, including a significant reduction in hospitaliza-

tions caused by a worsening of their heart failure.

In response to the Q-Symbio study results, Dr. Mortensen has suggested that CoQ10 may play an important role as an adjuvant

treatment to conventional heart failure therapy. No side effects of the CoQ10 treatment were observed in the Q-Symbio study. In fact, the researchers saw a significant effect of CoQ10 in those patients who received the compound as add-on therapy with their conventional heart failure medication.

Source: (*Journal of the American College of Cardiology, HEART FAILURE, online Oct. 2014*)



Myoqinon is prepared through a special heating process that transforms the molecular structure of the CoQ10 from rough crystals to a snowflake-like shape.



At body temperature, the CoQ10 snowflakes dissolve, thereby creating a homogeneous oil matrix that is easily absorbed by the body.

The International Journal of Cardiology:

A Scientific Breakthrough

Daily supplementation with the two nutrients, selenium and CoQ10, can reduce cardiovascular mortality by 54% and improve cardiac performance substantially, according to a Swedish study published in 2013 in the *International Journal of Cardiology*. KiSel-10, as the randomized, double-blind, placebo-controlled study is officially named, was headed by Associate Professor Urban Alehagen, a cardiologist from the University Hospital of Linköping. The study, which was carried out with the two Pharma Nord products, SelenoPrecise and Myoqinon, made headlines internationally.

Now, after further number-crunching of the data in the study, Dr. Alehagen and Dr. Jan Olav Aaseth, a Norwegian professor in endocrinology, have suggested in an article in the *Journal of Trace Elements in Medicine and Biology* that this nutrient combo may be particularly useful for people with low selenium status.

Protects Against Oxidative Stress

Selenium is an essential constituent of various proteins (called selenoproteins) that play a crucial role in protecting against a phenomenon called oxidative stress, which appears to be involved in many types of cardiovascular disorders. With too little selenium in the body, these protective selenoproteins may not function optimally. In addition, selenium works synergistically with CoQ10, a compound that also protects against oxidative damage to cells and tissue. Finally, CoQ10 has a vital function that is highly relevant for the heart.

CoQ10 dissolved in a unique oil matrix in light-proof capsules is the formula that has been used in many of the large-scale studies of CoQ10's effect.



Fuels the Heart

CoQ10 fuels the energy turnover that takes place inside the mitochondria (powerhouses) in all human cells. The heart is particularly dependent on energy, and it is in the production of cellular energy that CoQ10 has shown interesting potential. In the KiSel-10 study, which was published in the *International Journal of Cardiology* in 2013, Dr. Alehagen and fellow researchers demonstrated that

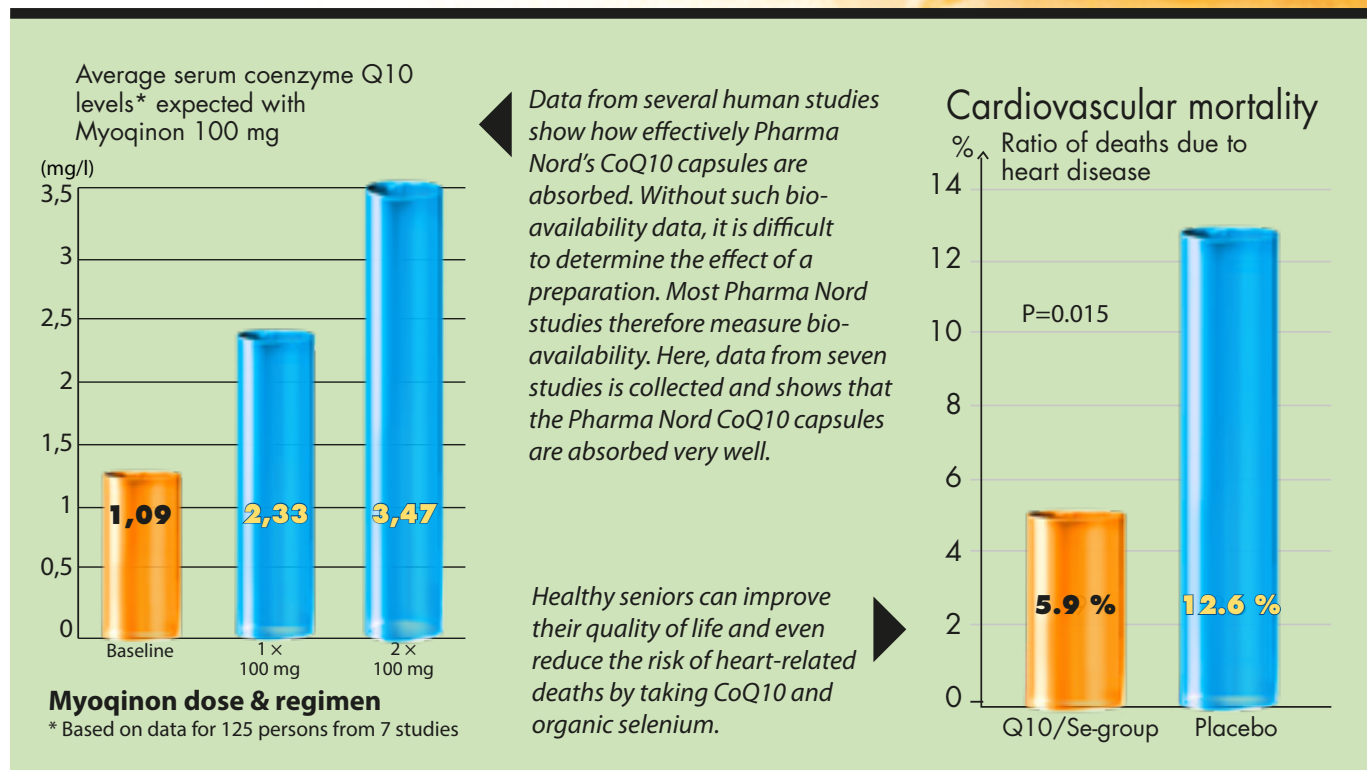
CoQ10 Myoqinon combined with selenium (SelenoPrecise) increased heart muscle strength significantly in a large group (443 men and women) of healthy elderly Swedes. Moreover, the cardiovascular mortality rate in the CoQ10-selenium group went down by 54%, compared with the group that was given placebo.

Not All CoQ10 Preparations are Absorbed Equally Well

The actual raw material (CoQ10) is a yellow, lipid-soluble, crystalline powder with a melting point around 48 degrees Celsius. When the raw material is heated to this temperature in an oily solution, the crystals dissolve, leaving the individual CoQ10 molecules completely separate from one another in the oil. Once the oil cools off, however, the CoQ10 molecules aggregate and form crystals again. This natural crystal formation inside CoQ10 capsules prevents CoQ10 products from being properly absorbed in the digestive

system. Through much hard work and experimentation, Pharma Nord has solved the problem of re-crystallization inside the capsules by means of a patented method that involves using a highly specialized heating treatment and different types of oil with different melting points. That way, it is possible to ensure complete separation of the individual CoQ10 molecules and effective absorption. Pharma Nord can document the excellent bio-availability of Myoqinon with a considerable number of published studies.

Many manufacturers stress that their CoQ10 products are made with the same type of raw material that has been used in scientific research. Unfortunately, this similarity of raw material is no guarantee of the product's effect. Unless the re-formation of crystals is effectively prevented, the product is worthless, regardless of the quality of the raw material.



How to Find a Product that Works

It can be quite challenging to find a CoQ10 preparation that works as expected. In fact, many consumers/patients purchase CoQ10 supplements completely unaware of the huge differences in quality and effect from one product to another. Most CoQ10 products on the market are sold as dietary supplements, and the producers are not able to document their products' bioavailability, safety, and effect. Whenever patients use an undocumented product they are taking a chance. The product may work, but the patients could also be wasting their money on something they never absorb. Moreover, there is the risk that the undocumented product contains impurities that have not been discovered because the product has not been scientifically tested and submitted to the rigid manufacturing control that is required for documented products. In contrast to popular belief, the origin of the raw material is not the most important factor. A high-quality CoQ10

raw material may easily be destroyed if it is processed the wrong way. A good example would be if the manufacturer does not know how to prevent the formation of CoQ10 crystals. The CoQ10 raw material, whether it is expensive or inexpensive, has a natural tendency to form such crystals. What matters is to document that the active substance in the actual capsule is effectively absorbed in the body instead of merely passing through the digestive tract without being able to penetrate the intestinal absorption cells and enter the bloodstream.

Myoqinon's formulation is based on the knowledge gained from approximately 100 published scientific studies, 25 years of experience with the CoQ10 preparations, and an international network of CoQ10 researchers who have used the current product in their scientific work. It is because of this extensive experience that Myoqinon's has been designated the science reference product (gold standard) of international CoQ10 research. This designation validates the quality, effect and safety of the product.

Pharma Nord has over 25 years of experience with the OTC version of Myoqinon (Bio-Quinone CoQ10)

The preparation is now the official science reference of international CoQ10 research.



CoQ10 Products:

Same Does Not Mean Equal

To date, approximately 100 studies of Pharma Nord's CoQ10 capsules have been carried out and published. Many of these studies have looked specifically at the bio-availability of the preparation. This is done by comparing the blood levels of CoQ10 before and after ingestion of either the actual product or a placebo. Based on an average of the research data from several studies of bioavailability, it is possible to increase blood levels of CoQ10 more than two-fold (with 100 mg Myoqinon per day) and three-fold (with 2 x 100 mg Myoqinon per day).

Unfortunately, the food and drug authorities do not require producers of commercially available CoQ10 products to document their products' bio-availability or effect. Therefore, it is generally a good idea to choose a CoQ10 product from a manufacturer who is able to document published research results.



Ubiquinone or Ubiquinol?

Experts are still debating which form of Coenzyme Q10 has the better absorption and the better clinical effects: the oxidized form (ubiquinone) or the reduced form (ubiquinol). So far, there is much more documentation for the safety and clinical effects of the ubiquinone form in treating chronic heart failure, hypertension and heart surgery patients.

In the only head-to-head bioavailability comparison study, a patented ubiquinone formulation was absorbed significantly better than a patented ubiquinol formulation. The well-formulated ubiquinone Coenzyme Q10 preparation is the most solidly documented form. It is safe, it is effective and it is affordable. Whether the ubiquinol form will have similar effects as the ubiquinone form on heart failure patients remains to be seen in the future.



Ubiquinone is characterized by having a yellow color.

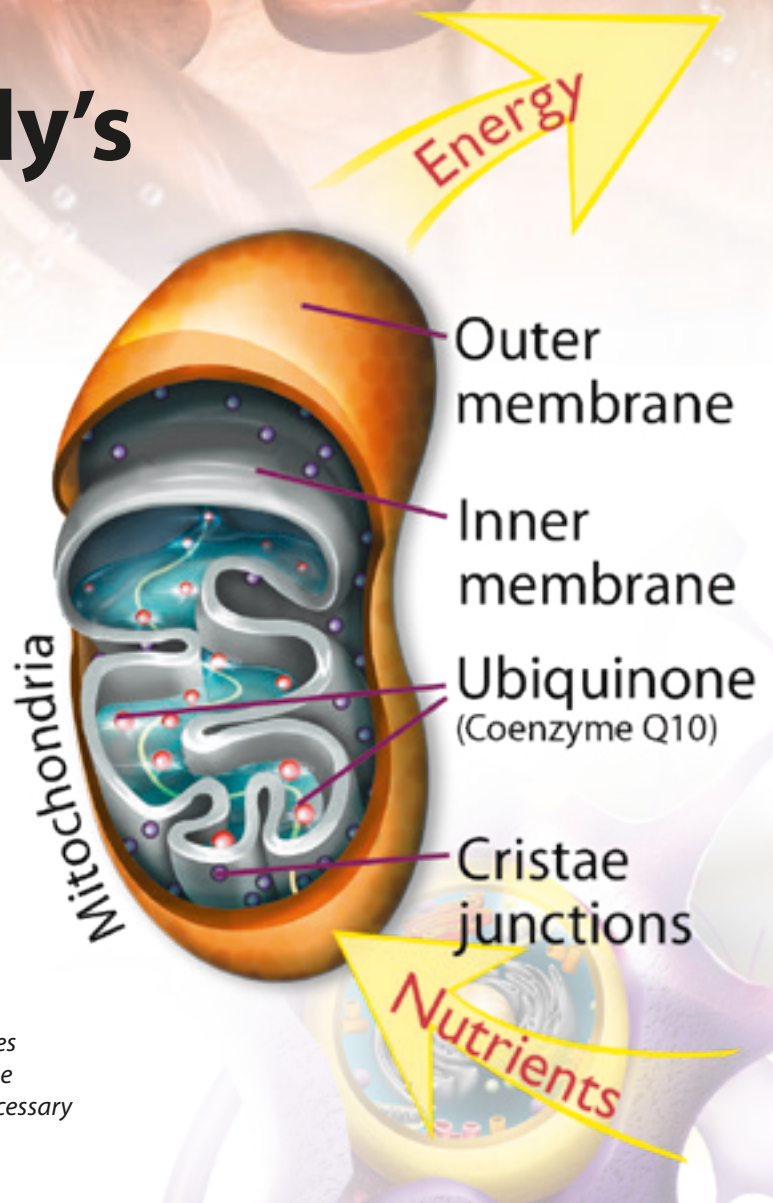


Ubiquinol is white or clear, depending on the surrounding temperature.

CoQ10 - the Body's Natural Energy Molecule

Many substances can give patients a feeling of increased energy, for instance ginseng and caffeine. These substances have one thing in common: They provide an artificial energy boost. They stimulate the central nervous system and, when consumed for extended periods of time, they may result in a stress-like state that burdens the organism. CoQ10, on the other hand, is a natural compound that the body itself is able to synthesize as part of supporting its cellular energy metabolism. This compound is essential to the turnover of energy in cells, and without CoQ10, we humans would not be able to survive. The substance is concentrated inside the cellular powerhouses (mitochondria). Muscle cells and heart muscle cells in particular harbor great concentrations of CoQ10.

The process that takes place inside the mitochondria involves five different phases. Fatty acids and glucose go through all five phases in order to get converted to ATP (energy). CoQ10 is essential for the transportation of electrons through the chain and is therefore necessary for normal functioning of a mitochondrion.



International Collaboration Gives Great Insight

For more than 30 years, Pharma Nord has worked with biologically active nutrients. The company's international collaboration with scientists and universities all over the world has resulted in extensive knowledge of how these nutrients are used most favorably in the manufacturing of nutritional supplements and medications. This insight has been of enormous value to consumers and patients through the years. With all of its manufacturing taking place in Denmark, Pharma Nord is able to control the quality of its products down to the smallest detail. The entire production process complies with

the exact same guidelines that are used for prescription medication manufacturing, and the entire process is carefully monitored by Pharma Nord's own laboratory as well as by external laboratories. This ongoing quality control combined with the documented research results that have been achieved with the products provides the consumer and the patient with a good guarantee of safe and effective products. In fact, Pharma Nord's quality control and documentation procedures extend far beyond what the authorities ask for – to provide consumers with the best, safest and most effective products.

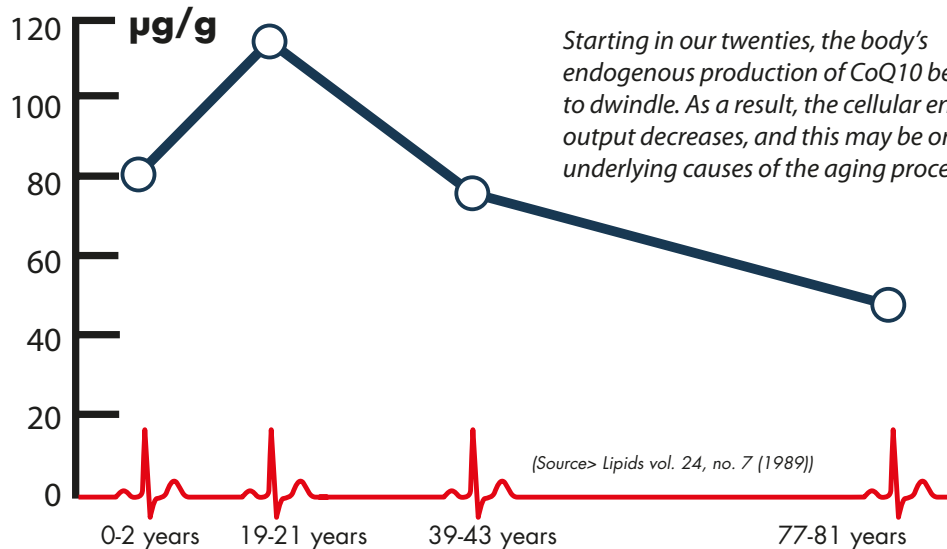


The 1978 Nobel Prize in Chemistry was awarded to the British scientist, Peter Mitchell. He received the award for his work explaining CoQ10's role in the body's cellular energy metabolism.



Age and Disease Reduce Our Production of CoQ10

Fatigue and lack of energy are common problems of the ageing population and there is a natural explanation to that. As we grow older, the body's ability to synthesize CoQ10 is reduced, causing the cellular levels of the energy-providing compound to decrease. This loss can be compensated for by taking capsules with CoQ10. As mentioned earlier, published studies show that daily ingestion of CoQ10 from a highly bio-available preparation can double or even triple blood levels of the compound. It therefore stands to reason that the older people who took part in the KiSel-10 study experienced increased quality of life and also had substantially lower cardiovascular mortality than their peers who took placebo capsules.





Pharmaceutical-grade Dietary Supplements

A thorough and tight control setup for food supplement manufacturing is necessary in order to guarantee consumers and patients that the products are safe. This can be done in different ways. Pharma Nord has chosen to follow the rules that apply to prescription medicine manufacturing even with its dietary supplements. This policy, in turn, places substantially greater demands on Pharma Nord's raw material suppliers and internal quality control routines.

Inspection and Analysis for Consumer Safety

The entire production of tablets and capsules is handled in Denmark in strict accordance with the same rules for quality inspection and documentation that apply to medical

drugs. As part of this process, the laboratory staff inspects and verifies that the active ingredients and tablet excipients meet the described quality level and purity requirements. That way, the consumers and patients are guaranteed products without any unwanted substances (toxins, impurities, etc.)

Can All Labels Be Trusted?

The step-by-step inspection carried out through all stages of the manufacturing process is necessary in order to guarantee that all products have corresponding content and label declarations. Medical drug manufactur-

ing is subject to these control procedures, whereas this is not the case with nutritional supplements. Before any of Pharma Nord's products is released for sale, the tablets or capsules are carefully analyzed to determine that their content of active ingredients is identical with the label declaration. This degree of quality control is required with all medical drugs. With regular nutritional supplement manufacturing, it is voluntary.

Clinical Research for Better Products

Pharma Nord carries out research on the company's own products because the only way to prove that a product works as expected is by conducting human clinical studies with a treatment group and a control group (placebo group). One group gets the active tablets or capsules while the other group gets the placebo. Both groups are instructed to take the products for a given length of time. Afterwards, the researchers analyze the results to determine which group had more benefit.

Today, Pharma Nord is one of the world's leading manufacturers of CoQ10 products and holds a leading position in the scientific research of this compound.



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CoQ10

The substance was originally discovered by American scientists doing research on mitochondria in 1957. It has been the subject of much research ever since. CoQ10 is found in all of the cells of the body, where it plays a key role in the electron transport chain and contributes to the aerobic cellular respiration that makes energy in the form of ATP (adenosine triphosphate). 95% of the body's energy is made that way. The organs with the highest energy requirement (particularly the heart, liver, and kidneys) contain the most CoQ10 for the same reason.

Also a Powerful Antioxidant

Besides its key function in cellular energy generation, CoQ10 is a very effective antioxidant. The actual CoQ10 molecule constantly changes form in an oxidation-reduction-cycle in the body. In its reduced form, CoQ10 functions as an antioxidant that prevents lipids from oxidizing (lipid peroxidation). It also protects proteins against oxidation. Freely circulating CoQ10 contained in LDL (Low-Density Lipoprotein) protects LDL against oxidation, which helps prevent atherosclerosis and cardiovascular disease.

From Factory to Science Journals

Many studies of nutritional supplements are published in journals worldwide. The most reliable studies are the "gold-standard" clinical trials that are published in peer-reviewed science journals. More and more manufacturers realize how important it is

to conduct this type of research in order to document that their products are what they claim to be. Consumers and patients are aware of this and often prefer supplements that are backed up by this type of science.



