MitoCharger™

Maintaining the Power Plant of Life

- **Supports the health of mitochondria**
- **Attacks a central theory of aging at its source**
- **Alleviates symptoms of Metabolic Syndrome and Type II Diabetes**
- **Enhances mitochondrial activity on six different levels**
- **Formulation design based on extensive research**

The Importance of the Mitochondria

The cell is the basis of all life, and the mitochondrion is the power plant that keeps the cell operating. A simple but effective metaphor for what is one of the most significant and complex biochemical relationships known to science. Without mitochondria, cells simply do not produce the energy (in the form of ATP) needed for the human body to function or even survive. It comes as little surprise, therefore, that any state of mitochondrial dysfunction can be associated with a host of metabolic conditions, including Type II Diabetes, Syndrome X and excessive free radical production.

The Vicious Cycle

Ironically, the mitochondria's ability to produce ATP also results in the simultaneous production of other, unproductive metabolic by-products, particularly ROS (reactive oxygen species) free radicals. This vicious cycle is known as the mitochondrial theory of aging

Boosting Mitochondrial Function

Many natural compounds have been shown to help support mitochondrial function, thereby helping to counteract mitochondrial dysfunction. These compounds include antioxidants like R(+)-Lipoic acid, as well as key molecules like Co-enzyme Q10, which are involved in ATP production. Vitamin B1, the herb Rhodiola Rosea, D-uridine, Gynostemma pentaphylum, oxaloacetic acid and acetyl-L-carnitine also help to support mitochondrial function through a variety of mechanisms.

180 Vegi-Caps

Serving Size:	**6 Capsules**
R(+)-Lipoic acid	150 mg
Co-enzyme Q10	100 mg
Rhodiola Rosea	150 mg
Benfotiamine	150 mg
Oxaloacetic Acid (benaGeneTM)	100 mg
D-Uridine	50 mg
Gynostemma Pentaphyllum	100 mg
Acetyl-L-Carnitine	1500 mg

Key Features:

Advanced mitochondrial support formula

Suggested Use:
Take 6 capsules daily with food, or as directed by a qualified health care practitioner.

Source:
Multi-Sourced

Cautions:
None Known

Pregnancy Nursing:
Do not use if pregnant or nursing

Main Applications:
Support for mitochondrial dysfunction
Type II diabetes
Syndrome X

Complementary Products:
Advanced B Complex, Ortho-Core, R(+)-SR, Co-QPLUS, Ribogen, Mag Malate Renew

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The Mitochondrial Theory of Aging

Mitochondria generate damaging free radicals, and inefficient mitochondria generate even more free radicals than efficient ones. This is because more fuel is required by each mitochondrion to produce the same amount of ATP, resulting in an increased ratio of free radicals-to-ATP production. To complicate matters further, mitochondrial DNA (mtDNA) differs from regular DNA in that mtDNA has no enzymatic defense against oxidative stressors. In-vivo studies have provided evidence for the Mitochondrial Theory of Aging so conclusive that one leading researcher summarized it this way: "It is generally accepted that oxidative mitochondrial decay is a major contributor to aging."

Maintaining the Power Plant – With Cocktails

As we have seen, the relative clarity of the mitochondria's role within human biochemistry is coupled with an inherent vulnerability that must be addressed if any attempt is to be made with regard to enhancing mitochondrial health. The efforts of researchers around the world have helped to create a plethora of complex nutraceutical formulations designed to enhance mitochondrial function and health from every conceivable perspective.

How It All Works

Enzyme Bypass: The theory here is to circumvent defects in the process of ATP production. ATP production involves a lipid-soluble carrier called ubiquinone. The supplemental form of ubiquinone is Co-Enzyme Q10 (Co-Q10), and studies have shown that it can expedite certain phases of ATP production by up to 200%.

NAD+ is another key coenzyme that is converted into its reduced form, NADH, during ATP production. An increased ratio of NAD+/NADH helps improve ATP production, and has also been linked to the activation of genes that have been associated with anti-aging effects. Oxaloacetic acid (benaGene™) has been shown to increase the ratio of NAD+/NADH. It also mimics the effects of a calorie-restricted diet, which has been shown to increase life-span in several mammal species.

Antioxidants: Conventional anti-oxidants such as vitamins C and E are certainly useful, but the ideal mitochondrial antioxidant appears to be R(+)-lipoic acid. Lipoic acid is metabolized to its active form, diHydrolipoic acid (DHLA) inside the mitochondrion itself. This process produces intense biological activity, including the regeneration and recycling of vitamins C and E and enhanced insulin sensitivity.

Alternative Energy: This tactic involves the maximal utilization of a source of ATP that does not require any mitochondrial participation, thus augmenting overall ATP production without burdening dysfunctional or aging mitochondria. The herb Rhodiola rosea has demonstrated a capacity to increase ATP production.

Reducing Lactate: Lactate is a by-product of anaerobic energy production that can build up in the muscles and cause muscle cramping. Lactate is formed from pyruvate, and if pyruvate can be directed into the mitochondria, and away from lactate production, it can instead be used for further energy production. This can be accomplished with vitamin B1 supplementation. This has been made even more appealing by the development of benfotiamine, which is nearly 5 times more bio-available than conventional thiamin.

Nucleotide Precursors: Nucleotides are the structural units of DNA and RNA – including mtDNA and mtRNA. As mitochondrial dysfunction is closely associated with the depletion of nucleotides, maintaining a healthy nucleotide pool is paramount. Uridine seems to be able to do this, and naturally-derived uridine supplements have been studied for their ability to improve mitochondrial function in patients with HIV.

Vasodilation: Vasodilation (the widening of the blood vessels) is linked to the mitochondria via the production of nitric oxide. The mitochondria are primary targets of nitric oxide, and even small amounts can regulate ATP synthesis. Gynostemma pentaphyllum is a powerful nitric oxide enhancer.

Fatty Acid Utilization: Acetyl-L-carnitine (ALCAR) is a source of L-carnitine, a key molecule involved in cellular energy production and that is essential for proper mitochondrial function. The most important function of L-carnitine is to help shuttle fatty acids into the mitochondria, where they are then used as fuel for energy production. Depleted L-carnitine levels have been associated with muscle and heart dysfunction.

AOR's Mitocharger provides an advanced and effective formula to help support the mitochondria and to counteract aging associated with mitochondrial deficiencies.