



# PROSTATE FACTORS™

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## THE PROSTATE

The prostate gland is the largest accessory gland of the male reproductive tract. It is located directly under the urinary bladder and surrounds the superior portion of the urethra from its origin in the bladder. The prostate is similar in size and texture to a chestnut and is composed of muscular and glandular tissues. It is actually a conglomerate of 30 to 50 small glands, from which 16 to 32 excretory ducts open independently into the urethra.<sup>1</sup> These glandular units are surrounded by fibromuscular tissue which contracts during seminal ejaculation. The gland is filled with nerve fibers, including sensory nerve endings, which are scattered in the connective tissue.

The prostate slowly increases in size from birth to puberty, then grows at an increased pace, attaining a stable size during the third decade of life. It remains stable in size until about the age of 45, when further enlargement may occur. For reasons not yet completely understood, the prostate can frequently increase in size, at an older age.

## THE FUNCTION OF THE PROSTATE

The function of the prostate is to secrete a milky, slightly acidic fluid into the prostatic urethra, through many prostatic ducts. The urethra is the terminal canal for the male reproductive and urinary systems and serves as a passageway for the different fluids which interact to form semen, the male reproductive fluid. Prostatic fluid contains enzymes which balance the acid levels of the interacting fluids and help in the movement function of sperm, the transporter of life from the male to the female.

Prostatic fluid contains citric acid, alkaline phosphatase, and various proteolytic enzymes, such as diastases, clotting enzymes, and fibrinolysin.<sup>2</sup> The

clotting enzymes play a role in the action of fibrinolysin, contributed by the seminal vesicles to coagulate semen shortly before ejaculation. Fibrinolysin functions in the prostate by balancing the clotting enzymes, providing motility to the sperm. Prostatic secretions account for about 25% of the volume of sperm and allow for its motility and viability.<sup>3</sup>

There is a good deal of research being conducted on the prostate, yet it remains one of the least understood structures in the body. One area of study concentrates on the major function of the gland, the production and the secretion of citrates. Citrates are part of the circular chain of cellular respiration, known as the *Kreb's Cycle*.

The *Kreb's Cycle* is the process in which a sequence of enzymatic reactions involving the metabolism of carbon chains of sugars, fatty acids, and amino acids to yield carbon dioxide, water, and high-energy phosphate bonds. The *Kreb's cycle* provides a major source of adenosine triphosphate energy and produces molecules that are the starting point for a number of vital metabolic pathways, including amino acid synthesis. It also releases carbon dioxide from the cells, for respiratory expulsion from the lungs.

Evidence suggests that citrate production occurs in the secretory epithelial cells and that prostatic citrate is an end product of metabolism. It is likely that the intracellular citrate exists in three forms: the major portion being citrate anions, some citrate in the form of citric acid, and some portion being chelated by the divalent cations magnesium, calcium, and zinc.

Interestingly, correlations exist between citrate production and zinc accumulation in the human prostate. For example, it is known that the hormone testosterone stimulates zinc uptake and

concentration in prostate, which parallels its stimulation of citrate accumulation and secretion.<sup>4</sup> Also, both zinc and citrate levels are increased in BPH and markedly decreased in CA.<sup>5</sup> However, studies are inconsistent in results of the citrate-zinc relationship, as the accumulation of zinc varies greatly among different species.<sup>6</sup>

## NUTRIENTS FOR THE PROSTATE

With the evidence of magnesium, calcium, and zinc in the process of citrate production, it might be important to understand the role these minerals play in the prostate and the reproductive system.

**ZINC.** Zinc is a component of semen and it is thought that at least 1 mg of zinc is excreted by one ejaculum. There are major losses of zinc in the intestinal tract. Zinc plays an important role in the processes of fertility, reproduction and sexual maturation.<sup>7</sup> At a biochemical level, zinc's primary role is as a component of zinc metalloenzymes. Many enzymes of the cell nucleus involved with genetic information transfer, protein synthesis, and cellular replication are metalloenzymes of zinc. Zinc also participates in RNA metabolism. Prostatic fluids and ocular tissues contain the highest levels of zinc in the body.<sup>8</sup> Citric acid is thought to be a binding element of zinc. Zinc also plays a role in enzymatic reaction, and more than 120 zinc enzymes have been identified in plant and animal species, with additional enzymes falling under the category of "zinc dependent." In normal cells, lack of zinc seems to prevent individual cells from acquiring the groups of proteins that must be synthesized during each cell cycle before the onset of DNA synthesis in the S phase.<sup>9</sup>

**MAGNESIUM.** Magnesium cations are indicated in citrate, but there is more to this mineral than citrate production. Magnesium is important in neuromuscular

activity, serves as a binding messenger of RNA and is involved in the synthesis of DNA. Magnesium is important in the process of muscle contractility, important to the prostate because the muscular contractility precedes the secretion of prostatic fluid. Magnesium also serves as an important part of the body's process of vitamin D absorption and together with vitamin D, plays a role in the body's absorption and use of citrates, salt formed by citric acids, important in the Krebs cycle of respiration. Magnesium is also a component in calcium homeostasis and numerous enzymatic transactions of ATP energy metabolism within the Krebs Cycle.

**CALCIUM** This essential mineral serves many purposes within the body. Within the Krebs cycle, the cation calcium is found, as a component of citrate. Calcium, found in quantity in bones and teeth, is also found in membrane structures and cellular cement structures. It is also an activator of several enzymes involved in neuromuscular function.<sup>10</sup>

**MICHAEL'S® PROSTATE FACTORS™** contains additional vitamins and amino acids important to the body.

**VITAMIN E.** Vitamin E protects unsaturated fatty acids from oxidation.

**PANTOTHENIC ACID** is an important part of the Krebs Cycle, serving as a constituent of the coenzyme A, which is essential for the transfer of pyruvic acid into the cycle. It also serves in the conversion of lipids and amino acids into glucose.

**GLYCINE** is involved in muscle cell metabolism and is important to the Krebs Cycle. It is converted in the body to creatine, which stores high energy phosphate in muscles and serves to maintain adequate amounts of ATP (adenosine triphosphate), the source of energy for muscle contraction.

**ALANINE** is another amino acid which participates in the Krebs energy production cycle. The amine enters the cycle for oxidation with the acetyl CoA, where it may be used to produce ATP or to synthesize new proteins for body growth and repair.

## HOW TO OBTAIN NUTRITIONAL SUPPORT

**MICHAEL'S® PROSTATE FACTORS™** contains nutrients which are essential for the various functions and activities of the prostate, including the important process of energy production in the Krebs Cycle. **MICHAEL'S® PROSTATE FACTORS™** contains zinc, magnesium, and calcium, and is complemented with Pygeum and Saw Palmetto Berries, both standardized to contain 90-95% phytosterols.

**MICHAEL'S® PROSTATE FACTORS™** is only one of the **FACTORS OF LIFE®**, synergistic formulations which provide nutritional support for various structures and functions of the body. **FACTORS OF LIFE®** are formulated to produce a synergistically-complete supplement and are free of anything artificial.

### Sources Cited:

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## Prostate Factors™

### Supplement Facts

Serving Size: One (1) Tablet

Amount Per Serving	% Daily Value
Vitamin E (as d-alpha Tocopheryl Succinate) .....	25 IU ..... 83%
Niacinamide (as Nicotinamide) .....	3 mg ..... 13%
Pantothenic Acid (as Calcium Pantothenate) .....	3 mg ..... 25%
Magnesium (as Magnesium Amino Acid Chelate) .....	25 mg ..... 6%
Zinc (as zinc citrate)** .....	5 mg ..... 33%
Essential Fatty Acids (from Flax Seed) .....	125 mg ..... *
(7% gamma Linolenic Acid, 64% Linoleic Acid)	
Bee Pollen .....	125 mg ..... *
Echinacea Root (Echinacea angustifolia) .....	75 mg ..... *
Glycine (as L-glycine) .....	75 mg ..... *
Alanine (as L-alanine) .....	75 mg ..... *
Glutamic Acid (as L-glutamic Acid) .....	75 mg ..... *
Parsley Leaf (Petroselinum sativum) .....	75 mg ..... *
Pygeum (Bark)(Pygeum africanum) .....	63 mg ..... *
1% Phytosterols, 0.6 mg	
Saw Palmetto (Fruit)(Serenoa serrulata) .....	63 mg ..... *
5% Fatty Acid, 3.15 mg	
Gravel Root (Eupatorium purpureum) .....	50 mg ..... *

\*Daily Value not established.

\*\*A Trademark of InterHealth Co.

OTHER INGREDIENTS: Dicalcium Phosphate, Calcium Amino Acid Chelate, Microcrystalline Cellulose, Stearic Acid, Magnesium Stearate and Croscarmellose Sodium.

