

Glucosamine



If you're buying glucosamine to treat your arthritis be sure the brand contains an effective dose.
Online 08/05

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In brief

- If you suffer from osteoarthritis, it may be worth considering glucosamine. There's now good research-based evidence that it's a safe and effective treatment, based on doses of 1500 mg of glucosamine sulphate or hydrochloride per day. Smaller doses may not have the same effect.
- When we tested 10 leading brands we found many of them contained less glucosamine than claimed on the label. The dose recommended on the bottle might not give you enough glucosamine to be sure of it doing you any good.

Arthritis affects around three million Australians — around 15% of the population — and is the leading cause of pain and disability among older people.

Osteoarthritis, its most common form, is a degenerative joint condition that affects weight-bearing joints such as the hips, knees and ankles as well as the hands and spine. While it can't yet be cured, it can be treated.

Currently most treatment programs include lifestyle changes like weight loss and physiotherapy, along with the common use of non-steroidal anti-inflammatory drugs (NSAIDs) to manage the pain. The bad news is that the safety of these NSAIDs is increasingly under a cloud.

- VIOXX was recently withdrawn from the market by its manufacturer after a link was found between its use and increased risk of heart attack or stroke.
- CELEBREX, while not withdrawn, has also been implicated in posing an increased risk of heart problems.
- **Ibuprofen**, and other milder forms of **NSAID** which are sold in supermarkets and pharmacies under brand names such as NUROFEN and ADVIL, can cause damage to the small intestine if used for more than three months. Ibuprofen has also recently been linked to increased risk of heart attack.

Naturally arthritis sufferers are worried and, not surprisingly, they're looking for alternatives, such as **glucosamine**.

The evidence for glucosamine

Glucosamine is a component of much larger molecules found in the body called glycosaminoglycans. These larger molecules are involved in the formation and repair of cartilage, and are major constituents of bones, ligaments, tendons and the synovial fluid that lubricates our joints.

The evidence that glucosamine is an effective treatment for osteoarthritis is very much stronger than for other 'alternative' treatments (see **Alternative alternatives**).

- It's been used for more than 20 years.
- During this time 16 randomised controlled trials have shown that it's both effective and safe in the short term. It not only relieves the symptoms of osteoarthritis — particularly in the knee — but may help reverse the disease's progress.
- It compares well with conventional pain relief, with trials showing it's at least as effective as paracetamol and the NSAID Ibuprofen.
- The Australian government has funded a major research project to look at the cost-benefits of glucosamine, which could eventually lead to it being considered for the Pharmaceutical Benefits Scheme.

As yet no trials have been long enough to gauge its long-term effects or any possible toxicity over many years. However, several trials have shown that it's:

- **safe in the short term,**
- **well tolerated by most people,**
- **and has fewer side effects than NSAIDs.**

Relief from symptoms generally takes at least two to four weeks, but protection of joints only occurs after continuous use over several years.

Always ask your doctor

Always check with your doctor before taking glucosamine or any other 'alternative' product. It may interact with other medication you're taking. Also, they haven't been tested on women who are pregnant or breastfeeding, and they may not be suitable for children.

Most glucosamine supplements are derived from material such as prawn shells, so if you have an allergy to shellfish be specially cautious. (Although some are made synthetically from glucose derived from maize starch, all the glucosamine products in this test are from marine sources.)

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» What we found

We checked the amount of glucosamine per tablet/capsule in one bottle each of 10 brands that you can find in supermarkets, pharmacies and healthfood stores.

Only three brands (HERRON, NATURE'S OWN and NATURE'S WAY) contained within 10% of the amount of glucosamine per tablet that's claimed on the label. Some brands (WAGNER PRO-BIOTICS, BLACKMORES and BIOGLAN) were deficient by 20% or more. (See the **Table** for the complete results.)

This has serious implications — if you take the minimum dose recommended on the label you won't be getting as much glucosamine as you think. And it's probably not enough to do you any good.

For some of the brands tested even the manufacturer's maximum recommended dose doesn't provide the daily amount of glucosamine sulphate/hydrochloride that clinical trials have shown to be effective.

Most clinical studies to date have shown that 1500 mg of glucosamine sulphate/hydrochloride taken each day can have a significant effect. It's not known whether smaller doses will give any significant benefit, though a

minimum of 1000 mg/day is often recommended on the product labels.

Check the **Table** to see which brands give you at least 1500 mg of glucosamine sulphate or glucosamine hydrochloride in the maximum recommended dose.

If you buy any of the products in the top section and take the maximum recommended dose, you should get enough.

Label lingo

The labels on these supplements can be confusing because glucosamine comes in different chemical forms that contain different amounts of actual glucosamine. It can make a big difference to how much of the active ingredient you're actually taking.

- **1000 mg of glucosamine hydrochloride** is equivalent to **830 mg** of actual glucosamine and
- **1000 mg of glucosamine sulphate** has a little less (**785 mg**).
- But **1000 mg of glucosamine sulphate/potassium chloride complex** delivers **only 590 mg** of glucosamine.

Once you've swallowed the stuff its original chemical form appears to make little difference — it's absorbed into your bloodstream as glucosamine and glucosamine hydrochloride, regardless of which form you take.)

Most brands simply say 'Glucosamine 1000' and leave you to decipher the small print to find out which chemical form — and so how much actual glucosamine you're getting. For examples of such confusing labels, see the photo, right.



The names of these two products clearly suggest each tablet contains 1000 mg of glucosamine sulphate. The small print, however, says it's 1000 mg of glucosamine sulphate/potassium chloride complex. If the latter is correct, you're in fact only getting 750 mg of glucosamine sulphate per tablet — well short of what you'd reasonably expect.

This article last reviewed August 2005

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» **Alternative alternatives**

We also had a look at some other popular alternatives, but none of them has been as thoroughly investigated as glucosamine. Some may improve your mobility, others may only relieve the pain (or, of course, they may do neither).

- **Chondroitin sulphate.**

Like glucosamine, this is a natural substance found in the body (it's a component of cartilage). While there have been fewer trials of this than of glucosamine, there's evidence that chondroitin sulphate can reduce pain and improve function in people suffering from osteoarthritis.

Chondroitin sulphate's often sold in combination with glucosamine. While some studies suggest this combination is more effective than either of them taken alone, the evidence isn't conclusive. What's more, in a combination form it's possible you'll be taking too low a dose of either substance for it to be effective, so some practitioners recommend taking one or the other.

If you avoid animal products, be aware that chondroitin is usually extracted from animal cartilage, such as cows' windpipes.

- **Capsaicin.**

A cream that's applied topically to the skin, this is currently off the Australian market, mostly due to production problems, though it's still available in New Zealand. In one double-blind study, capsaicin was shown to be effective at relieving pain for both rheumatoid arthritis and osteoarthritis. (If you're wondering where you've heard the name before, capsaicin is the substance responsible for the heat in chillies.)

- **Devil's claw.**

Derived from a shrub that grows in southern Africa, the active ingredient is harpagoside, which has an anti-inflammatory effect. Two trials have found devil's claw can significantly reduce pain, but there are various reports of interactions with conventional medicines such as warfarin.

- **Avocado-soybean unsaponifiables.**

This is an extract derived from one-third avocado oil and two-thirds soybean oil. While there have been conflicting results from the small number of published studies, two double-blind studies did find improvement in pain scores in patients taking it for a period of months. This treatment appeared to be more effective for people with osteoarthritis of the hip than of the knee.

- **New Zealand green-lipped mussel (lyprinol).**

Derived from mussels that do indeed come from New Zealand, this product is available freeze-dried, concentrated or ground in capsules. More like an old-style anti-inflammatory, findings for it have been mixed, but some studies suggest that it may reduce inflammation, lubricate joints and reduce pain.

- **Acupuncture.**

Research findings are again inconclusive, but two recent studies found that acupuncture played a modest role in helping boost the power of drugs to reduce the pain suffered by patients with osteoarthritis in their knees, and also helped improve their movement.

- **Thermotherapy — treatment with cold packs.**

It's an inexpensive and easy method of managing osteoarthritis, but again the evidence for any benefit is limited. Cold packs can reduce swelling of the knees and improve movement but don't seem to relieve pain significantly.

- **Electromagnetic therapy.**

Treating osteoarthritis using pulsed electric stimulation has been growing in popularity. While there hasn't been enough rigorous research done in this area, three double-blind clinical trials have suggested that electromagnetic stimulation therapy might reduce pain, particularly in the knee, and may also improve the joint's function.

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» Table

Brand ¹ (in alphabetical order within groups)	Tablets or capsules?	Manufacturer's recommended daily dose	Glucosamine sulphate or glucosamine hydrochloride per tablet or capsule (mg)			Cost per max daily recommended dose ⁵ (cents)
			Claimed ²	Measured ³	% difference ⁴ (measured vs claimed)	
Maximum daily dose more than 1500 mg (based on the measured amount of glucosamine sulphate/hydrochloride)						
BIOGLAN (A)	Tablets	1 to 2	1000	780	-22	52
BLACKMORES (B)	Capsules	1 to 2	1000	780	-22	42
HERRON (B)	Tablets	1 to 2	1000	1020	2	51
NATURE'S WAY (C)	Tablets	1 to 2	1000	940	-6	64
PRETORIUS (A)	Tablets	1 to 2	1000	840	-16	66
Maximum daily dose less than 1500 mg (based on the measured amount of glucosamine sulphate/hydrochloride)						
BIO-ORGANICS (C)	Capsules	2	750	640	-15	70
HERBS OF GOLD (C)	Tablets	1	1125	1000	-11	52
NATURE'S OWN (C)	Capsules	2	750	720	-4	36
NUTRA-LIFE (C)	Capsules	1 to 2	750	660	-12	66
WAGNER PRO-BIOTICS (C)	Capsules	1 to 2	750	540	-28	49

Table notes

(A) Glucosamine sulphate.

(B) Glucosamine hydrochloride.

(C) Glucosamine sulphate/potassium chloride complex. Claimed and measured figures in the table are for glucosamine sulphate/hydrochloride, which we calculated when it wasn't given on the label.

1 Brand

For better comparability, we restricted the test to products that contain glucosamine only. You should be able to easily find these brands in supermarkets, pharmacies and the major healthfood stores. There are also many products on the market that contain glucosamine in combination with other substances, particularly chondroitin — see **Alternative alternatives**, for more on this.

2 Claimed

The amount of glucosamine sulphate or glucosamine hydrochloride per tablet or capsule claimed on the label. Where the amount stated is for glucosamine sulphate/potassium chloride complex only, we calculated the amount of glucosamine sulphate this contains.

3 Measured

Clinical trials have been done with both the sulphate and hydrochloride forms and they're approximately equivalent. We measured one sample from one batch of each brand; there may be batch-to-batch variations. The results are rounded to the nearest 20 mg.

4 Percentage difference (measured vs claimed)

The difference between the measured amount of glucosamine sulphate/ hydrochloride per tablet or capsule and the amount claimed on the label.

5 Cost per maximum daily recommended dose

This is based on prices we paid in April 2005 and the maximum daily dosage recommended by the manufacturer.

This article last reviewed August 2005

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