



DaVinci®

*Laboratories  
of Vermont*

***Innovative*** by nature

# Mitochondrial Health with Ribose

The Facts from DaVinci® Laboratories

*Be Strong™*



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## Mitochondrial Health with Ribose:

### The Facts from DaVinci Laboratories

Mitochondrial health and wellness have a wide variety of carry-over affects on one's general health and wellness. Ribose has long been considered an effective supplement to bolster mitochondrial well-being. Now, increasing clinical research on the link between ribose and mitochondrial health is proving this.

Learn what you need to know to decide if Mito Fuel is the right formula for your patients.

Also discover how Mito Fuel was designed, in conjunction with Dr. Mitchell Ghen of the Strax Longevity Institute, to super-charge cells' mitochondria and give cardiovascular and muscular support for pre and post workouts and surgery; and general cardiovascular health.

Mito Fuel's unique combination of ribose and other nutrients fuels mitochondrial health.

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\*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.

*Be Strong*<sup>TM</sup>



## Mitochondria: The Overview

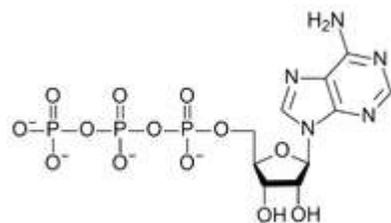
Mitochondria is a membrane-enclosed organelle found in most eukaryotic cells. These organelles range from 0.5–10 micrometers in diameter. Mitochondria are sometimes described as “cellular power plants” because they generate most of the cell’s supply of adenosine triphosphate (ATP), used as a source of chemical energy. In addition to supplying cellular energy, mitochondria are involved in a range of other processes, such as signaling, cellular differentiation, cell death, as well as the control of the cell cycle and cell growth. Mitochondria dysfunction has been implicated in several human diseases, including mitochondrial disorders and cardiac dysfunction, and may play a role in the aging process.

Several characteristics make mitochondria unique. The number of mitochondria in a cell varies widely by organism and tissue type. Many cells have only a single mitochondrion, whereas others can contain several thousand mitochondria.

The organelle is composed of compartments that carry out specialized functions. These compartments or regions include the outer membrane, the inter-membrane space, the inner membrane, and the cristae and matrix.

### The Role of Adenosine Triphosphate (ATP)

ATP is a multifunctional nucleotide that plays an important role in cell biology as a coenzyme, that is, the “molecular unit of currency” of intracellular energy transfer. ATP transports chemical energy within cells for metabolism. It is an energy source produced during photosynthesis in plants and cellular respiration and consumed by many enzymes and a multitude of cellular processes, including biosynthetic reactions, motility, and cell division.



Adenosine Triphosphate

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ATP is made from adenosine diphosphate (ADP) and adenosine monophosphate (AMP) and its use in metabolism converts it back into these precursors. ATP is therefore continuously recycled in organisms, with the human body turning over its own weight in ATP each day.

ATP is used as a substrate in signal transduction pathways by kinases that phosphorylate proteins and lipids, as well as by adenylate cyclase, which uses ATP to produce the second messenger molecule cyclic AMP. The ratio between ATP and AMP is used as a way for a cell to monitor how much energy is available and to control the metabolic pathways that produce and consume ATP.

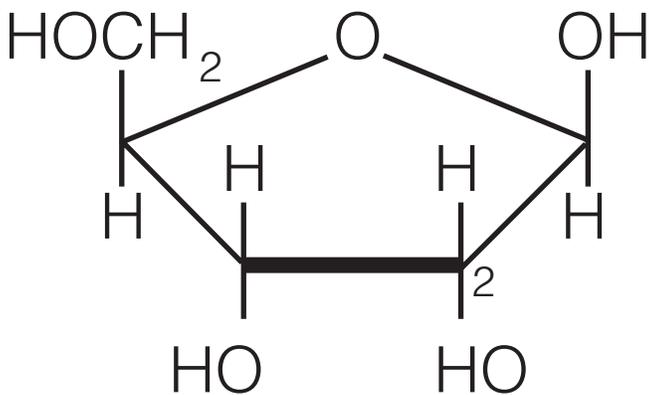
### Ribose: An Introduction

Ribose is a simple, five-carbon sugar (known as a pentose by biochemists) that is found naturally in our bodies. But unlike other simple sugars, the body naturally separates ribose from other sugars and stores it to make the energy molecule that actually powers the body, ATP.

Because the body cannot make ribose to keep up with demand, it is becoming widely popular with doctors and practitioners looking to help their patients overcome fatigue and promote mitochondrial and cardiovascular health.

### Ribose: An Overview

Ribose, primarily occurring as D-ribose, is an organic compound that occurs widely in nature. It is an aldopentose, that is a monosaccharide containing five carbon atoms that, in its acyclic form, has an aldehyde functional group at one end. Typically, this species exists in the cyclic form, as depicted below. It was first reported in 1891 by Emil Fischer.



## Ribose

It is referred to as the backbone of RNA, a biopolymer that is the basis of genetic transcription. It is related to deoxyribose, as found in DNA, by the removal of one hydroxy group. Once phosphorylated, ribose can become a subunit of ATP, NADH, and several other compounds that are critical to metabolism.

### Ribose in Effect

This naturally occurring substance is used by every cell in the body to synthesize and rebuild energy. Ribose is the most fundamental building block of adenosine triphosphate (ATP), the primary source of energy for every muscle cell in the body. ATP gives your body the energy it needs to stay healthy, overcome fatigue, and regain the vitality you need to live a normal, active life.

Ribose supports cellular energy. Aging, strenuous exercise or overexertion, and many metabolic or physiological conditions can drain ATP from your tissue and affect how well your body makes and uses energy. Ribose is a necessary ingredient for rebuilding energy in the human body.

Unfortunately, hearts, muscles, and other vital tissues in the body cannot make ribose very quickly, and ribose is not stored in our cells and tissues. That's why supplementing with ribose can support cell energy - quickly and naturally.



*Patients love MITO FUEL Drink mix. It's the ultimate energy delivery system. Delicious, nutrient rich and easy to take.*

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### DaVinci Labs: Mito-Fuel

Sold Exclusively through Health Care Practitioners, this combination of ingredients was specially formulated in conjunction with Dr. Mitchell Ghen to combine his clinical expertise with DaVinci Laboratories' 35 years of product expertise.

Mito Fuel contains 8 major nutrients that are found in multiple biochemical pathways to support the mitochondria. This formula helps protect the cells from free radical damage. It also supports quicker muscle recovery, decreases muscle soreness after exercise and improves the Krebs' cycle and supports healthy glucose metabolism.

This unique combination of nutrients works together to support on general mitochondrial structure and function, which has carry-over effects in numerous areas of one's general health and well-being.

#### Each Serving Contains

D-Ribose	5,000 mg
Acetyl L-Carnitine	500 mg
Malic Acid	300 mg
DMG HCl	100 mg
Rhodiola rosea Extract	75 mg
yielding rosavins 2.25 mg	
CoQ10	30 mg
Bromelain	625 GDU
Protease (from Aspergillus niger)	75,000 HUT
Stevia	

Other ingredients: natural orange powder, natural orange flavor, citric acid, tricalcium phosphate.

### Quality from Beginning to End

As with all DaVinci products, the raw materials used in Mito Fuel are of the highest grade and are as natural as possible. They are guaranteed to contain no artificial flavorings, preservatives, colors, sweeteners unless otherwise stated on our labels.

Mito Fuel is a unique convenient powder formula that is easy to take and generally enjoyed by customers.

## Mito Fuel, The Premium Formulation, Contains:

### D-Ribose

D-Ribose is a naturally occurring sugar that has been shown to support the production and recycling of ATP.

### DMG

DMG is a metabolic enhancer that helps the body overcome various forms of stress caused by aging, poor oxygen availability, free radical damage and a weakened immune system. As a methyl donor it contributes methyl groups to keep ATP at optimal levels.

### CoEnzyme Q10

CoQ10 is an antioxidant and a naturally occurring cofactor in cellular energy. It is vital to the production of ATP. It supports the heart's pumping ability, supports blood circulation, better tolerance to exercise and supports the heart's muscle tone. As a powerful antioxidant it helps protect heart tissue from free-radical damage. CoQ10 levels may decline in individuals after the age of 35.

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#### **About Dr. Ghen Co-Creator of Mito-Fuel**

He is the co-author of three textbooks and he has authored dozens of articles in peer-reviewed journals. He has been a host and guest on hundreds of radio programs as well as television, as the expert in alternative health. Dr. Ghen lectures internationally on topics of oral and IV nutrition and stem cell transplantation. He is one of the premier teachers at conferences and seminars on integrative medicine. His vast academic knowledge, coupled with his entertaining delivery, makes him one of the most sought after presenters. Currently, he is the medical director of Strax Longevity Institute in Lauderhill, Florida.

#### **Acetyl-L-Carnitine**

Acetyl-L-Carnitine is a derivative of the amino acid, carnitine. It supports heart function by transporting fatty acids from the blood through to the mitochondrial membranes and into heart cells so the fatty acids can be converted into ATP. The heart requires a constant supply of ATP in order to function at high efficiency.

#### **Malic Acid**

Malic Acid is involved in energy production in muscle cells. It supports ATP production because it's involved in the Krebs cycle. Malic acid is needed for glucose metabolism, which is important for nourishing muscles and nerves.

#### **Rhodiola**

Rhodiola is an herb (*Rhodiola rosea*) that supports cellular metabolism. It supports production of ATP (adenosine triphosphate) and CP (creatine phosphate), thus providing more of the energy molecules required by the body. The product uses the *Rhodiola Rosea* species which is standardized to contain the proven 3:1 ratio of 3 percent rosavins and 1 percent salindosides.

#### **Bromelain**

Bromelain is a proteolytic enzyme that supports muscle recovery. It has been shown to alleviate muscle soreness after intense muscle contractions.

#### **Protease**

Protease is a proteolytic enzyme that helps decrease muscle soreness following intense exercise.

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## About DaVinci Laboratories

For 37 years, DaVinci Laboratories has developed and produced leading edge, high quality, innovative supplements exclusively for healthcare professionals. DaVinci Laboratories is a division of FoodScience Corporation, which provides the highest quality formulations in the Nutritional Supplement Industry for both human and animal needs.

More than 100 FoodScience Corporation employees are dedicated to an unmatched commitment of quality and service for every product produced. World-class facilities allow the company to reach the diverse needs of our unique customer base quickly and efficiently. An on-staff Ph.D. Biochemist ensures that a high level of supervision goes into the production process of nearly 200 products that meet rigorous worldwide standards. The flexible facilities also allow for custom formulations and private labeling for those customers who wish to market their own brand of natural products.

### DaVinci Research

DaVinci's research focuses on the complex relationships that exist among nutrients and the latest advancements in nutrition therapies to develop and produce some of the most significant products available to Holistic Practitioners. DaVinci Laboratories' extensive research into the exciting properties of N,N-Dimethylglycine (DMG) has been unparalleled. The company has been awarded four patents for DMG's beneficial effect in the areas of immune response and cell support. DaVinci Laboratories' Research and Development Department is under the direction of a Ph.D. Nutritional Biochemist.

DaVinci Supports Research at the following Institutions  
University of Southern California Medical School, Los Angeles;  
Medical University of South Carolina, Charleston; Institute For  
Child Behavior Research, San Diego; San Diego State  
University; Northern Kentucky University, Highland Heights;  
Florida Medical School, Tampa; University of Bridgeport,  
Bridgeport, Connecticut; Clemson University College of  
Sciences, Clemson, South Carolina.

### DaVinci Specialty Formulations

Ongoing research and development at DaVinci Laboratories has resulted in the most exclusive line of specialty products, some of which include: Pure N,N-Dimethylglycine (Gluconic® DMG); the most complete high potency multiple vitamin/mineral formulas available (Daily Best™, Kid's Mighty Vites™, Omni™, Omni Jr™, Spectra™, Spectra™ Man, Spectra™ Senior, Spectra™ Woman, Spectra™ Multi Age, Ultimate Prenatal™); and unique glycosaminoglycan products (Cartilage+™, Disc-Discovery®, Perna® and Perna® Plus). DaVinci was also the first nutritional supplement company in the United States to introduce Evening Primrose Oil (Gamma-Lin™) to health practitioners in 1980 as well as the first company to offer doctors an efficient and accurate protocol for evaluating the quality of Oil of Evening Primrose.

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