Frequently asked questions about Adequan® Canine (polysulfated glycosaminoglycan)

ABOUT ADEQUAN® CANINE

What is Adequan® Canine?
Adequan® Canine (polysulfated glycosaminoglycan or PSGAG) is the only FDA-approved disease-modifying osteoarthritis drug (DMOAD) for dogs. It is recommended for intramuscular injection for the control of signs associated with non-infectious degenerative and/or traumatic arthritis of canine synovial joints.

Adequan® Canine is a prescription formulation PSGAG. It is a DMOAD which inhibits cartilage loss in a dog’s joints.

Are there age or breed restrictions for Adequan® Canine?
No age or breed restrictions; use in pregnant, breeding or lactating animals has not been evaluated.

How is Adequan® Canine packaged?
Adequan® Canine is a solution that is colorless to slightly yellow; 100 mg/mL in a 5 mL preserved multiple-dose vial, packaged 2 vials per box.

What is the dosage and administration?
2 mg/lb (.02 mL/lb or 1 mL/50 lb) by intramuscular injection only, twice weekly for up to 4 weeks (maximum of 8 injections).

How fast does Adequan® Canine work?
It begins to work in the joint within 2 hours and stays in the joint for approximately 3 days.1

What is the pharmacology of Adequan® Canine?
• Low molecular weight allows the distribution of PSGAG from the bloodstream to the synovial fluid.
• Distribution from the synovial fluid to the cartilage takes place by diffusion.
• In the articular cartilage, the drug is deposited into the cartilage matrix.
• PSGAG reaches synovial fluid within 2 hours of injection.1
• Detectable levels are maintained in synovial fluid and articular cartilage for up to 72 hours.1
• The specific mechanism of action of Adequan® Canine in canine joints is not known.

MODE OF ACTION & EFFICACY

What is the Mechanism of Action for Adequan® Canine?
The specific mechanism of action of Adequan® Canine in joints is not known. In vitro research suggests PSGAG:
• Inhibits certain catabolic enzymes which have increased activity in inflamed joints.
• Enhances the activity of anabolic enzymes.
• Stimulates the synthesis of protein, collagen, proteoglycans and hyaluronic acid by chondrocytes and synoviocytes.
• Potentiates hyaluronic acid synthesis by synovial membrane cells.
• In the articular cartilage the drug is deposited into cartilage matrix and may help shield against further degradation.

What is the proof of efficacy for Adequan® Canine?
Efficacy demonstrated in two studies, radiolabeled and clinical field trials.
• A study was conducted of the distribution of radiolabeled PSGAG into canine serum, synovial fluid and articular cartilage following a single IM injection of 2 mg/lb. Synovial fluid protein (an indicator of synovial inflammation) was significantly reduced in the shoulder joint.1
• Field trial: Dogs (n=51) with radiographically detectable degenerative joint disease in one or two limbs were administered IM injections twice weekly for 4 weeks (total of 8 injections). Dogs treated with Adequan® Canine had statistically significant improvement in range of motion and orthopedic scores compared with placebo-treated control dogs.1

For additional Pharmacology and Efficacy information, see the Full Prescribing Label on page 4.
FAQ FOR PRESCRIBING VETERINARIANS

HOW TO USE: PROTOCOL

Can I give Adequan® Canine to a dog already taking an NSAID?
American Regent Animal Health (ARAH) has not completed any trials or studies identifying the combination use of NSAIDs and Adequan® Canine (polysulfated glycosaminoglycan or PSGAG).

What is the treatment protocol for a new patient starting with Adequan® Canine?
The approved label dose of Adequan® Canine is 2 mg/lb body weight (.02 mL/lb or 1 mL/50 lb), by intramuscular injection only, twice weekly for up to 4 weeks (maximum of 8 injections).

Do not exceed the recommended dose or therapeutic regimen. Do not mix Adequan® Canine with other drugs or solvents. Be sure to practice aseptic techniques in withdrawing each dose to decrease the possibility of post-injection bacterial infections. Adequately clean and disinfect the stopper prior to entry with a sterile needle and syringe. Use only sterile needles and use each needle only once.

What is the treatment protocol after the first 8 injections?
The approved label dose of Adequan® Canine is 2 mg/lb body weight (.02 mL/lb or 1 mL per 50 lb), by intramuscular injection only, twice weekly for up to 4 weeks (maximum of 8 injections). We have no further studies or technical data supporting a use protocol beyond the approved label dosing.

Do I have to keep Adequan® Canine refrigerated?
No, Adequan® Canine needs to be stored at 68° to 77° F (20°C to 25°C) with excursions permitted to 59° to 86° F (15°C to 30°C). You need to avoid prolonged exposure to temperatures greater or equal to 104° F (40°C).

Can I give Adequan® Canine subcutaneously instead of by intramuscular injection?
Adequan® Canine is approved only for intramuscular injection.

Is Adequan® Canine in a multiple-use vial?
Yes, Adequan® Canine contains a preservative, which allows for multiple punctures of an individual vial. A product vial must be used within 28 days of first puncture and is limited to a maximum puncture of 10 times. Please properly dispose of spent needles in accordance with all federal, state and local environmental laws.

HOW DOES ADEQUAN® CANINE COMPARE?

What is the difference between FDA-approved prescription Adequan® Canine and other over-the-counter products?
There are many supplements and over-the-counter products making similar claims to Adequan® Canine. However, these products are only supported by statements and do not have the structured and qualified product testing and trials Adequan® Canine completed to obtain FDA-approval.

Adequan® Canine is the only FDA-approved disease-modifying osteoarthritis drug for use in dogs and is recommended for the control of signs associated with non-infectious degenerative and/or traumatic arthritis of canine synovial joints.

SAFETY INFORMATION

Are there any Contraindications?
Do not use in dogs showing a hypersensitivity to PSGAG. PSGAG is a synthetic heparinoid; do not use in dogs with known or suspected bleeding disorders.

Any Precautions?
The safe use of Adequan® Canine used in breeding, pregnant, or lactating dogs has not been evaluated. Use with caution in dogs with renal or hepatic impairment.

What is the current ISI (Important Safety Information) statement?
Adequan® Canine should not be used in dogs who are hypersensitive to PSGAG or who have a known or suspected bleeding disorder. It should be used with caution in dogs with renal or hepatic impairment. Adverse reactions in clinical studies (transient pain at injection site, transient diarrhea, and abnormal bleeding) were mild and self-limiting. In post approval experience, death has been reported in some cases; vomiting, anorexia, depression/lethargy and diarrhea have also been reported. The safe use of PSGAG in breeding, pregnant or lactating dogs has not been evaluated. For additional safety information, please Click Here for Full Prescribing Information.

For additional Protocol and Safety information, see the Full Prescribing Label on page 4.
ABOUT AMERICAN REGENT
ANIMAL HEALTH
The manufacturer of Adequan® Canine
American Regent Animal Health (ARAH), a division of American Regent, Inc., is committed to advancing animal health with proven FDA-approved products.
As the manufacturer of Adequan® (polysulfated glycosaminoglycan), the company is positioned as a leader in joint health care for dogs and horses. American Regent Animal Health is committed to maximizing our ability to serve you and your patients.
Where can I find out more about American Regent Animal Health?
For more information, visit ARAnimalHealth.com

HOW TO PURCHASE
How can I order Adequan® Canine?
Your Adequan® Canine needs can be serviced through a wide network of authorized veterinary distributors. Please go to the website, adequancanine.com or call ARAH at 800-458-0163.

Can veterinarians or pet owners purchase Adequan® Canine directly from American Regent Animal Health?
We have established a wide network of distributors that make purchase easy. If you want to buy directly from ARAH, we can have our National Key Accounts Manager reach out to you to discuss options. And since this is a prescription-only product, pet owners must purchase through a licensed, practicing veterinarian.

How do I return expired product?
Short-dated or expired Adequan® Canine product should be returned to the distributor that originally supplied the product, per the established return policies. Contact your distributor or American Regent Animal Health at 800-458-0163.

Do I have an ARAH sales representative I can call?
Yes, you can contact ARAH direct at 800-458-0163 if you would like to connect with your ARAH sales representative or contact your local distributor if you need to place an order.

Which distributors currently carry Adequan® Canine?
- Patterson Vet — 800-225-7911
- MWI — 800-824-3703
- Henry Schein Vet — 855-724-3461
- Midwest Vet — 800-643-9378
- Penn Vet — 800-233-0210
- Victor Medical — 800-888-8908

FOR MORE INFORMATION
Where can I get marketing and in-clinic material?
You can coordinate obtaining marketing and promotional material through your local Adequan® Canine sales representative or by contacting American Regent Animal Health directly. To learn more, please visit adequancanine.com or call ARAH at 800-458-0163.

Who can I call with questions about Adequan® Canine?
To speak to a customer service representative, please call 800-458-0163 Monday-Friday, 8 a.m. to 6 p.m. ET or email cs@americanregent.com. For technical questions, call Medical Affairs at 888-354-4855 Monday-Friday, 9 a.m. to 5 p.m. ET. To report an adverse event, call 800-734-9236 or email pv@americanregent.com.

Is there a website?
Yes, you can learn more at adequancanine.com.
Pharmacology:
Pharmacology:
The specific mechanism of action of Adequan® in canine joints is not known.
PSGAG is characterized as a "disease modifying osteoarthritis drug". Experiments conducted in vitro have shown PSGAG to inhibit certain catabolic enzymes which have increased activity in inflamed joints, and to enhance the activity of some anabolic enzymes. For example, PSGAG has been shown to significantly inhibit serine proteinases. Serine proteinases have been demonstrated to play a role in the Interleukin-I mediated degradation of cartilage proteinases and collagen. PSGAG is reported to be an inhibitor of Prostaglandin E2 (PGE2) synthesis. PGE2 has been shown to increase the loss of proteoglycan from cartilage. PSGAG has been reported to inhibit some catabolic enzymes such as elastase, stromelysin, metalloproteinases, cathepsin B1, and hyaluronidases, which degrade collagen, proteoglycans, and hyaluronic acid in degenerative joint disease. Anabolic effects studied include ability to stimulate the synthesis of protein, collagen, proteoglycans, and hyaluronic acid in various cells and tissues in vitro. Cultured human and rabbit chondrocytes have shown increased synthesis of proteoglycan and hyaluronic acid in the presence of PSGAG. PSGAGs have shown a specific potentiating effect on hyaluronic acid synthesis by synovial membrane cells in vitro.

Absorption, distribution, metabolism, and excretion of PSGAG following intramuscular injection have been studied in several species, including rats, rabbits, humans, horses and dogs. Studies in rabbits showed maximum blood concentrations of PSGAG following IM injection were reached between 20 to 40 minutes following injection, and that the drug was distributed to all tissues studied, including articular cartilage, synovial fluid, adenals, thyroid, peritoneal fluid, lungs, eyes, spinal cord, kidneys, brain, liver, spleen, bone marrow, skin, and heart.

Following intramuscular injection of PSGAG in humans, the drug was found to be bound to serum proteins. PSGAG binds to both albumin and beta-globulins and the extent of the binding is suggested to be 30 to 40%. Therefore, the drug may be present in both bound and free form in the bloodstream. In the bloodstream, free PSGAG is excreted by the kidneys. The synovial membrane is suggested to be a significant barrier to distribution of PSGAG from the bloodstream to the synovial fluid. Distribution from the synovial fluid to the cartilage takes place by diffusion. In the articular cartilage the drug is deposited into the cartilage matrix.

Serum and synovial fluid distribution curves of PSGAG have been studied in dogs and appear similar to those found in humans and rabbits.
In rabbits, metabolism of PSGAG is reported to take place in the liver, spleen, and bone marrow. Metabolism may also occur in the kidneys. PSGAG administered intramuscularly and not proactively injected into the bloodstream is bound or bound to other tissues is excreted primarily via the kidneys, with a small proportion excreted in the feces.

Toxicity: In a subacute toxicity study, 32 adult beagle dogs (4 males and 4 females per treatment group) received either 0.9% saline solution or PSGAG at a dose of 5 mg, 15 mg, or 50 mg/kg of body weight (approximately 2.3, 6.8, or 22.7 mg/kg), via intramuscular injection twice weekly for 13 weeks. PSGAG doses represent approximately 1X, 3X, and 10X the recommended dosage of 2 mg/lb, and more than 2 and 3 times the recommended 4-week duration of treatment. Necropsies were performed 24 hours after the final treatment. During week 12, one dog in the 50 mg/kg dosage group died 1 day post-treatment. No other mortalities occurred during the treatment period. Statistically significant changes in the 50 mg/kg group included increased prothrombin time, decreased platelet count, an increase in ALT and cholesterol, and increased liver and kidney weights. Increased cholesterol and kidney weights were also noted in the 15 mg/kg group. Microscopic lesions were noted in the liver (Kupffer cells containing eosinophilic foamy cytoplasm), kidneys (swollen, foamy cells in the proximal convoluted tubules), and lymph nodes (macrophages with eosinophilic foamy cytoplasm) in the 15 mg/kg and 50 mg/kg groups. Intramuscular inflammation, hemorrhage, and degeneration were seen in all 3 PSGAG treated groups; the incidence and severity appeared dose related.

Efficacy: Efficacy of Adequan® Canine was demonstrated in two studies. A laboratory study using radiolabeled PSGAG established a relationship between PSGAG canine serum and synovial fluid following a single intramuscular injection of 2 mg/kg. A clinical field trial was conducted in dogs diagnosed with radiographic-confidence traumatic and/or degenerative joint disease of 1 or 2 joints. Joints evaluated included hips, stifles, shoulders, hocks and elbows. Fifty-one dogs were randomly assigned to receive either Adequan® Canine at 2 mg/lb of body weight or 0.9% saline.

Both treatments were administered by intramuscular injection twice weekly for 4 weeks (8 injections total). Investigators administering treatment and evaluating the dogs were unaware of the treatment assignment. A total of 71 limbs in 51 dogs were evaluated. Of these, 35 limbs in 24 dogs were in the Adequan® Canine treated group. Each lame limb was scored for lameness at a walk, lameness at a trot, pain, range-of-motion, and functional disability. The scores for the individual parameters were combined to determine a total orthopedic score. At the end of the treatment period, dogs treated with Adequan® Canine showed a statistically significant improvement in range of motion compared to placebo treated control dogs.

Indications and Usage: Adequan® Canine is recommended for intramuscular injection for the control of signs associated with non-infectious degenerative and/or traumatic arthritis of canine synovial joints.
Contraindications: Do not use in dogs showing hypersensitivity to PSGAG. PSGAG is a synthetic/heparinoid; do not use in dogs with known or suspected bleeding disorders.

Precautions: The safe use of Adequan® Canine in breeding, pregnant, or lactating dogs has not been evaluated. Use with caution in dogs with renal or hepatic impairment.

Adverse Reactions: In the clinical efficacy trial, 24 dogs were treated with Adequan® Canine twice weekly for 4 weeks. Possible adverse reactions were reported after 2.1% of the injections. These included transient pain at the injection site (1 incident), transient diarrhea (1 incident each in 2 dogs), and abnormal bleeding (1 incident). These effects were mild and self-limiting and did not require interruption of therapy.

Post Approval Experience (2014): The following adverse events are based on voluntary, post-approval reporting. Not all adverse reactions are reported to FDA/CMV. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data. The signs reported are listed in decreasing order of reporting frequency.

Vomiting, anorexia, depression/lethargy, diarrhea

In some cases, death has been reported.

To report suspected adverse drug events, contact American Regent, Inc. at 1-800-458-0163. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or http://www.fda.gov/AnimalVets/SafetyHealth.

Warnings: Not for use in humans. Keep this and all medications out of reach of children.

DOSAGE AND ADMINISTRATION: Practice aseptic techniques in withdrawing each dose to decrease the possibility of post-injection bacterial infections. Adequately clean and disinfect the injection site with a sterile needle and syringe. Use only sterile needles, and use each needle only once.

The vial stopper may be punctured a maximum of 10 times.
The recommended dose of Adequan® Canine is 2 mg/lb body weight (0.02 mL/lb, or 1 mL per 50 lb), by intramuscular injection only, twice weekly for up to 4 weeks (maximum of 8 injections). Do not exceed the recommended dose or therapeutic regimen. Do not mix Adequan® Canine with other drugs or solvents.

Storage Conditions: Store at 20° to 25°C (68° to 77°F) excursions permitted to 15° to 30°C (59° to 86°F) (See USP Controlled Room Temperature). Avoid prolonged exposure to temperatures ≥40°C (104°F).

Use within 28 days of first puncture and puncture a maximum of 10 times. Dispose of spent needles and syringes. Use only sterile needles, and use each needle only once.

Need assistance or want more details?
800-458-0163  adequancanine.com