

Cardiovascular Facts



Compared to other systems, our cardiopulmonary vascular system is complex, consisting of a network of “lines and channels” that keep us alive. In this issue, we examine the roles of blood pressure, cholesterol metabolism, fat metabolism and water balance in keeping the body’s cardiopulmonary vascular system healthy and efficient. We look at how blood pressure is regulated and the function of cholesterol and fat in the body and the nutrients required for their proper metabolism. Finally, water’s role in the body is discussed, including how the body maintains a healthy water balance and the nutrients involved in this process.

BLOOD PRESSURE

This is the force exerted by blood as it presses against and attempts to stretch the walls of blood vessels, particularly the arteries.¹ Blood pressure’s numeric reading is determined primarily by three factors: the rate of the heartbeat, the strength of the heartbeat and the amount of blood that passes through the vessels. Resistance to the blood by the arteries is the result of the chemical properties of blood itself and the size of the arteries serving the blood.

STRESS

If stress, either internal or external, causes an increase in heartbeat, the following sequence occurs. The heart increases its beats per minute, pushing more blood through the ventricle into the arteries at a faster rate per minute, which increases the pressure on the walls of the arteries. This higher pressure is detected by the pressure-sensitive nerve cells in the arteries which send messages in the form of nerve impulses to the brain.

The brain responds to the message by telling the heart to slow down, normally decreasing the blood pressure and defusing the situation. The nervous system continually monitors blood pressure in this manner, in an effort to maintain a normal flow of blood.² This is called a feedback system.

FEEDBACK SYSTEM

This is any circular situation, or loop, in which information and the status of an operation are continually reported to a central control area. The manner in which the brain and nervous system interact is a good example of a feedback system. For this process to work properly, all its component systems must also be in proper working order. The blood vessels, the nerve cells and the brain’s neurotransmitters all must function together to maintain homeostasis of the blood pressure.

HOMEOSTASIS

Homeostasis (homeo = same; stasis = standing still) is defined as balance and harmony within the body. It is the condition created when each cell in the body functions in an internal environment, which remains within certain physiological limits. Homeostasis can be achieved when the body’s internal environment: (1) has the proper amounts of gases, nutrients, ions and water; (2) maintains the optimal internal temperature; and (3) has an optimal volume for the health of cells. When homeostasis is disturbed, it may affect health.³

NUTRITIONAL SUPPORT

In the complex operation of maintaining a normal cardiovascular system, the body needs a constant source of nutrients. Nutrients are essential for the proper functioning of the pressure-sensitive nerve cells, the muscles of the blood vessels and the neurotransmitters of the brain. Nutrients also are required in cholesterol metabolism and in maintaining proper water balance within the system.

Nutrients involved in normal blood pressure maintenance include:

- **Calcium**, a mineral important for neuromuscular excitability and the transmission of nerve impulses; Potassium, a mineral vital in the transmission of nerve impulses, an important action in the operation of normal blood pressure;
- **Vitamin D**, which helps the body utilize calcium efficiently;
- **Vitamin B6**, necessary for the proper functioning of the pressure-sensitive nerve cells and cardiac muscles involved in maintaining normal blood pressure; and
- **L-Taurine**, a free-form amino acid, known to affect several biological functions, including cardiac contractility.⁴

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CHOLESTEROL & FATS

Cholesterol is a fat. Fats, referred to medically and nutritionally as lipids, are essential for good health. Triglycerides, also known as neutral fats,⁵ are a source of insulation, protection, energy and energy storage molecules in the body. Phospholipids, fats that contain phosphorus, are the major lipid component of cell membranes and are found in high amounts in the brain and nerve tissues.⁶

THE IMPORTANCE OF FATS

A fat is a substance containing one or more fatty acids that is the principle form in which energy is stored in the body. A certain amount of fat is necessary in the diet to provide an adequate supply of essential fatty acids to the body and for the efficient absorption of fat-soluble vitamins from the intestine. A surplus of carbohydrates, proteins or fats in the diet is all converted to triglycerides and stored in fat tissue.⁷

METABOLISM OF FATS

Metabolism is the term used to describe the chemical and physical changes that take place within the body that enable it to grow and function.⁸ Fat metabolism is related to basal metabolism—the point at which the resting body breaks down nutrients and liberates energy.⁹ The proper metabolism of these compounds is an important aspect of good health.

METABOLISM OF FATS AND CHOLESTEROL

The healthy metabolism of fats, carbohydrates and proteins is one of the most important aspects of good health. There are two main types of metabolism: building up, known as anabolism; and breaking down, known as catabolism.

In anabolism, smaller molecules such as amino acids are converted into larger molecules, such as proteins. In catabolism the opposite is true. Larger molecules, such as glycogen, are broken down to smaller molecules, such as glucose.

Because it serves different functions in the body, cholesterol must be metabolized on a continual basis. It is a component of cell membranes. The adrenals use cholesterol as a precursor for steroid hormone production. In fact, all steroid hormones in the human body are derived from cholesterol. Cholesterol is also a precursor of vitamin D.

All growing animals, humans included, need adequate cholesterol because of the role it plays in basic nutritional well being of the body. Of course, an excess of cholesterol is not beneficial because it could upset the body's homeostasis.

UNSATURATED FATTY ACIDS

Most triglycerides contain more than one kind of fatty acid, polyunsaturated (PUFA), saturated and monosaturated, and most food fats are mixtures of different triglycerides.¹⁰

The body has a specific need for PUFA since they cannot be synthesized in the body.¹¹ Linoleic acid is the PUFA needed for healthy cell membranes and serves as a precursor for the formation of other fatty acids necessary within the body.¹² Arachidonic acid is the PUFA that is a major precursor for prostaglandins, a group of chemically active, hormone-like compounds that influence innumerable body processes.¹³

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NUTRITIONAL SUPPORT

Nutrients, such as those listed below, play a vital role in the metabolism of cholesterol and other fats as well as in the overall health of the body.

FOR CHOLESTEROL METABOLISM

- **Choline is important** to the metabolism and transport of fats and cholesterol and in the formation of lecithin.
- **Inositol** is used in the metabolism of fats and cholesterol and in the formation of lecithin.
- **Vitamin B6** is necessary for the metabolism of fats, carbohydrates and proteins. It also is necessary for healthy skin, the nerves and muscles, and aids in antibody formation and digestion.
- **Unsaturated fatty acids** are essential for growth.
- **Niacin** is another nutrient necessary for the metabolism of fats, carbohydrates and proteins.
- **Iodine** is an essential part of the hormones thyroxine and triiodothyronine.
- **Pantothenic acid** is necessary for growth, contributing to energy functions, and to the skin.
- **Magnesium** is essential for the normal metabolism of potassium and calcium.

FOR FAT METABOLISM

- **Choline** is involved in the transport of fats and cholesterol in the body. This B complex factor is involved in the formation of lecithin, used in fat metabolism by the liver.
- **Inositol** like choline, is a compound used in the metabolism of fats and cholesterol and in the formation of lecithin.
- **Vitamin B6** is necessary for the metabolism of fats, carbohydrates and proteins.
- **Potassium** is stored almost entirely within the lean tissues, where it serves as the dominant intracellular cation.
- **Iodine,** an essential part of the thyroid-produced hormones thyroxine and triiodothyronine, is an essential micronutrient for all animal species, including humans.¹⁴ These hormones are required for normal growth and development and for maintenance of a normal metabolic rate.
- **Chromium** is a mineral that is generally accepted as an essential nutrient that potentiates insulin action and thus influences carbohydrate, lipid, and protein metabolism.¹⁵

❖These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

“Mind is the builder; Body is the life. Think it – Achieve it.”

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WATER BALANCE

Water is the largest single component of the human body. It constitutes about 60% of body weight in young adult males and 50% in young adult females. Water constitutes 93% of plasma and 97% of interstitial fluid.

Intracellular water is the major component of cells, except fat cells, and constitutes 73% of the weight of metabolically active cells of muscle and viscera.

Since distribution of total body water is based on the concentration levels of sodium and potassium it is wise to maintain proper balance. This also helps in maintaining proper acid-alkaline balance. This is important for good health.

Too much sodium creates lowered potassium, and the reverse is also true. Too much of either mineral will create an imbalance in the distribution of fluids between the cellular walls. Sodium is thought to cause high blood pressure. The causes of hypertension formerly were not definitively known; indirect evidence suggests, however, that several aspects of nutrition, especially the ingestion of excessive amounts of sodium, may be involved.¹⁶

Potassium is stored almost entirely within the lean tissues, where it helps maintain fluid volume.¹⁷

REFERENCES

^{1,2}Tortora, Gerard J. & Grabowski, Sandra R. (1993) *Principles of Anatomy and Physiology* (7th ed.). New York: Harper Collins College Publishers, 11.

³Tortora, 9-10.

⁴Shils, Maurice E., M.D., & Young, Vernon R., Ph.D. (1988) *Modern Nutrition in Health and Disease* (7th ed.). Philadelphia: Lea & Febiger, 466.

^{5,6,7}Tortora, 42-43.

⁸Tortora, 823.

⁹Tortora, 853.

^{10,11,12,13}Sutor, Carol Jean West, M.S., R.D., & Crowley, Merrily Forbes, R.N., M.S. (1984) *Nutrition — Principles and Applications in Health Promotion* (2nd ed.). Philadelphia: J.B. Lippincott Co., 37.

¹⁴National Research Council. (1992). *Recommended Dietary Allowances* (10th ed.) Washington, D.C.: National Academy Press, 255.

¹⁵*Recommended Dietary Allowances*, 213.

¹⁶Page, David M., M.D., M.P.H. (1988) *Clinical Nutrition* (2nd ed.) Washington, D. C.: C. V. Mosby Co. Publishers, 203.

¹⁷Tortora, 910.

ABOUT MICHAEL'S® PRODUCTS

Seasoned health food shoppers already know that a combination of nutrients is always more effective than taking single nutrients. Add in the cost savings of taking combinations, with herbs included, and the math proves to be more efficient, too. Combinations increase assimilation and reduce the amount of binders and fillers. That's why MICHAEL'S® created the FACTORS OF LIFE® basic nutritional support programs. Your life is busy enough as it is. Why worry when synergistically complete nutrition is conveniently at hand?

MICHAEL'S® products include a best if used by date to ensure freshness. Michael personally guarantees purity and specified content. Each product is hypoallergenic with no artificial colors or flavors. The formulas contain cold-pressed, wild-crafted or organically grown (when available) herbs to ensure the highest quality.

Additionally there is no dairy, wheat, yeast or any artificial ingredients in any of our supplements. These high-potency, all-natural products are even manufactured with food-grade fillers, binders and enteric coatings. Most are suitable for vegetarians and those who follow a kosher diet.

Every product is double safety-sealed with an outer shrink wrap and inner-bottle freshness seal. As is normal in all-natural products, some color and texture variations may occur but this does not affect product purity, potency or assimilation.

MICHAEL'S® NATUROPATHIC PROGRAMS comprise fundamental basics and the newest developments along with the finest ingredients and the most effective formulations for your total healthcare. Above all else, due to our innovative nutritional approach to supplementation, every MICHAEL'S® program is designed to produce results you can feel.

MICHAEL'S® CHOLESTEROL METABOLISM FACTORS™ and MICHAEL'S® FAT METABOLISM FACTORS™ are ideal, synergistically complete formulas for providing nutritional support to the process of metabolizing foods. These products contain nutrients and other dietary factors, and are complemented by a variety of herbs, each known for specific healthful attributes.

MICHAEL'S® FAT METABOLISM FACTORS™ provides nutrients important in the metabolism of fats plus essential fatty acids to balance a diet full of highly processed, nutrient-stripped foods.

MICHAEL'S® WATER BALANCE FACTORS™ is a synergistic combination of Vitamin B6 and potassium complemented by herbs. The herbs corn silk, uva ursi and hydrangea are well known for their healthful benefits.

MICHAEL'S® BLOOD PRESSURE FACTORS™ contains nutrients essential for the homeostasis of blood pressure, complemented by herbs, including cayenne.



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MICHAEL'S® CARDIO SUPPORT™ FORMULAS

Blood Pressure Factors™

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin D3 (as Cholecalciferol) (from Lanolin)	1.25 mcg	6%
Vitamin B6 (as Pyridoxine Hydrochloride)	100 mg	5882%
Calcium (as Dicalcium Phosphate and Calcium Amino Acid Chelate)	200 mg	15%
Magnesium (as Magnesium Amino Acid Chelate)	30 mg	7%
Manganese (as Manganese Amino Acid Chelate)	11 mg	478%
Potassium (as Potassium Amino Acid Chelate)	210 mg	4%

Proprietary Blend	1.73 g (1725 mg)	*
Hawthorn Berry (<i>Crataegus oxyacantha</i>), Apple Pectin, Garlic Bulb Powder (<i>Allium sativum</i>), Hops Flower (<i>Humulus lupulus</i>), Valerian Root (<i>Valeriana officinalis</i>), Taurine, Cayenne Fruit (<i>Capsicum annum</i>) and Celery Seed (<i>Apium graveolens</i>)		

*Daily Value not established.

OTHER INGREDIENTS: Stearic Acid, Inulin (from Agave), Vegetable Magnesium Stearate, Silicon Dioxide, and Pharmaceutical Glaze (Shellac, Povidone).

Cholesterol Metabolism Factors™

Supplement Facts

Serving Size: Six (6) Tablets

Amount Per Serving	% Daily Value	
Vitamin D3 (as Cholecalciferol) (from Lanolin)	9 mcg	45%
Niacin (as Niacinamide)	180 mg	1125%
Vitamin B6 (as Pyridoxine Hydrochloride)	90 mg	5294%
Choline (as Choline Bitartrate)	192 mg	35%
Magnesium (as Magnesium Amino Acid Chelate)	180 mg	43%

Proprietary Blend	2.2 g (2237.8 mg)	*
Whole Oat Bran (from Nutrim® Oat Bran**), Inositol, Organic Apple Fruit, Phytosterol Blend (from Pine Tree) (70% Beta Sitosterol, 15% Campesterol, 2% Stigmasterol), Organic Ginger Root (<i>Zingiber officinale</i>), Lecithin (from Sunflower), Milk Thistle Extract (<i>Silybum marianum</i>) (80% Silymarin), Pantethine (from Pantothenic Acid), Organic Butcher's Broom Root (<i>Ruscus aculeatus</i>) and DHA† (Docosahexaenoic Acid) from Algae Oil Complex Powder		

*Daily Value not established.

OTHER INGREDIENTS: Microcrystalline Cellulose, Stearic Acid, Dicalcium Phosphate, Modified Cellulose Gum, Vegetable Magnesium Stearate, Silicon Dioxide and Pharmaceutical Glaze (Shellac, Povidone).

†Contains milk and soy.

**Nutrim® is a registered trademark of VDF FutureCeuticals, Inc. U.S. Patent No. 6060519.



Fat Metabolism Factors™

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin B6 (as Pyridoxine Hydrochloride)	100 mg	5882%
Choline (as Choline Bitartrate)	200 mcg	36%
Iodine (from Kelp)	225 mcg	150%
Chromium (as Chromium Polynicotinate**)	200 mcg	571%
Potassium (as Potassium Amino Acid Chelate)	99 mg	2%

Proprietary Blend	1 g (1000 mg)	*
Lecithin (from Sunflower), Inositol, Guggul Gum*** resin (from <i>Commiphora mukul</i>) (2.5% Guggulsterones) and L-Phenylalanine		

*Daily Value not established.

OTHER INGREDIENTS: Dicalcium Phosphate, Microcrystalline Cellulose, Stearic Acid, Modified Cellulose Gum, Vegetable Magnesium Stearate, Silicon Dioxide and Clear Coating (Hydroxypropyl Methylcellulose).

**ChromeMate® is a Trademark of InterHealth Nutraceuticals, Inc.

***Gugulipid® is a Trademark of Sabinsa Corp.

CAUTION: Contains phenylalanine and should be avoided by phenylketonurics and women who are pregnant or lactating. Keep out of reach of children.

Water Balance Factors™

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin B6 (as Pyridoxine Hydrochloride)	150 mg	8824%
Potassium (as Potassium Amino Acid Chelate)	210 mg	4%

Proprietary Blend	2.7 g (2700 mg)	*
Corn Silk (Styles and Stigma) (<i>Zea mays</i>), Buchu Leaf (<i>Barosma betulina</i>), American Elder Flower (<i>Sambucus nigra canadensis</i>), Hydrangea Root (<i>Hydrangea arborescens</i>), Uva Ursi Leaf (<i>Arctostaphylos uva ursi</i>), Parsley Leaf (<i>Petroselinum crispum</i>) and Watermelon Seed (<i>Citrullus vulgaris</i>)		

*Daily Value not established.

OTHER INGREDIENTS: Stearic Acid, Dicalcium Phosphate, Microcrystalline Cellulose, Modified Cellulose Gum, Vegetable Magnesium Stearate, Silicon Dioxide and Pharmaceutical Glaze (Shellac, Povidone).

CAUTION: Not to be taken by pregnant or lactating women. Keep out of reach of children.

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