

## Polysulfated Glycosaminoglycan (Adequan)

*(for information only)*

Available as injectable

### Background



A joint consists of articulating bones, a fibrous capsule enclosing the joint, and slippery lubricating joint fluid to facilitate the gliding of the two bones across each other when the joint is flexed.

The bones are capped by cushions of cartilage to facilitate frictionless gliding. Cartilage consists of what is called matrix (which makes up 95% of cartilage, the other 5% being chondrocytes, the cells that secrete the matrix). Cartilage matrix consists of collagen (the tough structural fibers that most people have heard of) and proteoglycans (the water absorbent molecules most people have not heard of). The function of a proteoglycan is to soak up water thus creating a cushion, sort of like a water bed, to absorb the pressure exerted on the joint as it works. A proteoglycan molecule looks something like a bottlebrush: it has a long handle (the “proteo” part) and long bristles called glycosaminoglycans (or GAGs) that soak up the water.

Over years, either through injury or poor conformation, cartilage wears down or is damaged and arthritis results. The body must then make more matrix and will require the raw materials to do so. Polysulfated GAGs may be injected into the body where they will be distributed to any joints currently effecting cartilage repair.

It turns out, however, that polysulfated GAGs represent more than just building materials. They have anti-inflammatory properties of their own that help slow down the actual damage to the cartilage. They also promote enzyme systems that facilitate other aspects of joint repair beyond simply making more matrix. They help the joint create more lubricating fluid as well.

The active ingredient in Adequan® is polysulfated GAG, which is mostly chondroitin sulfate, extracted from cow tissue (the trachea, to be exact).



### How this Medication is Used

In treating arthritis, injections are given twice a week for 4 weeks for a maximum of eight injections. Injections are given intramuscularly. Dogs, cats, and horses are the usual patients.

There is another more controversial use for this medication and that is in the treatment of [feline lower urinary tract disease](#). One of the theories of this very complicated syndrome is that the GAGs that line the

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urinary bladder and help protect the bladder tissue from the irritating urine become depleted. Giving a GAG injection may help restore it, thus helping to resolve the urinary discomfort associated with this syndrome. We know that in humans with interstitial cystitis who were given a synthetic GAG analog called [pentosan polysulfate sodium](#), 38% of affected people showed a greater than 50% improvement in urinary symptoms while only 18% receiving placebo showed similar improvement. Feline lower urinary tract disease has been described as one of the great mysteries of veterinary medicine. No single treatment has emerged as the best one and until one does, this theory seems as good as any. GAG injections are thus often used in therapy for this condition.

### **Side Effects**

In a study of 24 dogs receiving injections, one developed a painful injection site, one developed diarrhea, and one developed a tendency toward increased bleeding. All side effects were classified as mild and none required treatment.

### **Interactions with other Drugs**

None known, in fact, it seems to make an excellent combination with other arthritis treatments for pets.

### **Concerns and Cautions**

This medication has not been studied in pregnant or lactating animals.

**Because polysulfated GAGs are similar in structure to the anticoagulant heparin, they should not be used in patients with known bleeding disorders. In studies where 25 times the recommended dose was used, bleeding tendencies of serious consequence did occur.**

When doses of approximately seven times the recommended dose were used, normal dogs developed enlarged kidneys. Because of this, caution is recommended when using this product in patients with [kidney disease](#).

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