Glucosamine & Chondroitin

Protects Joints and Supports Cartilage Repair

- Two key joint health compounds in one formula
- Relieves joint pain from arthritis
- Provides clinically proven doses

Details
Glucosamine sulfate and chondroitin sulfate are two components of joint cartilage and other types of structural tissue, making them important nutrients in those with joint pain. Both ingredients are commonly used for their ability to reduce pain and improve function in the joints of arthritis sufferers.

The main purpose of glucosamine and chondroitin is to provide structural support for joint cartilage. Chondroitin provides resistance against compression forces, while glucosamine provides support for both the cartilage and the synovial fluid surrounding the joints that helps cushion them and reduce friction. Therefore, these compounds are most often taken by those with osteoarthritis to reduce joint breakdown and pain.

Subjects supplementing with glucosamine and chondroitin have been able to reduce their use of non-steroidal anti-inflammatory drugs (NSAIDs), and although these natural supplements take longer to provide relief than NSAIDs, their beneficial effects have been shown to last longer. Those with osteoarthritis and painful degenerative joint conditions will benefit from taking AOR’s Glucosamine & Chondroitin.
Glucosamine sulfate and chondroitin sulfate are components of the cartilage in joint tissue, supporting joint structure by aiding in the formation of connective tissue and protecting against the deterioration of cartilage from chronic joint diseases, while helping to relieve joint pain associated with osteoarthritis.

**Product Variation**

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<th>Product Code</th>
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**Supplements Facts**

**Serving Size:** 1 Capsule

<table>
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<tr>
<th>Amount</th>
<th>Glucosamine Sulfate 2KCl (vegetarian)</th>
<th>375 mg</th>
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<td>Chondroitin Sulfate (bovine cartilage)</td>
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Non-medical ingredients:

- microcrystalline cellulose, sodium stearyl fumarate
- Capsule: hypromellose

**Guarantees**

AOR™ guarantees that all ingredients have been declared on the label. Contains no wheat, gluten, nuts, peanuts, sesame seeds, sulphites, mustard, soy, dairy, eggs, fish or shellfish.

**Adult Dosage**

Take 3-4 capsules daily with food, or as directed by a qualified health care practitioner. Allow a minimum of 1 month to see beneficial effects.

**Cautions**

Consult a health care practitioner prior to use if you are pregnant, breastfeeding or if symptoms worsen with ongoing supplementation.

**Source**

- Glucosamine - vegetarian
- Bovine cartilage

**Main Application**

- Osteoarthritis
- Sports injuries
- Cartilage regeneration

**Disclaimer**

The information and product descriptions appearing on this website are for information purposes only, and are not intended to provide or replace medical advice to individuals from a qualified health care
professional. Consult with your physician if you have any health concerns, and before initiating any new diet, exercise, supplement, or other lifestyle changes.

Research

Background

Chemistry

Glucosamine is two hexosamine sugars common in animal cells. The synthesis of glucosamine begins with the enzyme glucosamine synthetase facilitating the transfer of amide group from glutamine to fructose-6 phosphate. The enzyme simultaneously isomerizes this compound to form glucosamine-6-phosphate (G-6-P). This molecule is the precursor to all hexosamine and hexosamine derivatives including: N-acetyl glucosamine, N-acetyl galactosamine and N-acetyl neuraminic acid. Chondroitin sulphate (CS) is a heterogenous group of glycosaminoglycan that is further classified into chondroitin-4-sulphate (CS4) or chondroitin-6-sulphate (CS6). CS functions as a component of proteoglycans. The low molecular weight and its high solubility enable GS to be readily absorbed in the blood stream (over 90% of an oral dose). Evidence indicates absorption of GS to be via active transport. GS is rapidly incorporated into articular cartilage. CS on the other hand is absorbed poorly due to the wide range of chain lengths and molecular weights. Estimations range between 0.8% and 8.5% absorption of CS intact. It would seem unlikely that the physiological benefits of CS are due to the intact molecule rather than to the increased availability of monosaccharide building blocks (glucuronic acid and N-acetyl glucosamine) created by the hydrolysis of CS during digestion and absorption.

Research

Clinical Applications of Glucosamine and Chondroitin Sulphate

Glucosamine is a very well studied joint-support supplement.

- A review of a number of clinical studies showed that over 90% of patients reported improvement of symptoms after taking 1 500mg GS daily for 50 days. Arthritis of the shoulder or elbow responded the best, while polyarticular arthritis of the hip had the poorer rate- 43% reported feeling better compared to 49% who reported no improvement. CS in various formulations produced similar effects. Co-administration of CS resulted in 72% reduction in the effective dose of NSAIDs required to relieve pain.
- Another study comparing Voltaren (a prescriptive NSAID) with CS showed that Voltaren produced a prompt reduction in clinical symptoms; however the symptoms reappeared quickly after the discontinuation of treatment. Patients treated with CS had a slower response to treatment, although the favorable response remained up to three months after discontinuation of treatment.
- Forty-two patients (aged 35-78) with symptomatic osteoarthritis of the knee received 800mg daily dose of CS or placebo for 1 year. After 3 months, joint pain was significantly reduced. The difference in pain reduction became even more marked after 12 months (63% vs 26%; p<0.01).

An Effective Combination

Studies using the combination of chondroitin sulfate and glucosamine have demonstrated its
effectiveness.

- In patients with capsulitis, disk displacement, disk dislocation or painful osteoarthritis of the temporomandibular joint, 1500 mg of glucosamine and 1200 mg of CS for 12 weeks reduced pain and joint tenderness, as well as the daily amount of over-the-counter medications required.
- In another study, glucosamine (1500mg/day) and CS (1200 mg/day) reduced pain in patients with knee osteoarthritis who had been suffering from moderate-to-severe knee pain.

**Market Trends**

There are a number of medications on the market that are prescribed to reduce joint pain. Unfortunately some non-steroidal anti-inflammatory medications can carry significant and serious side effects and may not have a long lasting effect.

**AOR Advantage**

Glucosamine and chondroitin sulphate are two well researched nutrients for joint support. AOR’s combination formula provides natural and effective relief for joint pain.

**References**


**Abstract**

Double blind investigation of the effects of oral supplementation of combined glucosamine hydrochloride (GHCL) and chondroitin sulphate (CS) on stride characteristics of veteran horses.

Forsyth RK, Brigden CV, Northrop AJ.

REASONS FOR PERFORMING STUDY: Oral chondroprotective supplements are commercially popular for veteran (and other athletic or arthritic) horses prone to joint degeneration, yet lack conclusive scientific support.

OBJECTIVES: To quantify the effects of an oral joint supplement (combination glucosamine hydrochloride (GHCL), chondroitin sulphate (CS) and N-acetyl-D-glucosamine) in vivo on stride parameters of veteran horses.

METHODS: Twenty veteran horses were randomly assigned to a treatment (n = 15) or placebo group (n = 5). Pre-treatment gait characteristics were recorded at trot using digital video footage (50 Hz). The range of joint motion, stride length, and swing and stance duration were assessed using 2-dimensional motion analysis. Treatment (or placebo) was administered daily for 12 weeks at the manufacturer’s recommended dosage. Gait was reassessed every 4 weeks using the pre-treatment protocol. Double blind procedure was implemented throughout. Relationships between variables were analysed using General Linear Model.

RESULTS: Differences occurred in the treated horses by week 8. Range of joint motion increased significantly in the elbow (P

CONCLUSION: The oral chondroprotective offered symptomatic relief to veteran horses, evidenced by improved stride characteristics.

POTENTIAL RELEVANCE: Oral GHCL and CS supplementation may improve welfare by alleviating symptoms of degenerative joint disease.

Collagen Synthesis in Tenocytes, Ligament Cells and Chondrocytes Exposed to a Combination of Glucosamine HCl and Chondroitin Sulfate.


Lippiello L.

Clinical testing of the nutraceuticals glucosamine (glcN) and chondroitin sulfate (CS) has shown efficacy in providing relief from symptoms in osteoarthritic patients. In vitro and in vivo studies support existence of a synergistic relationship upregulating synthetic activity in chondrocytes. A combination of glcN and CS may also be useful as adjunct therapy in sports-related injuries if similar upregulation of collagen synthesis is elicited in accessory ligament and tendon joint tissue. Collagen and non-collagenous protein (NCP) synthesis in cultures of bovine tenocytes, ligament cells and chondrocytes exposed to glcN CS were assayed by uptake of radiolabeled proline into collagenase-sensitive material. Assay of radiolabel in hydroxyproline (a specific marker for collagen synthesis) following HPLC isolation confirmed the specificity of the metabolic effect. Synthesis of total collagenase-sensitive material was maximally upregulated at physiologically obtainable doses of glcN CS. Tissue response followed the sequence ligament cells (69%) > chondrocytes (56%) > tenocytes (22%). Labeled hydroxyproline increased by 132% in ligament cells, 27% in tenocytes and 49% in epitendon.
cells after a 48 h exposure to 5 µg ml-1 glcN 4 µg ml-1 CS. Low dose combinations of glcN and CS effectively stimulate in vitro collagen and NCP synthesis by ligament cells, tenocytes and chondrocytes. Hence, therapeutic use following accessory joint tissue trauma may help augment repair processes.

The reverse glucosamine sulfate pathway: application in knee osteoarthritis.


Herrero-Beaumont G, Rovati LC, Castaneda S, Alvarez-Soria MA, Largo R.

Glucosamine is a natural amino sugar and a normal constituent of glycosaminoglycans in the cartilage matrix and synovial fluid of joints. Crystalline glucosamine sulfate salt has been approved as a medicinal product for the treatment of osteoarthritis in several European countries. Nevertheless, although it has been prescribed for more than 10 years, it is only due to the research in the last 5 years that the scientific basis underlying its beneficial effects are starting to be clarified. In randomised, double-blind, placebo-controlled trials, this compound clinically controls pain and produces beneficial effects in patients with knee osteoarthritis, possibly delaying the appearance of long-term structural changes in the joint (i.e., it has a structure-modifying effect). Furthermore, it has an excellent toxicity profile. Despite the different lines of investigation that have been followed, the mechanism of action of glucosamine sulfate still remains to be clearly defined. However, the activity of glucosamine sulfate has recently been related to its capacity to downregulate the catabolic effects of pro-inflammatory molecules, such as IL-1, which are present in osteoarthritic cartilage.

Risk assessment for glucosamine and chondroitin sulfate.


Hathcock JN, and Shaoa A.

Glucosamine and chondroitin sulfate are two popular dietary ingredients present in dietary supplements intended to support joint health. A large body of human and animal research suggests that oral intakes of these ingredients, either alone or in combination, reduces joint pain and improves mobility in persons with osteoarthritis. The increased awareness and use of these ingredients in dietary supplements warrant a comprehensive review of their safety. Systematic evaluation of the research designs and data do not provide a basis for risk assessment and the usual safe upper level of intake (UL) derived from it unless the newer methods described as the observed safe level (OSL) or highest observed intake (HOI) are utilized. The OSL risk assessment method indicates that the evidence strongly supports safety at intakes up to 2000 mg/d for glucosamine, and 1200 mg/d for chondroitin sulfate, and these levels are identified as the respective OSL. These values represent the highest levels tested in human clinical trials. The complete absence of adverse effects at these levels supports a confident conclusion of their long-term safety.
Structural and Symptomatic Efficacy of Glucosamine and Chondroitin in Knee Osteoarthritis.

Arch Intern Med. 2003;163:1514-1522.

Richy F, Bruyere O, Ethgen O, Cucherat M, Henrotin Y, Reginster JY.

OBJECTIVE: To assess the structural and symptomatic efficacy of oral glucosamine sulfate and chondroitin sulfate in knee osteoarthritis through independent meta-analyses of their effects on joint space narrowing, Lequesne Index, Western Ontario MacMaster University Osteoarthritis Index (WOMAC), visual analog scale for pain, mobility, safety, and response to treatment.

METHODS: An exhaustive systematic research of randomized, placebo-controlled clinical trials published or performed between January 1980 and March 2002 that assessed the efficacy of oral glucosamine or chondroitin on gonarthrosis was performed using MEDLINE, PREMEDLINE, EMBASE, Cochrane Database of Systematic Reviews, Current Contents, BIOSIS Previews, HealthSTAR, EBM Reviews, manual review of the literature and congressional abstracts, and direct contact with the authors and manufacturers of glucosamine and chondroitin. Inclusion, quality scoring, and data abstraction were performed systematically by 2 independent reviewers who were blinded to sources and authors. Conservative approaches were used for clear assessment of potential efficacy.

RESULTS: Our results demonstrated a highly significant efficacy of glucosamine on all outcomes, including joint space narrowing and WOMAC. Chondroitin was found to be effective on Lequesne Index, visual analog scale pain, mobility, and responding status. Safety was excellent for both compounds.

CONCLUSIONS: Our study demonstrates the structural efficacy of glucosamine and indistinguishable symptomatic efficacies for both compounds. Regarding the relatively sparse data on glucosamine and joint space narrowing and the absence of data on structural effects of chondroitin, further studies are needed to investigate the relationship among time, dose, patient baseline characteristics, and structural efficacy for an accurate, disease-modifying characterization of these 2 compounds.


Nguyen P, Mohamed SE, Gardiner D, Salinas T.

Previous studies have shown chondroitin sulfate and glucosamine hydrochloride have beneficial effects on symptoms of osteoarthritis of the knee. Our aim was to study the effect of a daily dose of 1500 mg of glucosamine hydrochloride (GH) and 1200 mg of chondroitin sulfate (CS) taken for twelve weeks on subjects diagnosed with capsulitis, disk displacement, disk dislocation, or painful osteoarthritis of the temporomandibular joint (TMJ). Forty-five subjects were enrolled in the study and were randomly assigned to either an active medication group or a placebo group. Eleven subjects were lost from the study for various reasons, resulting in fourteen subjects remaining in the active medication group and twenty subjects remaining in the placebo group. Subjects taking CS-GH had
improvements in their pain as measured by one index of the McGill Pain Questionnaire, in TMJ tenderness, in TMJ sounds, and in the number of daily over-the-counter medications needed. Subjects taking the placebo medication had improvements in their pains as measured by the visual analog scale and by four indices of the McGill Pain Questionnaire. Additional studies are required to evaluate the clinical effectiveness of CS-GH and to determine the exact mechanism by which CS-GH affects the articular cartilage of synovial joints.