

Glucosamine Chondroitin

Supports Healthy Joint Function*



By David M. Brady, ND, DACBN, IFMCP, FACN and Kendra Whitmire, MS, CNS

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Glucosamine Chondroitin is a combination of glucosamine sulfate and chondroitin sulfate to promote healthy joint function.* Glucosamine and chondroitin are the building blocks of cartilage and may help to promote normal cartilage synthesis.* They may also promote a healthy inflammatory response to support joint health.*

Ingredient Highlights*

- 1,500 mg of glucosamine sulfate to support cartilage health*
- 1,200 mg of chondroitin sulfate to promote normal joint function*
- CSBioactive® for enhanced chondroitin absorption and activity

Glucosamine sulfate helps support joint function and cartilage health.* It is one of the substrates in the biosynthesis of proteoglycans in chondrocytes.^{1,2} It is a water-soluble amino monosaccharide found in substantial amounts in the articular cartilage and is also a constituent of glycosaminoglycans.^{1,2} Glucosamine also stimulates the synthesis of proteoglycans and inhibits synthesis of connective tissue proteolytic enzymes.³ Glucosamine promotes a healthy inflammatory response, potentially by reducing the catabolic activity of proteases, which may help decrease inflammatory processes.^{2,3} It also may inhibit nuclear factor kappa B (NF-κB) signaling and downstream pro-inflammatory responses.^{2,3} Glucosamine also supports hyaluronic production in the synovial membrane.³ Research demonstrates the potential for glucosamine to help prevent type II collagen degradation and maintain the synthesis of collagen in athletes with excess joint usage.⁴

Studies determine the potential for glucosamine to support joint health.* A systematic review and meta-analysis assessed data from 14 randomized controlled trials that used doses of 1,500 mg daily for a duration ranging from 4 to 144 weeks. The researchers found that glucosamine exhibited a statistically significant benefit for stiffness in those with osteoarthritis (OA). Additionally, the researchers concluded that glucosamine supplementation was safe, with no statistical difference in adverse events compared to the placebo.¹ Another systematic review and meta-analysis reviewed 13 studies using 1,500 mg of glucosamine per day for a duration of 46 days to 3 years. The results showed that glucosamine decreased pain in patients with OA in the knee.³ Another meta-analysis and systematic review of 18 randomized controlled trials determined that 1,500 mg glucosamine per day for a duration between 6 weeks and 2 years demonstrated a small benefit, but not significant benefit to knee function and pain.⁵ Using a newly established scale for monitoring OA in the knee, the researchers determined glucosamine was superior to the placebo in alleviating symptoms.⁵

Chondroitin sulfate (as CSBioactive®), a component of the articular cartilage extracellular matrix and a sulfated glycosaminoglycan bound to proteins as a part of a proteoglycan supports cartilage health and joint function.*^{1,3,6} Chondroitin may also stimulate hyaluronic acid and proteoglycan synthesis. It may also inhibit the synthesis of connective tissue proteolytic enzymes and inducible nitric oxide and inhibit NF-κB to promote a healthy inflammatory response.^{3,6} One meta-analysis assessing data from 12 studies with doses ranging from 800 mg to 1,200 mg daily for a duration ranging from 12 to 96 weeks found that chondroitin had the potential to alleviate pain and improve function compared to a placebo.¹ Another systematic review and meta-analysis assessed data from 16 studies with doses ranging from 800 mg to 1,200 mg for a duration from 6 months to 3 years. The researchers determined that chondroitin decreased pain in patients with osteoarthritis in the knee.³

Benefits*

- Promotes healthy joint function
- Supports cartilage health
- Supports healthy aging

Supplement Facts

Serving Size 4 capsules
Servings per container 30

Amount Per Serving	% Daily Value	
Glucosamine Sulfate (as Glucosamine Sulfate 2KCl)	1500 mg	*
Chondroitin Sulfate (as CSBioactive®)	1200 mg	*

*Daily Value not established.

Other Ingredients: Microcrystalline cellulose, vegetable stearate, silicon dioxide.

Contains shellfish (crab and shrimp)

CSBioactive® is included in Designs for Health's Glucosamine Chondroitin, which has extensive research of its efficacy and safety, with more than 20 clinical studies with a total of more than 5,000 patients.⁷⁻²⁷ One study demonstrated that taking 800 mg CSBioactive® twice daily for 6 months followed by 800 mg once daily for an additional 6 months led to fewer total knee replacements after a 4-year follow-up. In the control group, 69% of participants required total knee replacements compared to 31% in the treatment group. The treatment group took chondroitin for the entire trial, whereas the control group took it in the second phase of the trial.¹⁵

Another randomized trial of 69 patients with clinical signs of synovitis assessed the results of taking 800 mg daily of CSBioactive®. The chondroitin group experienced significantly less cartilage volume loss compared to the placebo group at 6 months. At 12 months, there were significantly lower bone marrow lesions scores in the treatment group.²⁰

Glucosamine and chondroitin may act synergistically to modulate the articular cartilage matrix metabolism and suppress inflammatory cytokines that may affect cartilage catabolism.³ Many studies have assessed the potential for the two combined to promote normal cartilage and joint function.* One systematic review found that supplementing with a combination of glucosamine and chondroitin led to a significant improvement in pain and function from baseline compared to the placebo.²⁸

Research has also begun to investigate the potential for glucosamine and chondroitin to support healthy aging.* The support to the extracellular matrix and promotion of a healthy inflammatory response may promote healthy aging.*⁶ Research on *Caenorhabditis elegans* found that glucosamine led to an increase in lifespan, likely due to inhibiting glycolysis. This increased mitochondrial biogenesis, reduced adenosine monophosphate-activated protein kinase activation, and supported an increase of amino acid turnover.²⁹ The researchers confirmed similar actions on mice in a second stage of their study.²⁹ Three long-term observational studies in humans found that supplementing with glucosamine and/or chondroitin was associated with a significant reduction in mortality risk.³⁰⁻³² Further research is necessary to clarify the association between glucosamine and chondroitin and healthy aging, but available research shows promising potential.

Recommended Use: Take 4 capsules per day or as directed by your health-care practitioner.

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/api/library-assets/literature-reference---glucosamine-chondroitin-tech-sheet-references>

CSbioactive®

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