At the Heart of It All: Nutritional Strategies for Cardiovascular Health

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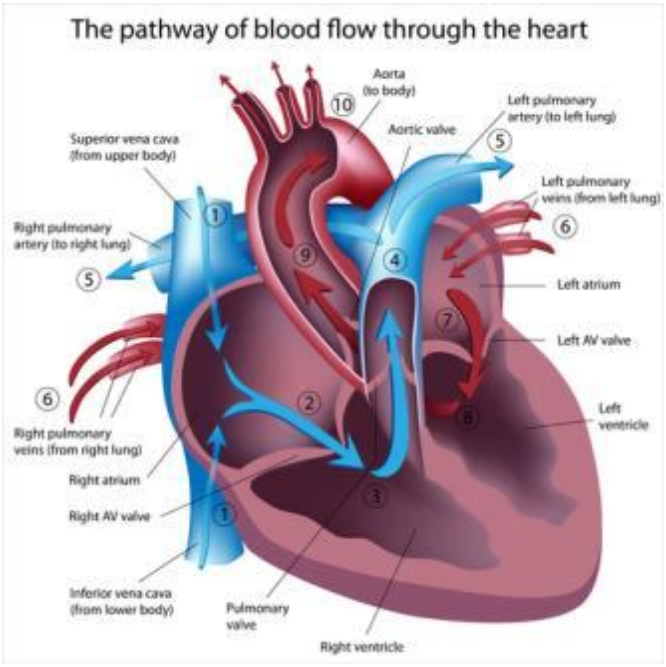
Heart Anatomy



Two Pumps

1. Right heart pumps blood to the lungs
2. Left heart pumps blood through the peripheral organs

Each of these two hearts is a pulsatile 2 chamber pump

Atrium: primer pump

Ventricle: primary pumping force

Types of Muscle

Skeletal Muscle

Voluntary (Somatic N.S.)

Striated tissue

Muscle fascicles

Muscle fibrils

Myofibrils

Fascia

Smooth Muscle

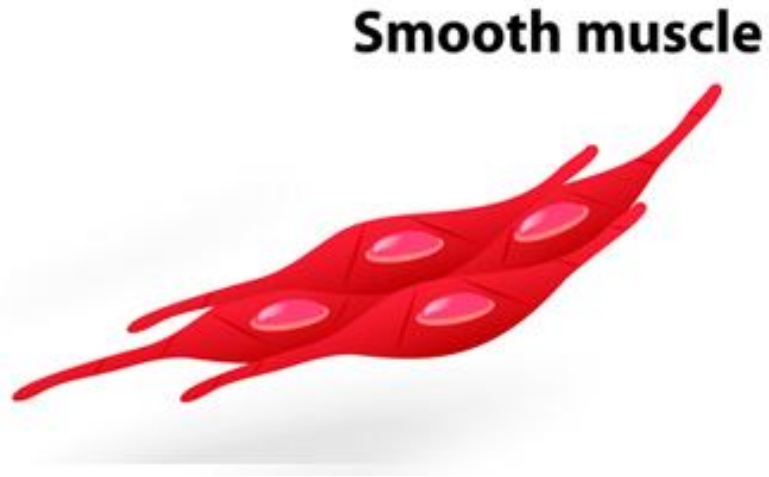
Involuntary (Autonomic N.S.)

Smooth tissue

Arteries

Veins

Intestines

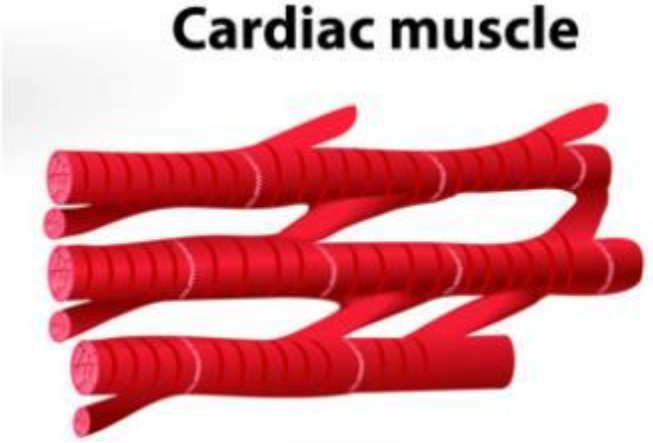


Third Type of Muscle: Cardiac

Striated muscle fibers interconnected by intercalated disks

Cardiac contains three types of muscle:

- Atrial
- Ventricular
- Specialized excitatory and conductive

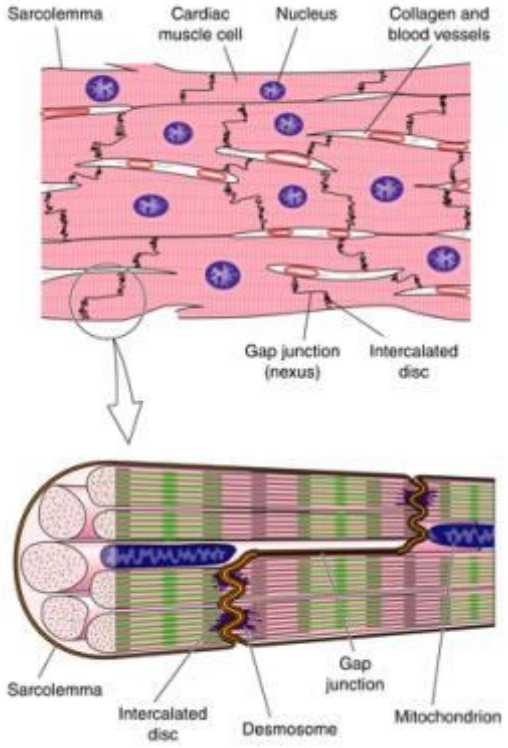


Can sustain a contraction (like smooth muscle)

Can contract quickly (like skeletal muscle)

Cardiac Muscle

Syncytium: A single cell or cytoplasmic mass containing several nuclei, formed by fusion of cells or by division of nuclei.



The Cardiac muscle is a syncytium of many heart muscle cells in which the cardiac cells are so interconnected that when one of these cells becomes excited, the action potential spreads to all of them, from cell to cell throughout the latticework interconnections.

Heart Valves

Atrioventricular Valves

- Tricuspid
- Mitral

Prevent backflow of blood from the ventricles to the atria during systole

Thin, filmy, require almost no backflow to close

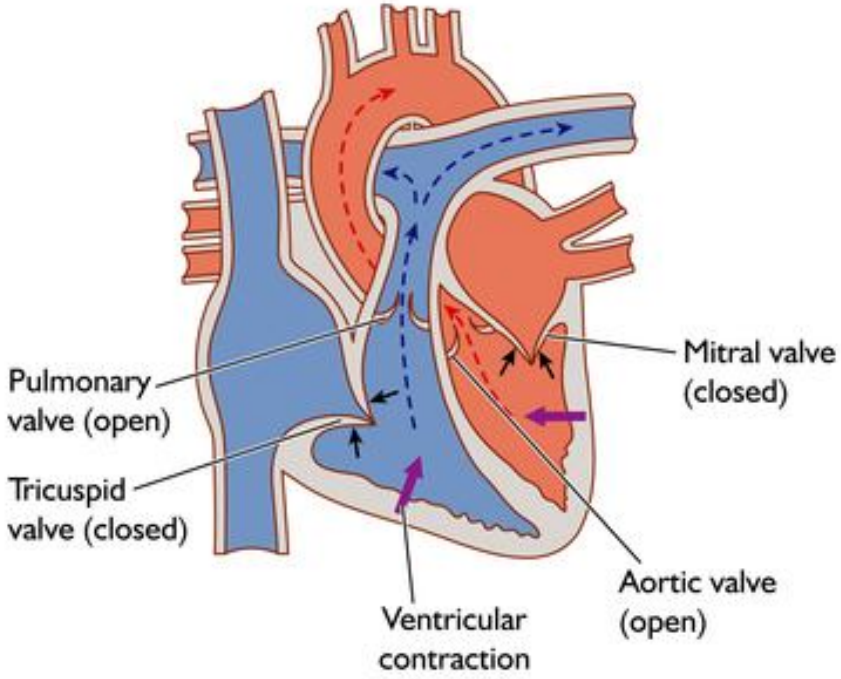
Semilunar Valves

- Aortic
- Pulmonic

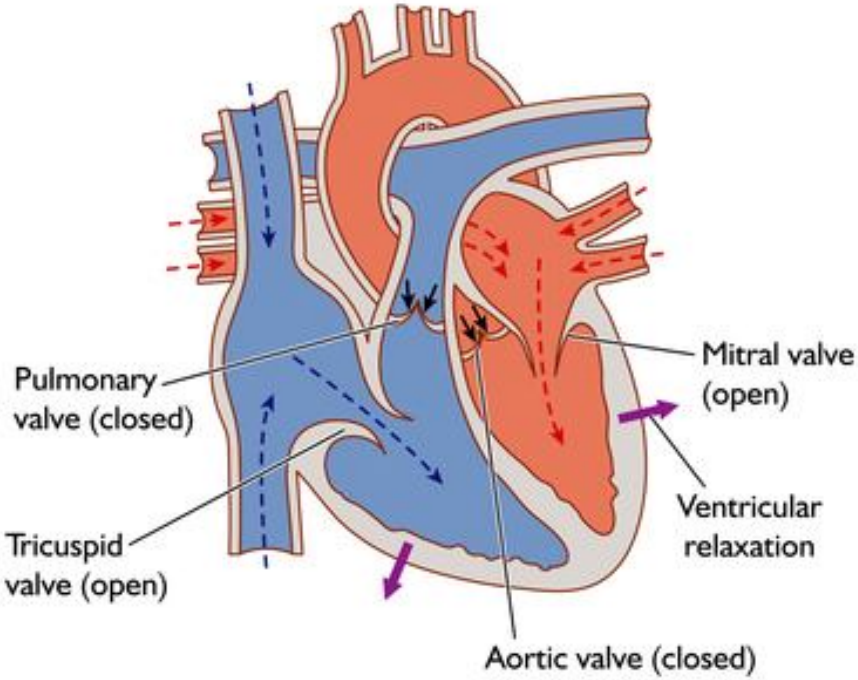
Prevent backflow from the aorta and the pulmonary arteries into the ventricles during diastole

Heavier, require rapid backflow to close

Heart Valves



The first heart tone (S1), is caused by the closure of the mitral and tricuspid valves at the beginning of ventricular contraction (systole)



The second heart tone (S2), is caused by the closure of the aortic and pulmonary valves at the end of ventricular systole

Heart Valves

A-V Valves

Lower pressure soft closure

Larger openings, therefore less pressure/velocity

Due to lower velocity, edges are subjected to less abrasive pressure

Supported by chordae tendineae

Semilunar Valves

High pressure causes snap close

Smaller openings therefore greater pressure/velocity

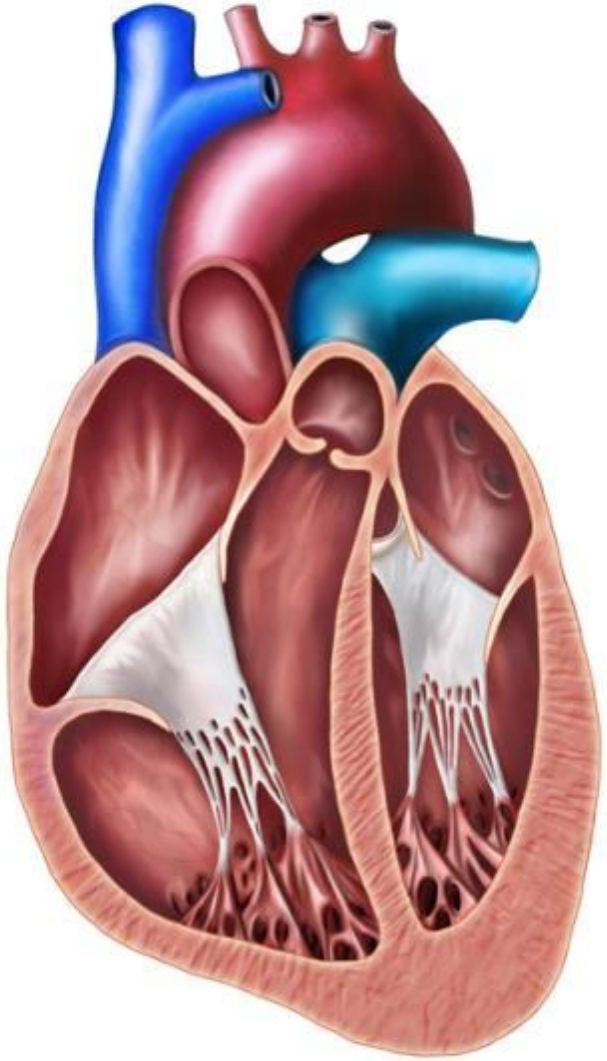
Due to rapid closure/ejection, edges are subjected to greater mechanical abrasion

No support chordae tendineae

Papillary Muscles and Chordae tendineae

Papillary muscles: attach to the vanes of the A-V valves by the chordae tendineae. These contract when the ventricles contract. They do not help the valves to close but instead pull the vanes of the valves inward toward the ventricles to prevent bulging during contraction.

Chordae tendineae: Thread like bands of fibrous tissue which attach on one end of the edges of the tricuspid and mitral valves of heart and on the other end to the papillary muscles (small muscles within the heart that serve to anchor the valves)



Arteries:

blood vessels that carry oxygenated blood away from the heart

Sympathetic autonomic nerves are well supplied through the arteries

Three layers of Endothelial lining

a. Tunica interna
b. Tunica media
c. Tunica externa

Arteries are elastic tissue to allow for distention during contraction (systole)

Veins

Contain same lining and layers as arteries but have less smooth muscle and connective tissue

- Walls thinner and less rigid than arteries
- Less pressure than arteries
- Holds more blood than arteries
- Almost 70% of the total blood volume held in veins
- Larger lumina (diameter) than arteries

Medium and large veins have one-way venous valves

Capillaries

Microscopic blood vessels that form a connection between arteries and veins

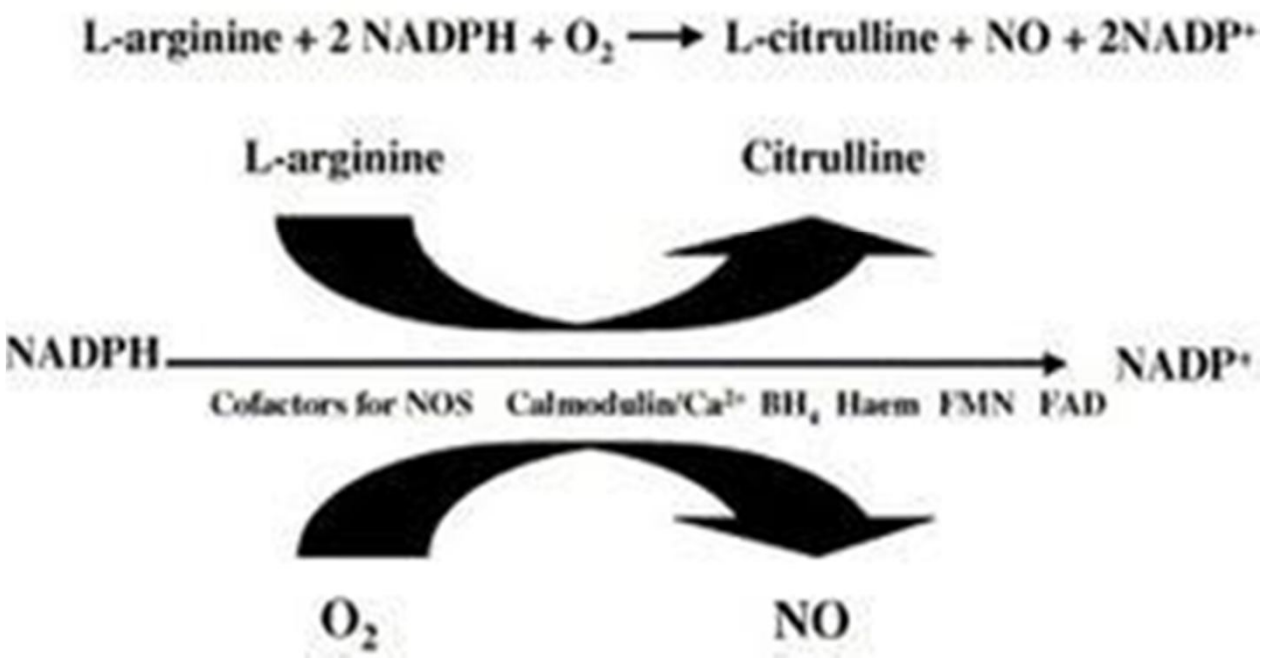
- Exchange nutrients and waste between blood and tissue cells
- Smallest and most numerous of blood vessels
- Walls are thin endothelium with a basement membrane
- Diameter so minute that RBCs must pass through single file
- The more metabolically active a body tissue, the richer its capillary distribution
- About 5% of blood supply in in the capillaries

Nitric Oxide: What is it and how does it affect heart function during exercise

1. Produced naturally by cells
2. Primarily produced by vascular endothelium in regulation of blood flow
3. Abnormal production can adversely affect blood flow and other vascular functions
4. Made by two amino acids: L-Arginine and Citrulline
5. Both come from food sources
   a. L-Arginine: tuna, shrimp, scallops, anchovies, pine nuts, almonds, pistachios, oats and wheat germ
   b. Citrulline: cucumbers, cantaloupe but primarily watermelon

Biosynthesis of Nitric Oxide

Overall reaction



Endurance

- Most important aspect of fitness
- Basically determines how strong heart is
- Affects both endurance and strength
- Cardiovascular vs. Muscular
  - Measured by muscles ability to resist fatigue
  - Measured by repetition

Endurance

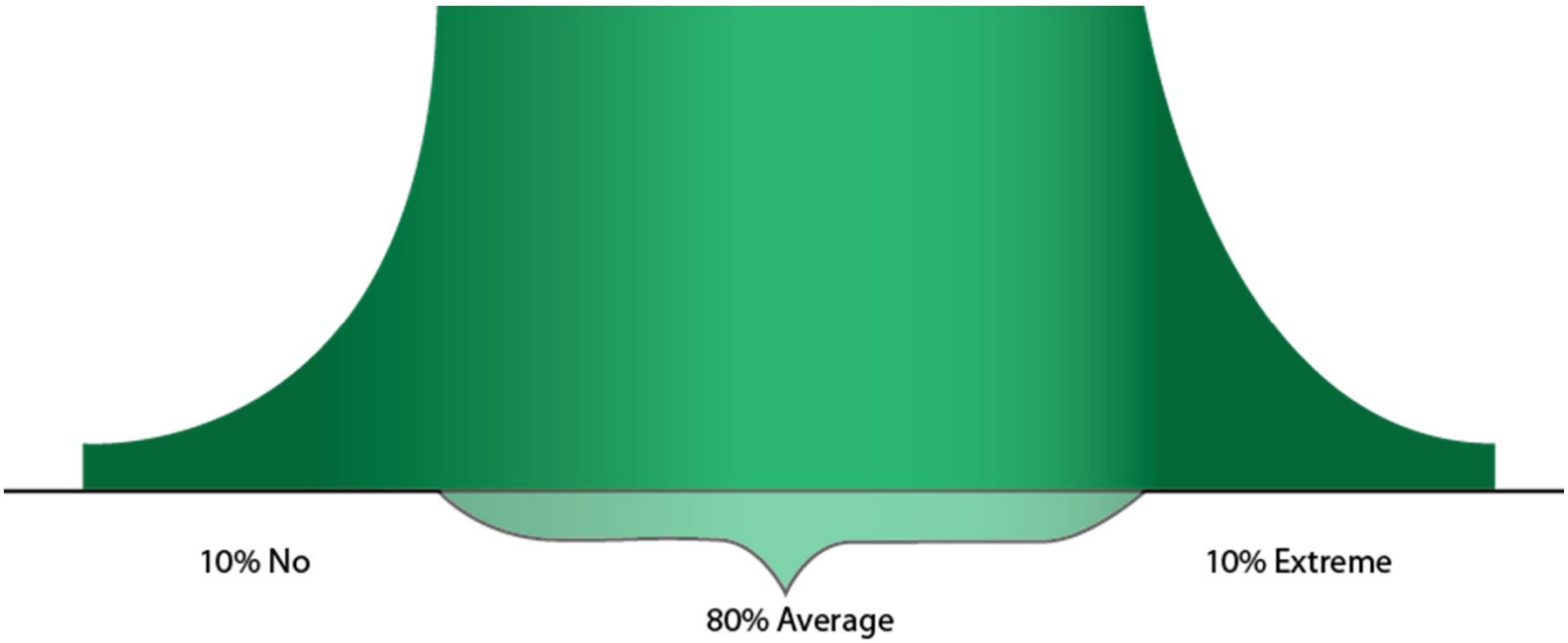
Cardiovascular

- Ability to pump blood throughout whole body
- Affects overall health
- Requires both aerobic and anaerobic exercise for optimal health

Muscular

- Ability to resist fatigue
- Ability for repetition
- Not muscular strength which determines the amount of power you can exert with a single effort

Endurance



Cardiovascular Endurance Exercise

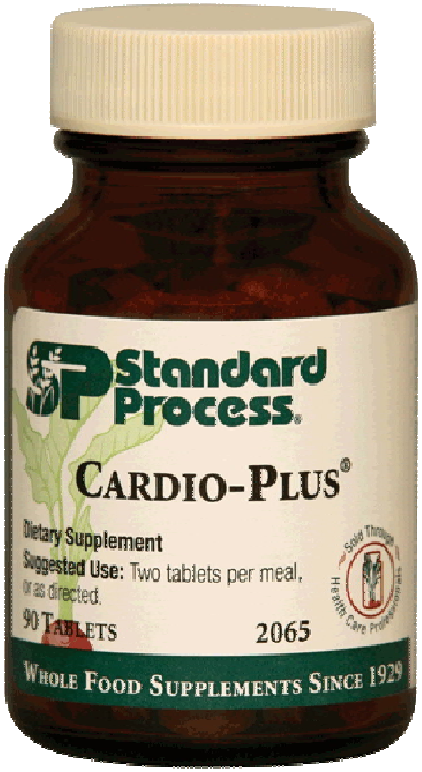
Requires working all your muscle fibers and their associated energy systems. Must use both aerobic and anaerobic.

Best: High-intensity interval training, Burst training, Surge training, etc.

Nutritional Support from Standard Process and MediHerb®

Cardio-Plus®

- Bovine heart PMG™ extract
- Bovine liver
- Choline bitartrate
- Calcium lactate
- Porcine stomach
- Bovine orchic extract
- *Tillandsia usneoides*
- Wheat germ
- Inositol
- Bovine spleen
- Ovine spleen
- Porcine brain
- Oat flour
- Bovine adrenal Cytosol ™ extract
- more



Cardio-Plus®

Cardio-Plus helps support the cardiovascular system.

- Supports the healthy functioning of the heart and other muscles
- Supports normal coronary blood flow
- Provides antioxidants
- Contains bovine heart PMG™ extract, which provides naturally occurring Coenzyme Q_{10}
- Support for increased oxygen demand during exercise
- Twin product to Myo-Plus®
- Contains a combination of key ingredients from Cataplex® G, Cataplex® E_2, Cardiotrophin PMG®, and Cataplex® C

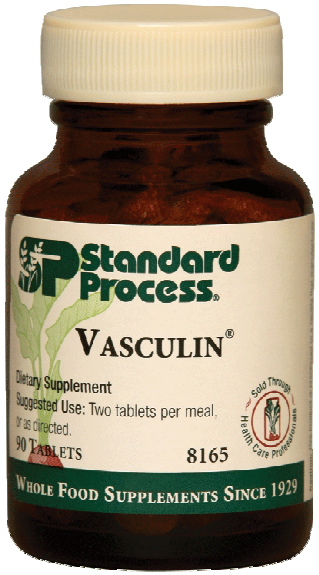
Vasculin®

- Bovine heart PMG™ extract
- Nutritional yeast
- Veal bone PMG™ extract
- Bovine liver
- Beet (root)
- Inositol
- Porcine duodenum
- Oat flour
- Defatted wheat (germ)
- Dried pea (vine) juice
- Ribonucleic acid
- Bovine adrenal Cytosol™ extract
- Dried alfalfa (whole part) juice
- Bovine spleen
- Ovine spleen
- more

Vasculin®

Vasculin is designed to support the cardiovascular system.

- Supports healthy functioning of the heart muscle
- Provides antioxidants
- Contains naturally occurring Coenzyme Q_{10}
- Promotes healthy heart connective tissue
- Contains a combination of key ingredients from Cardiotrophin PMG®, Cataplex® E, Cataplex® B, Cataplex® C



Hawthorn

Hawthorn contains oligomeric procyanidins, flavonoids (including vitexin-2-rhamnoside) and other compounds. This product is standardized to contain 6.01 mg of vitexin-2-rhamnoside to ensure optimal strength and quality. The substances in Hawthorn, particularly the oligomeric procyanidins and flavonoids, work together to:

- Support the healthy functioning of the heart muscle
- Help maintain normal blood pressure within a normal range
- Supports normal coronary blood flow
- Promote cardiovascular system health
- Provide antioxidant activity

Cod Liver Oil/Calamari/ Tuna Omega -3

Tuna Omega-3 Oil delivers essential omega-3 fatty acids (including DHA and EPA).

- Natural profile of fish oil, not concentrated
- Supports the body's natural inflammatory response
- Provides antioxidants
- DHA is important for proper fetal eye and brain development
- Supports the nutritional needs of the mother and baby during lactation
- Supports skin/hair health
- Supports emotional balance†
- Supportive but not conclusive research has shown that EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.

Product:	Cod Liver Oil	Calamari Omega-3 Liquid	Tuna Omega-3 Oil	Tuna Omega-3 Chewable	Linum B_6 (630 mg of flaxseed oil per serving)
Form	perle (3/day)	liquid (1 tsp./day)	perle (4/day)	perle (4/day)	perle (3/day)
Vitamin A	2000 IU	NA	NA	NA	NA
Vitamin D	90 IU	NA	NA	200 IU	NA
EPA/serving	210 mg	400 mg	120 mg	100 mg	NA
DHA/serving	300 mg	800 mg	600 mg	500 mg	NA
Alpha-linolenic acid/serving	NA	NA	NA	NA	~346 mg

Cataplex® E_2

- Bovine orchic extract
- Calcium lactate
- *Tillandsia usneoides*
- Bovine spleen
- Ovine spleen
- Inositol
- Bovine adrenal Cytosol™ extract
- Oat flour
- more

Cataplex® E_2

Cataplex® E_2 supports cellular health and general well-being.

- Supports normal cardiovascular health
- Provides antioxidants

Questions?