Glucosamine Chondroitin MSM + Hyaluronic Acid

INGREDIENTS
Glucosamine Chondroitin MSM + Hyaluronic Acid features a comprehensive suite of reliable ingredients to support joints and connective tissue in the body. The patented, award-winning ingredient BioCell Collagen® is derived from a naturally occurring matrix of constituents that is standardized to 20% chondroitin sulfate (CS) and 10% hyaluronic acid (HA), with approximately 60% Collagen Type II. Our formula also includes 1,500 mg of glucosamine sulfate (GS) and 1,000 mg of additional CS (above and beyond what is provided by the BioCell Collagen® ingredient), quantitatively matching or exceeding dosage amounts used in landmark clinical studies that have revealed the utility of these two pivotal ingredients towards joint health. Furthermore, Glucosamine Chondroitin MSM + Hyaluronic Acid features patented OptiMSM® methylsulfonylmethane, MSM distilled to be 99.9% pure. MSM is a naturally occurring nutrient that provides sulfur, used by the body to maintain normal connective tissues.1

BENEFITS
Superior Ingredients with an Outstanding Record
Glucosamine Chondroitin MSM + Hyaluronic Acid provides an all-in-one formula that brings together joint and skin health ingredients in substantial amounts. Glucosamine sulfate (GS) and chondroitin sulfate (CS) have been the topics of intense and fruitful research into joint health over the past few decades. Levels of GS & CS seen in the most acclaimed research are offered in this complete formula. Also in the formula are two vital structural components of the joint and skin that decline as we age: collagen type II and hyaluronic acid. The formula’s BioCell Collagen® furnishes these to help replenish the body's natural supply, which in turn can support joint function and healthy skin.

BioCell Collagen® is hydrolyzed and denatured to low molecular weight compounds that increase the bioavailability and absorption of its components. In an absorption study of BioCell Collagen®, measurements revealed a gradual and significant increase of active total Hyaluronic Acid (HA) in the blood of test subjects after a single dose.2 In the same study, subjects taking BioCell Collagen® for 28 days maintained elevated blood levels of HA compared to initial levels.

Glucosamine and chondroitin sulfates are often discussed together in scientific literature. In a recent meta-analysis of six studies involving 1,502 volunteers, it was determined that long-term daily supplementation with glucosamine sulfate (at 1,500 mg for at least 3 years) or chondroitin sulfate (at 800 mg for at least 2 years) supported maintenance of knee joint structure over the years, compared to placebo.3 In a recent report, a British physician and joint health specialist concluded that, “Glucosamine, chondroitin, and the combination of these two agents have stood the test of time.”4

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Glucosamine Sulfate
Glucosamine sulfate (GS) supports joint function by supplying the body with dietary ingredients (glucosamine and sulfur) to help maintain healthy joints. Glucosamine, a monosaccharide that is essential to the glycosaminoglycans found in cartilage and synovial fluid, stimulates chondrocytes (cartilage cells) to manufacture building blocks known as proteoglycans. These building blocks contribute to the maintenance of sound joint struc-

Supplement Facts

<table>
<thead>
<tr>
<th>Serving Size</th>
<th>5 Capsules</th>
<th>Servings Per Container</th>
<th>30</th>
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<tbody>
<tr>
<td>Amount Per Serving</td>
<td>% Daily Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choline (from glucosamine sulfate 2KCI)</td>
<td>180 mg</td>
<td>8%</td>
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<tr>
<td>Sodium (from chondroitin sulfate sodium)</td>
<td>85 mg</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Potassium (from glucosamine sulfate 2KCI)</td>
<td>180 mg</td>
<td>4%</td>
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</tr>
<tr>
<td>BioCell Collagen*</td>
<td>1000 mg</td>
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</tr>
<tr>
<td>(from chicken sternal cartilage) providing minimum:</td>
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<tr>
<td>Hydrolyzed Collagen Type II</td>
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<tr>
<td>Chondroitin Sulfate</td>
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</tr>
<tr>
<td>Hyaluronic Acid</td>
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<td></td>
</tr>
<tr>
<td>Glucosamine Sulfate 2KCI</td>
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</tr>
<tr>
<td>Chondroitin Sulfate</td>
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</tr>
<tr>
<td>(from chondroitin sulfate sodium)</td>
<td>1000 mg</td>
<td>†</td>
<td></td>
</tr>
<tr>
<td>MSM (Methylsulfonylmethane/OptiMSM®)</td>
<td>1000 mg</td>
<td>†</td>
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</tr>
</tbody>
</table>

* Daily Value not established.

Other ingredients: Gelatin (capsule), rice powder, magnesium stearate (vegetable source).
Contains Shellfish (crab and shrimp shells)

Suggested Adult Use: Take 5 capsules daily with food, or as recommended by a nutritionally-informed physician.

WARNING: Consult your physician before using any health supplement if pregnant, lactating, or have a medical condition. Not for use by individuals under the age of 18 years. Keep out of reach of children.

Non-GMO / Gluten Free / Soy Free
Store in a cool dry place.

* 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.
ture, ultimately enhancing healthy joint function. Additionally, glucosamine inhibits unhelpful catabolic enzymes and can aid in the balance of interleukin-1β levels in synovial fluid.1 A recent in vitro investigation examining the molecular biology of chondrocytes found 18 different proteins that were modulated by glucosamine sulfate.4 In conjunction with other studies, this new evidence suggests that GS fights cytokine-mediated oxidative stress in chondrocytes.

In addition to its value in influencing joint structure, research also backs the ability of GS to influence joint comfort. A short-term (4-week) randomized, double-blind, parallel-group study of 200 subjects showed that GS taken orally can indeed promote comfortable joint function.5 Similar results were obtained from a multicenter, randomized, placebo-controlled, double-blind, parallel-group study of 252 subjects, where joint comfort in the knee was found to be higher in the GS group.6 More recently, a study of 318 subjects found 1,500 mg of GS daily to be more effective than placebo in enhancing joint comfort.7 Key among findings from these types of studies is the reoccurring theme of a good safety profile for glucosamine sulfate; reported “side effects” of GS were essentially no different than placebo.

Hyaluronic Acid

Hyaluronic Acid (HA) is a type of building block called a glycosaminoglycan, and it plays an important role in supporting the structural strength of joint tissue and the skin dermis. The physiological role of HA is underscored by its remarkable capability of retaining water molecules, which generates viscoelastic properties. HA plays dual roles for joint health. First, it is an essential structural component of proteoglycans such as aggrecans in the cartilage matrix. Second, HA is highly concentrated in synovial fluid, where it serves to enhance joint lubrication and the viscoelastic structural and functional characteristics of the joint. A clinical study in 2007 with 98 participants determined that a healthy concentration of HA in synovial fluid is a strong indicator of joint health.8 Since the body’s supply of HA naturally decreases with age, Glucosamine Chondroitin MSM + Hyaluronic Acid was formulated to help maintain healthy HA levels, allowing for the extended maintenance of joint and skin.

OptiMSM® Methylsulfonylmethane

Results from a randomized, double-blind, placebo-controlled pilot trial examining the effect of MSM supplementation on joint comfort in 50 men and women are promising. Subjects were administered OptiMSM® methylsulfonylmethane for 12 weeks, ramping up to 6 grams per day by the end of the first week (for the duration of the study). Those taking OptiMSM® experienced greater joint comfort than those taking placebo, suggesting potential for MSM as a joint support nutrient that warrants further investigation in larger clinical trials.9 MSM also produced statistically significant changes in urinary malondialdehyde (a marker of oxidative stress), suggesting a potential support role for MSM in metabolic processes requiring methylation, such as antioxidant capacities.

BioCell Collagen®

Components of BioCell Collagen® (collagen type II, chondroitin sulfate, and hyaluronic acid) can enhance the normal production of proteoglycans in the joint matrix, thereby helping maintain healthy joint structure. In a randomized, double-blind, placebo-controlled pilot study exploring the safety and effectiveness of BioCell Collagen® towards joint health, 16 subjects were enrolled to receive 2 grams of BioCell or placebo daily for 8 weeks.10 The subjects who were administered BioCell demonstrated significantly greater joint comfort, mobility, and quality of life over time, compared with placebo.

Chondroitin Sulfate

Chondroitin has been extensively researched for its effects on joint health. In a 6-month multicenter randomized, double blind, placebo-controlled trial of 146 volunteers, 400 mg of CS was administered three times daily (totaling 1,200 mg per day) for 3 months and changes in joint comfort were measured according to several clinical parameters. Significant improvements in comfort were noted after the first month, and they were maintained for three months after the subjects stopped taking the chondroitin sulfate.11 A subsequent study (similar in design) found that 1,200 mg of CS taken daily also improved subjective measurements of comfort and mobility among the 127 study volunteers; this study also determined that taking CS in a single daily dose of 1,200 mg granted the same benefits as taking three 400 mg doses daily.12

Collagen Type II

The benefits of collagen type II in supporting healthy joint and skin function have been extensively researched in both animal and clinical studies.

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