Joints, Tendons & Muscles—hops, magnesium, glucosamine, MSM, chondroitin, antioxidants, EPA/DHA, calcium

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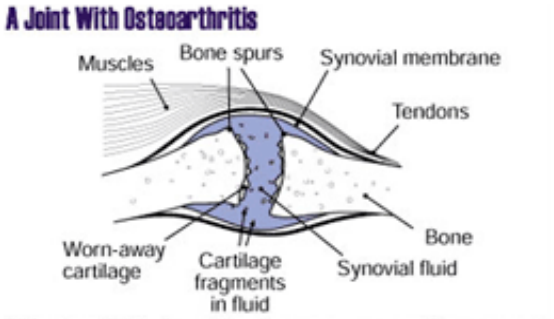
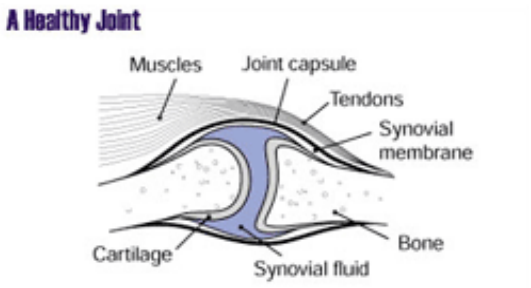
OSTEOARTHRITIS

An estimated 27 million adults in the United States live with osteoarthritis—the most common type of arthritis. Osteoarthritis, also called degenerative joint disease, is caused by the breakdown of cartilage, which is the connective tissue that cushions the ends of bones within the joint. Often called wear-and-tear arthritis, osteoarthritis is characterized by pain, joint damage, and limited motion, swelling, and deformity. The disease generally occurs later in life, and most commonly affects the hands and large weight-bearing joints, such as the knees. Age, female gender, and obesity are risk factors for this condition.



With osteoarthritis, the cartilage becomes worn away. Spurs grow out from the edge of the bone, and synovial fluid increases. Altogether, the joint feels stiff and sore.



In a healthy joint, the ends of bones are encased in smooth cartilage. Together, they are protected by a joint capsule lined with a synovial membrane that produces synovial fluid. The capsule and fluid protect the cartilage, muscles, and connective tissues.

Painful joints often have the following characteristics:-

- Poor lubrication due to low hyaluronic acid levels,
- Painful movements due to an increased level of inflammatory substances called prostaglandins,
- Reduced cartilage depth on joint load bearing surfaces.

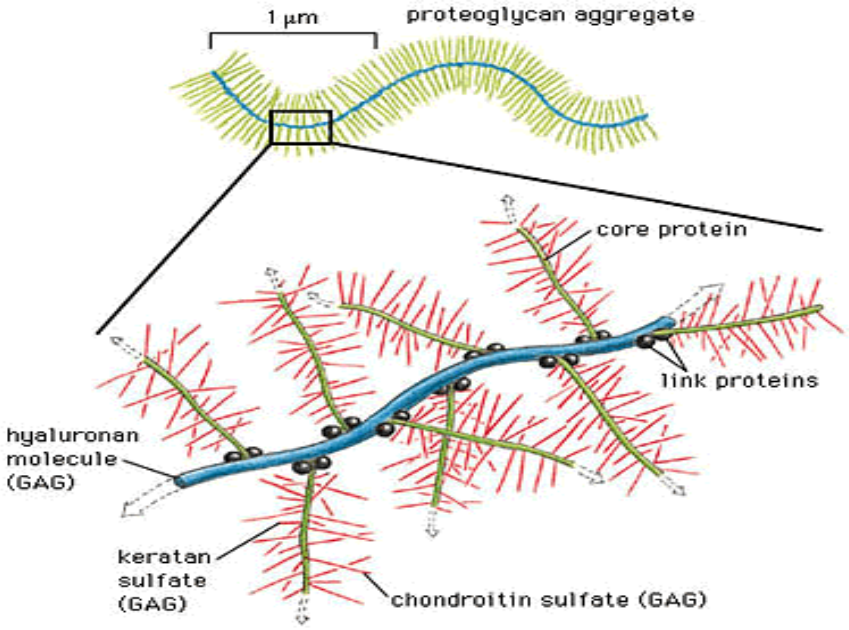
What are glucosamine and chondroitin sulfate?

Glucosamine and chondroitin sulfate are two natural substances found in the cells of normal cartilage and around in the fluid that baths the joints. Cartilage acts as a cushion between the bones in a joint. Inside your joints, cartilage undergoes a constant process of breakdown and repair. However, to be properly repaired, the building blocks of cartilage must be present and available.

Glucosamine is an amino sugar that the body produces and distributes in cartilage and other connective tissue. Glucosamine is a precursor building block to a larger molecule called a **Glycosaminoglycan** (GAG's) - this molecule is used in the formation and repair of **Proteoglycans** - the larger aggregate of connective tissue and cartilage. Proteoglycans are a type of molecule found in the connective tissue of the body. Connective tissue is fibrous tissue that provides support for other body structures. Proteoglycans are core proteins with chains of polysaccharides, a kind of carbohydrate, attached that act as the backbone for connective tissue. The specific type of polysaccharides attached to proteoglycans are called Glycosaminoglycans (GAGs). GAGs are highly negatively charged molecules that extend perpendicularly from the core in a brush-like conformation that creates high viscosity to the solution. GAGs are located primarily on the surface of cells or in the extracellular matrix the material between cells that provides structural support. Unlike in other body tissues, the extracellular matrix (ECM)is the most important part of connective tissue. Along with the high viscosity of GAGs comes low compressibility, which makes these molecules ideal for a lubricating fluid in the joints. The GAG chains of a proteoglycan may be made of chondroitin sulfate, dermatan sulfate, heparin sulfate, heparan sulfate, or keratan sulfate.

Chondroitin is the most abundant glycosaminoglycan in cartilage and is responsible for the resiliency of cartilage, that helps cartilage retain water. Chondroitin gives cartilage elasticity and is believed to prevent the destruction of cartilage by enzymes.

Hyaluronic is unique among the GAGs in that it does not contain any sulfate and is not found covalently attached to proteins as a proteoglycan. It is, however, a component of non-covalently formed complexes with proteoglycans in the ECM. Hyaluronic acid polymers are very large and can displace a large volume of water. This property makes them excellent lubricators and shock absorbers.



Viscosupplementation is a term which implies that treatment can achieve the following:-

- Improve the viscosity of the synovial (lubricating) fluid.
- Relieve chronic pain and swelling within the joint.
- Increase the articular cartilage depth on load bearing surfaces.
- Help improve arthritis pain control and consumption of pain relieving drugs

Viscosupplementation can be achieved by two methods:-

- Injecting Hyaluronic Acid into the affected joint.
- Taking oral supplements like Glucosamine, Chondroitin and MSM (Methyl Sulphonyl Methane).

Nutrient protocols for acute joint trauma: Sprains, strains and dislocations include proteolytic enzymes, vitamins, anti-inflammatory agents, antioxidants and glycosaminoglycan treatment. Strains resulting from sudden overload can cause acute inflammatory events characterized by pain, muscle spasm, loss of strength and loss of function. Two phases are necessary for a protocol and they include:

Phase 1: Start as soon as possible after injury, continue for 1 week.

1.	Protease mixture (bromelain)	500mg QID empty stomach
2.	Vitamin C (ascorbate)	4000mg (1000mg QID)
3.	Bioflavenoids (citrus)	2000mg (500mg QID)
4.	Curcumin	2000mg (500mg QID)
5.	Multiple vitamin/mineral mixture	
6.	Antioxidant mixture (Coenzyme Q10)	20mg TID

Phase 2: If extensive joint damage has occurred, and healing has not progressed by 1 week post-injury, then the following protocol can be started at 1 week post-injury, and continued until adequate healing has occurred.

1.	Vitamin C (Acerbates)	4000mg (1000mg QID)
2.	Bioflavonoid	2000mg (500mg QID)
3.	Vitamin B1 (thiamin)	1000mg (500mg BID)
4.	Pantothenate	2000mg (500mg QID)
5.	Multiple vitamin/mineral	
6.	Glucosamine salts	2000mg (500mg QID)
7.	Chondroitin sulfates	2000mg (500mg QID)
8.	Antioxidant mixture (Coenzyme Q10)	20mg TID

As can be seen by the above discussion, nutrition can be applied to injury rehabilitation and treatment and will not interfere with any medications a patient might be taking, such as anti-inflammatory or analgesics. Both dietary considerations and nutritional supplementation offer a powerful means to

enhance healing and decrease time for healing of musculoskeletal conditions common to athletes as well as the general population.

Glucosamine and Chondroitin

Glucosamine and chondroitin are molecules that make up the type of cartilage found within joints. Since glucosamine is a precursor for glycosaminoglycans, and glycosaminoglycans are a major component of joint cartilage, supplemental glucosamine may help to prevent cartilage degeneration and treat arthritis. The theory behind using the glucosamine and chondroitin joint supplements is that more of the cartilage building blocks will be available for cartilage repair. Glucosamine thickens the synovial fluid in your joints so that it can absorb more friction and cushion the joints, meaning more lubrication and less discomfort. Over time, the amount of Glucosamine in your body decreases to the point where the amount your body synthesizes is far less than the amount it needs for joint health.

Treatment with these joint supplements is based on the theory that oral consumption of glucosamine and chondroitin may increase the rate of formation of new cartilage by providing more of the necessary building blocks. In the United States, glucosamine and chondroitin sulfate are sold as dietary supplements, which are regulated as foods rather than drugs. Glucosamine and chondroitin are available in tablet, capsule, powder, or liquid form and are often taken in combination with each other or in combination with other dietary supplements. Glucosamine may be taken separately as a dietary supplement for joints.

Glucosamine, also called chitosamine, which is a natural substance that is found in the covering of shellfish. It is available in different forms, including glucosamine hydrochloride, N-acetyl-glucosamine (NAG), and glucosamine sulfate, which is a combination of glucosamine and mineral salt. The body absorbs glucosamine well. Chondroitin can come from natural sources, such as shark or bovine cartilage, or it can be made in a lab. Chondroitin is also known as chondroitin sulfate, chondroitin sulfuric acid. Chondroitin sulfate is a combination of chondroitin and mineral salt.

Research indicates that taking 1,500 mg of glucosamine and 1,200 mg of chondroitin daily can help improve joint function and give joints what they need to stay healthy. Glucosamine is sometimes combined with methylsulfonylmethane, or MSM.

Vitamin C

Vitamin C is responsible for helping to build and maintain all living tissues and strengthening our immune system and especially important in wound-healing and in preventing bleeding from capillaries. Vitamin C is essential to prevent free radical damage, which is accelerated after injuries, sickness and the trauma of weight training, thus enhancing recovery and growth. It is also essential in helping to repair the connective tissue. Ascorbic Acid is involved with amino acid metabolism, especially the formation of Collagen. Collagen is the primary constituent of connective tissue, the stuff that holds your bones and muscles together. This may not seem important, but if you are active, get injured easily or physically train often or lift heavier weights, the stress you put on your structure becomes tremendous. If your connective tissue is not as healthy and strong as it should be, risk of injury dramatically increases.

Vitamin C takes the cholesterol that you digest from your body and transformation it into a natural steroidal hormone that the body uses for gaining muscle mass – very important with increasing your basal metabolic rate. Ascorbic acid also assists in the formation and release of steroid hormones, including the anabolic hormone testosterone. It is a natural process in your body that helps build muscles and helps in the recovery of your muscles.

Third, vitamin C helps in the absorption of Iron. Iron is necessary to help Oxygen bind to hemoglobin in blood. Without adequate oxygen transportation in blood, muscles are robbed of precious oxygen and energy and performance is greatly reduced.

Finally, vitamin C is perhaps the most water soluble vitamin there is. In other words, it diffuses very rapidly in water. Since a muscle cell is mostly water, the more muscular an athlete becomes, the more vitamin C disperses and the lower the concentration of this critical substance becomes in body tissues. So vitamin C requirements are greatly increased for those that weight train and exercise on a structured diet. The RDA is a mere 60mg's which in my opinion is way too low for a normal person let alone a physically active individual or bodybuilder or someone trying to lose weight. Many Doctors and nutritionists also think that 60mg's is too low and tend to lean towards suggestion *1000-3000 mg's* is a range to experimenting with Vitamin C amounts. You could try a little more and see if you notice and difference in recovery. Remember, Vitamin C is water soluble, so any extra will just wash out of your system with your fluids.

Calcium

Calcium is especially important for growth, maintenance and repair of bone tissue, maintenance of blood calcium levels, nerve conduction, and normal blood clotting. Inadequate dietary calcium and vitamin D increase the risk of low bone mineral density and stress fractures. Female athletes are at greatest risk for low bone mineral density if energy intakes are low, dairy products and other calcium-rich foods are inadequate or eliminated from the diet, and menstrual dysfunction is present. Calcium is necessary for muscular contraction and relaxation. If adequate stores of Calcium are not available in the muscle, full, hard muscular contractions cannot be sustained.

Calcium is also stored in fat cells and plays a crucial role in regulating how fat is stored and broken down by the body. A recent study theorized that the more calcium there is in a fat cell, the more fat will burn. Calcium is no magic bullet. What the study says is that ... higher-calcium diets favor burning rather than storing fat. Calcium changes the efficiency of weight loss.

Supplementation with calcium and vitamin D should be determined after a thorough nutrition assessment. The FNB established RDAs for the amounts of calcium required for bone health and to maintain adequate rates of calcium retention in healthy people. They established 1.0 -1.2 g per day. The two main forms of calcium in supplements are carbonate and citrate. Calcium carbonate is more commonly available and is both inexpensive and convenient. Both the carbonate and citrate forms are similarly well absorbed, but individuals with reduced levels of stomach acid can absorb calcium citrate more easily. Other calcium forms in supplements or fortified foods include gluconate, lactate, and phosphate. Calcium from M.C.H.C. and calcium citrate are readily absorbed and utilized by the body. While other forms of calcium may halt bone loss, only M.C.H.C. has been shown to restore bone density. M.C.H.C. or microcrystalline calcium hydroxyapatite complex, prepared from raw bone, is in an extremely bioavailable form of calcium which has been used with great success in prevention and treatment of osteoporosis, to prevent and halt bone loss, and to restore bone density. Additional minerals are present in the natural ratios occurring in normal bone. Calcium citrate malate is a well-absorbed form of calcium found in some fortified juices. The body absorbs calcium carbonate most efficiently when the supplement is consumed with food, whereas the body can absorb calcium citrate equally effectively when the supplement is taken with or without food. Current supplementation recommendations for athletes, individuals with disordered eating, amenorrhea, and risk for early osteoporosis are *1500 mg* of elemental calcium.

Magnesium

Every organ in the body -- especially the heart, muscles, and kidneys -- needs the mineral magnesium. It also contributes to the makeup of teeth and bones. Most important, it activates enzymes, contributes to energy production, and helps regulate calcium levels as well as copper, zinc, potassium, vitamin D, and other important nutrients in the body. Magnesium plays a variety of roles in cellular metabolism (glycolysis, fat, and protein metabolism) and regulates membrane stability and neuromuscular, cardiovascular, immune, and hormonal functions.

You can get magnesium from many foods. However, most people in the United States probably do not get as much magnesium as they should from their diet. Foods rich in magnesium include whole grains, nuts, and green vegetables. Green leafy vegetables are particularly good sources of magnesium. Too much coffee, soda, salt, or alcohol as well as heavy menstrual periods, excessive sweating, and prolonged stress can also lower magnesium levels. Symptoms of magnesium deficiency may include agitation and anxiety, restless leg syndrome (RLS), sleep disorders, irritability, nausea and vomiting, abnormal heart rhythms, low blood pressure, confusion, muscle spasm and weakness, hyperventilation, insomnia, poor nail growth, and even seizures.

Magnesium deficiency impairs endurance performance by increasing oxygen requirements to complete exercise. Athletes in weight-class and body-conscious sports, such as wrestling, ballet, gymnastics, and tennis or those on calorie restricted diets have been reported to consume inadequate dietary magnesium. In athletes with low magnesium status, supplementation is beneficial. Without magnesium, your muscles will not be able to contract to the best of their ability. It helps produce a compound called Adenosine Triphosphate (ATP) which is the prime source of energy in the muscles. Magnesium also increases your growth hormone for the recovery of physical activity.

Recommended supplemental types include magnesium citrate, magnesium gluconate, and magnesium lactate, all of which are more easily absorbed into the body than other forms. It is a good idea to take a B vitamin complex, or a multivitamin containing B vitamins, because the level of vitamin B6 in the body determines how much magnesium will be absorbed into the cells.

Pediatric

Do not give magnesium supplements to a child without a doctor's supervision.

- Infants and children up to 3 years of age: 40 - 80 mg daily
- Children 4 - 6 years of age: 120 mg daily
- Children 7 - 10 years of age: 170 mg daily

Adult

- Adolescent and adult males: 270 - 400 mg daily
- Adolescent and adult females: 280 - 300 mg daily
- Pregnant females: 320 mg daily
- Breastfeeding females: 340 - 335 mg daily

A person' s need for magnesium increases during pregnancy, recovery from surgery and illnesses, and athletic training.

Essential Fatty Acids (EFAs)

EFAs "essential fatty acid", refers to those omega-6 and omega-3 polyunsaturated fatty acids which are required in the body for biological processes and optimal health and which must be consumed since we cannot synthesize them. Only two EFAs are known for humans: alpha-linolenic acid (omega-3 fatty acid) and linoleic acid (omega-6 fatty acid).

The essential fatty acids start with the **short chain polyunsaturated fatty acids:**

- omega-3 fatty acids:
    - α-Linolenic acid or ALA
- omega-6 fatty acids:
    - Linoleic acid or LA

These two fatty acids cannot be synthesized by humans, as humans lack enzymes required for their production. They form the starting point for the creation of longer fatty acids, which are also referred to as **long-chain polyunsaturated fatty acids**:

- omega-3 fatty acids:
    - eicosapentaenoic acid or EPA
    - docosahexaenoic acid or DHA
- omega-6 fatty acids:
    - gamma-linolenic acid or GLA
    - dihomo-gamma-linolenic acid or DGLA
    - arachidonic acid or AA
- omega-9 fatty acids: are not essential in humans, because humans generally possess all the enzymes required for their synthesis.

In the body, essential fatty acids serve multiple functions. In each of these, the *balance* between dietary ω-3 and ω-6 strongly affects function. Fatty acids are modified to assist with many functions including regulating inflammation and directing cellular signaling. It plays an essential role in the skin where it accumulates in a specific lipid component of the epidermal surface and cells to protect the body from excessive water loss and skin malfunctioning. They help stimulate hair growth, maintain bone health, regulate metabolism, and maintain the reproductive system. Research suggests the benefit of EFA's for healthy infant development. First, let me briefly touch on why this ratio is important. When we eat fat, some of it is incorporated into the cell membrane as phospholipids (lipids with a phosphate attached.) These make up the barrier between the inside and outside of the cells. The phospholipids are important because they're used to make a family of hormone-like molecules called eicosanoids.

Eicosanoids are involved in pretty much everything our body does, and we could spend days just talking about them. The big picture here is that if we're eating a lot of omega 6 fatty acids, we get phospholipids with omega 6 fatty acids in them. The eicosanoids are then made from the omega 6s. The same is true for eating omega 3s.

The eicosanoids made from 3s and 6s have many different functional properties. One of the big differences is that omega 6 eicosanoids are very pro-inflammatory, whereas omega 3 eicosanoids are very weakly inflammatory at best. A dietary shift towards more omega 3s has been shown to help in a variety of diseases from asthma to cardiovascular disease, but it also has the potential to be of benefit to athletes.

Over the past 100 years there has been an enormous imbalanced increase in the consumption of omega-6 fatty acids due to the increased intake of vegetable oils from corn, sunflower seeds, safflower seeds, and soybeans. Today, in Western diets, the ratio of ω 6 to ω 3 fatty acids ranges from 20–30:1 *instead of* the optimal range of 1–2:1. Studies indicate that a high intake of ω-3 fatty acids shifts the physiologic state to one that is antiinflammatory, antithrombotic, antiarrhythmic, hypolipidemic, and vasodilatory properties. These beneficial effects of ω-3 fatty acids have been shown in the prevention and management of cardiovascular disease, coronary heart disease, hypertension and type 2 diabetes. Additional studies also suggest that low levels of essential fatty acids and the wrong balance of types are a factor in illnesses including osteoporosis, renal disease, rheumatoid arthritis, ulcerative colitis, Crohn's disease, and chronic obstructive pulmonary disease.

There has been a surge in interest of the health effects of omega-3 fatty acids derived from fish/fish oils - consisting of ***DHA -EPA***. DHA is required in high levels in synaptic membranes of the brain and retina as a physiologically-essential nutrient to provide for optimal neuronal functioning (learning ability, mental development) and visual acuity, in young and old alike. This is critical for synaptic transmission and membrane fluidity which is directly related to brain function, improving mood and decreasing depression or suicide behaviors. It is evident that western diets are deficient in ω-3 and excessive in ω-6, and balancing of this ratio would confer numerous health benefits.

Almost all the polyunsaturated fat in the human diet is from EFA. Common food sources of ω-3 and ω-6 fatty acids are fish and shellfish, flaxseed (linseed), hemp oil, soya oil, canola (rapeseed) oil, seeds, pumpkin seeds, sunflower seeds, leafy vegetables, and walnuts. Dietary plant sources of ω-3 contain neither EPA nor DHA. The human body can convert α-linolenic acid to EPA and subsequently DHA. This however requires more metabolic work, which is thought to be the reason that the absorption of essential fatty acids is much greater from animal rather than plant sources. The best source of alpha-linolenic acid, a common omega-3 fatty acid, is flaxseeds or ***flaxseed oil***.

For those seeking to increase their intake of omega-3 fats, *more concentrated sources* can be found in oils such as canola (rapeseed), soybean, walnut, and wheat germ. The NIH Workshop recommended a daily intake of *650 mg of DHA plus EPA* for normal *healthy individuals* (for overall health and cardiovascular care). Finally, the American Heart Association in its official Dietary Guidelines recommended that the daily intake of DHA plus EPA in individuals with coronary heart disease should target *900 mg/day*.

Product Recommendations

At Goodyear Chiropractic Health Center, we offer only the highest quality nutritional supplements. The brands we offer are formulated with the highest regard for safety and efficacy with the highest quality ingredients and standardized extracts for best absorption and consistent results. Some of the brand names we offer are ***Advocare, Metagenics, Nutrition Dynamics, Optimum Nutrition, Standard Process, and Nutrina***.

Chondro-Relief Intensive Care

Comprehensive Joint Health Support

Joint Health support formula to maintain normal joint strength and flexibility by effectively supporting cartilage integrity. Delivers clinically significant dosages of glucosamine HCl and chondroitin sulfate, with

the addition of; MSM, a substance that reduces pain and has an anti-inflammatory effect; ETArol, an extract of New Zealand green-lipped mussels that play a key role in reduction of joint swelling; Hyaluronic Acid, which supports resiliency, reduces friction and acts as a natural shock absorber; and ASU, which has been shown to increase joint cartilage and articular cartilage as well as reducing production of pro-inflammatory cytokines. Safe and effective for long-term use.

Four capsules supply:

- Glucosamine HCl 500 mg
- Chondroitin Sulfate 400 mg
- MSM (Methylsulfonylmethane) 1,000 mg
- Vitamin C (Manganese ascorbate) 38 mg
- Manganese (Manganese ascorbate) 15 mg
- ETArol™† (Perna Canaliculus) 1000 mg
- Hyaluronic Acid 100 mg
- Avocado/Soybean Unsaponifiables (ASU) 300 mg

Ultra Potent-C® 1000

1,000 mg of Buffered Vitamin C

Ultra Potent-C 1000 is an exclusive, patented formula that is designed to enhance the utilization of Vitamin C. Preliminary scientific research suggests that vitamin C in the form of Ultra Potent-C may result in improved uptake by white blood cells when compared to regular ascorbic acid. *Provides valuable antioxidant protection. Supports the production of collagen and connective tissue. Supports immune function* by helping to promote natural killer cell and white blood cell activity as compared to simple ascorbic acid.

• Buffered to help prevent potential stomach upset.

One tablet supplies:

- Vitamin C (as Ultra Potent-C©)1,000 mg
- Niacin (as niacinamide ascorbate)77 mg
- Calcium (as calcium ascorbate)47 mg
- Magnesium (as magnesium ascorbate)6 mg
- Sodium (as sodium ascorbate)13 mg
- Potassium (as potassium ascorbate)6 mg
- L-Lysine HCl36 mg
- Citrus Bioflavonoid Complex35 mg
- [standardized to 45% (15.8 mg) full spectrum bioflavonoids]
- Tetrasodium Pyrophosphate15 mg
- Alpha-D-Ribofuranose14 mg
- Xylitol10 mg
- L-Cysteine10 mg
- L-Glutathione5 mg

Multigenics®

Optimum Multiple Vitamin/Mineral Formula

Multigenics is a comprehensive multiple vitamin and mineral formula suitable for adolescents, adults, and seniors that provides an essential, comprehensive foundation for optimal health. Supplies high potency, balanced B vitamins with extra B12 for healthy methylation and homocysteine metabolism. Delivers select nutrients to support liver and adrenal function. Provides broad-spectrum antioxidant protection, which includes quercetin and Caro-xan™, our proprietary blend of beta-carotene and Betatene© mixed carotenoids. Provides natural source vitamin E in a 1:1 ratio of alpha to gamma tocopherols. Features mineral amino acid chelates designed for mineral absorption.

• Also offered in an iron-free formula.

Wellness Essentials™ for Men

Support to Enhance Vitality, Strength, and Stamina

Wellness Essentials™ for Men is a combination of four specialized formulas packaged together to provide essential vitamins and minerals, omega-3 fatty acids, antioxidants, and calcium to support overall health and well-being. Also contains a unique, all-natural herbal formula to support optimal male vitality, stamina, and healthy sexual function.
Packets contain the following four products:

• Tribulus Synergy©: A specialized, concentrated blend of the highest quality Ayurvedic botanical extracts featuring beneficial levels of tribulus fruit extract—a key herb used traditionally to support male libido and healthy sexual function. In combination with cowage seed and ashwagandha extracts, this formula promotes vitality and strength.

• EPA-DHA Extra Strength© Lemon-Flavored: A concentrated, purity-certified source of EPA and DHA—essential omega-3 fatty acids from cold water fish oil that are an important part of foundation nutrition and directly affect cardiovascular health, as well as nervous system and immune system function. Each softgel supplies 500 mg of these critical essential fatty acids, with a light natural lemon flavor to avoid a “fishy” aftertaste.

• Multigenics© Intensive Care without Added Iron: A comprehensive, high quality multivitamin/mineral formula that is easily absorbed. It features a broad spectrum of essential nutrients that include a natural source mixed tocopherols, patented mineral amino acid chelates, ratio-balanced B vitamins, quercetin, and Caro-xan™—a proprietary blend of beta-carotene and Betatene© mixed carotenoids for specialized, balanced antioxidant protection.

• Zinc A.G.™: Features a highly absorbable form of zinc/true amino acid chelate to help maintain prostate and male reproductive health. A mineral with multiple physiological benefits, zinc is also important for energy metabolism and immune support.

Wellness Essentials™ for Women

Optimal Nutritional Support For Women in Convenient Packets

Wellness Essentials for Women is a combination of four specialized nutritional formulas packaged together to provide comprehensive nutritional support and convenience for women in a single dose packet.
Packets contain the following four products:

• *Multigenics© Intensive Care Formula*: A comprehensive, high quality multivitamin/mineral formula that is easily absorbed. It features a broad spectrum of essential nutrients that include a natural source mixed tocopherols, patented mineral amino acid chelates, ratio-balanced B vitamins, quercetin, and Caro-xan™—a proprietary blend of beta-carotene and Betatene© mixed carotenoids for specialized, balanced antioxidant protection.

• *E Complex-1:1™*: As unique combination of four forms of vitamin E—alpha- and gamma-tocopherols in a one-to-one ratio and delta- and beta-tocopherols for optimal vitamin E nutrition and antioxidant activity.

• *EPA-DHA Extra Strength© Enteric-Coated*: A highly concentrated, purity-certified source of EPA and DHA—essential omega-3 fatty acids from cold water fish oil. It is an important part of foundation nutrition and directly affects cardiovascular health and nervous and immune system function.

• *Cal Apatite© with Magnesium*: Supports optimal bone health, and healthy muscle function. This unique, proprietary formula features microcrystalline hydroxyapatite concentrate (MCHC), an excellent source of calcium, delicate protein matrix, organic factors, and bone growth factors that are naturally found in healthy bone. It is blended with three complementary forms of magnesium to achieve a 2:1 calcium-to-magnesium ratio.

Cal Apatite® with Magnesium

Complete Bone NutritionPurity-Certified MCHC with Magnesium

Cal Apatite with Magnesium is the same formula as original Cal Apatite©, but with the addition of 300 mg of magnesium per serving. Magnesium plays important roles in bone metabolism, with over one-half of the total body stores of magnesium found in bone tissue. *Provides a 2:1 calcium to magnesium ratio.*

• Magnesium is provided as a blend of glycinate, citrate, and aspartate designed for enhanced absorption. Does not contain magnesium oxide.

Three tablets supply:

- Vitamin D (as cholecalciferol)600 IU
- Calcium (as MCHC and dicalcium phosphate)600 mg
- Phosphorus (as MCHC and dicalcium phosphate)378 mg
- Magnesium (as magnesium citrate, 300 mg
- magnesium aspartate, and magnesium gylcinate†)
- MCHC††1,500 mg

EPA-DHA Extra Strength® Lemon Flavored

Concentrated and Stabilized Purity-Certified, Omega-3 Fish Oils

EPA-DHA Extra Strength is a concentrated source of health-promoting, antioxidant stabilized, omega-3 essential fatty acids from cold water fish. Advantages of this premium formula include: Pharmaceutical-grade fish oil. Low in cholesterol.

• *EPA-DHA Extra Strength supports healthy musculoskeletal, cardiovascular, nervous, and immune functions*.

Two soft gels supply:

- Calories20
- Calories from Fat18
- Total Fat1 g
- Cholesterol< 5 mg
- Natural Marine Lipid Concentrate2 g
- EPA (Eicosapentaenoic acid) 600 mg
- DHA (Docosahexaenoic acid) 400 mg

Other Ingredients:

- Gelatin, purified water, glycerin, natural lemon flavor, mixed tocopherols, rosemary, and ascorbyl palmitate. Contains: fish (herring, sardine, anchovy).

Be sure to discuss nutritional supplementation with your health care provider, especially if you have a health condition or are currently taking medication.

Maintain a healthy Lifestyle

Make sure that you're eating a sensible diet, training regularly and intensely, staying well hydrated, and getting at least 7 hours of sleep every night. Protein provides the building blocks, but even the best sources won't build new muscle without the proper stimulus and **consistency**!

For more on why nutritional supplements are an important part of healthy eating, schedule your nutrition consult.