



Glucosamine *Glucosamine sulfate, Glucosamine hydrochloride*

Common Indications:

- Support healthy cartilage and connective tissue function
- Inflammatory conditions, including arthritis
- Sports injury/trauma

General Comments:

Glucosamine is the key building block in the synthesis of glycosaminoglycans, hyaluronic acid and proteoglycans.¹ These substances are the building blocks for tendons, ligaments, cartilage, collagen, basement membranes, mucous membranes of the digestive system, membranes in the respiratory tract and synovial fluid in the joints. Glucosamine is naturally produced by the human body so exogenous use is typically assimilated with ease. Many glucosamine products though are acid stripped from animal cartilage leading to a sub-par, denatured product with less than ideal results. The use of properly manufactured glucosamine may provide long-term benefits, for repair of joint structures.

Proteoglycan proteins synthesized from glucosamine that make up the connective tissue of cartilage giving joints their elasticity, strength, and resilience.

Glucosamine sulfate is the most readily available dosage form of glucosamine. When ingested, glucosamine sulfate is fully ionized in the stomach to glucosamine HCL.

Benefits & Mechanism of Action:

Support healthy cartilage and connective tissue function

Glucosamine stimulates synovial production of hyaluronic acid (HA). HA has anti-inflammatory and analgesic properties, and promotes anabolic behavior in chondrocytes.^{6,7,8,9,10,11,12,13,14} Glucosamine appears to act synergistically with chondroitin sulfate without side effects. Glucosamine is an inhibitor of proteoglycan degradation.² Chondroitin sulfate is reported to inhibit the negative effects of degradative enzymes on critical joint components. In vitro, glucosamine showed the ability to suppress PGE₂ production and partially suppress NO production.^{3,4}

Inflammatory conditions, including arthritis

The anti-inflammatory action of glucosamine is increasing the production of heparan

sulfate proteoglycans by the vascular endothelium.⁵ Concentration and molecular weight of HA is decreased in osteoarthritis. Multiple studies have reported that glucosamine can help decrease the symptoms associated with osteoarthritis, including decreasing pain and improving mobility.^{6,7}

Sports injury/trauma

A clinical study reported that glucosamine was effective in improving recovery after acute knee injury in athletes.^{15, 16} Glucosamine has been reported in studies to work as well, if not better, than NSAID's (like ibuprofen/Advil) and aspirin, without the side effects. It not only limits and reduces inflammation, but, over time, it actually helps to rebuild the collagen between the joints.

Dose: dosing is weight dependent.

- Weight less than 175 pounds - 500 mg, 2 to 3 times daily
- Weight more than 175 pounds - 1,000 mg, 2 times daily
- Initial use of high dose glucosamine of 3000mg daily can be used short term, 4-6 weeks to rapidly reduce inflammation and pain.

Symptoms of Deficiency: There is no deficiency directly associated with glucosamine in humans.¹⁷ An increased need for glucosamine is seen in people who exercise heavily.

Cautions & Side Effects:

There is no known toxicity when using glucosamine as a dietary supplement.

Glucosamine supplements are commonly extract from shellfish. Use with caution if an allergy to shellfish is present.¹⁸

Medications with increased effects while taking glucosamine include:

- Warfarin¹⁹
- Non-steroidal anti-inflammatory drugs²⁰

Patients with the following disease states or conditions should not use glucosamine:

- Kidney impairment - use with caution²¹
- Liver impairment - use with caution²²

Food Sources:

Glucosamine does not occur in foods. Supplemental sources of glucosamine are derived from chitin, which is the processed exoskeleton of shrimp, lobster, and crab shells.

References:

General Comments

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Support healthy cartilage and connective tissue function

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Inflammatory conditions, including arthritis

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Sports injury/trauma

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Symptoms of Deficiency

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Cautions & Side Effects

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