

Beyond Slowing Down: Diagnosing and Managing
Arthritis in Senior Pets”

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What is arthritis

Arthritis in dogs and cats is a chronic, progressive joint disorder characterized by synovial inflammation, articular cartilage degeneration, subchondral bone remodeling, and periarticular fibrosis, resulting in pain, reduced range of motion, and functional impairment.



What are common signs of OA pain in dogs and cats?

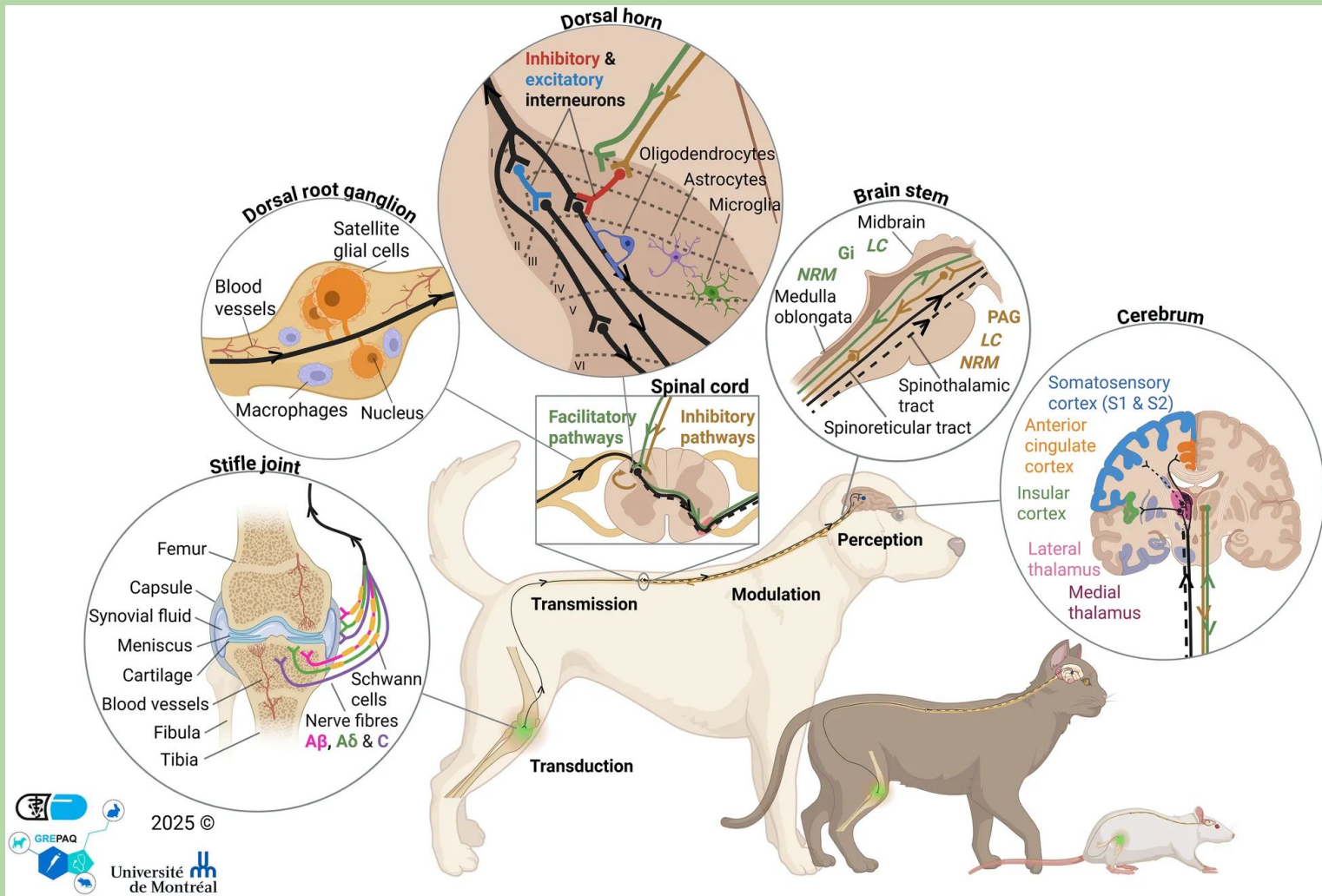
Patients with OA may experience joint pain and tenderness, reduced mobility, stiffness, reduced range of motion and reluctance to exercise, crepitus, muscle atrophy, joint effusion and inflammation.

The pain is associated with direct stimulation of the joint capsule and bone receptors by cytokines and degradative process (Fox and Mills, 2010)



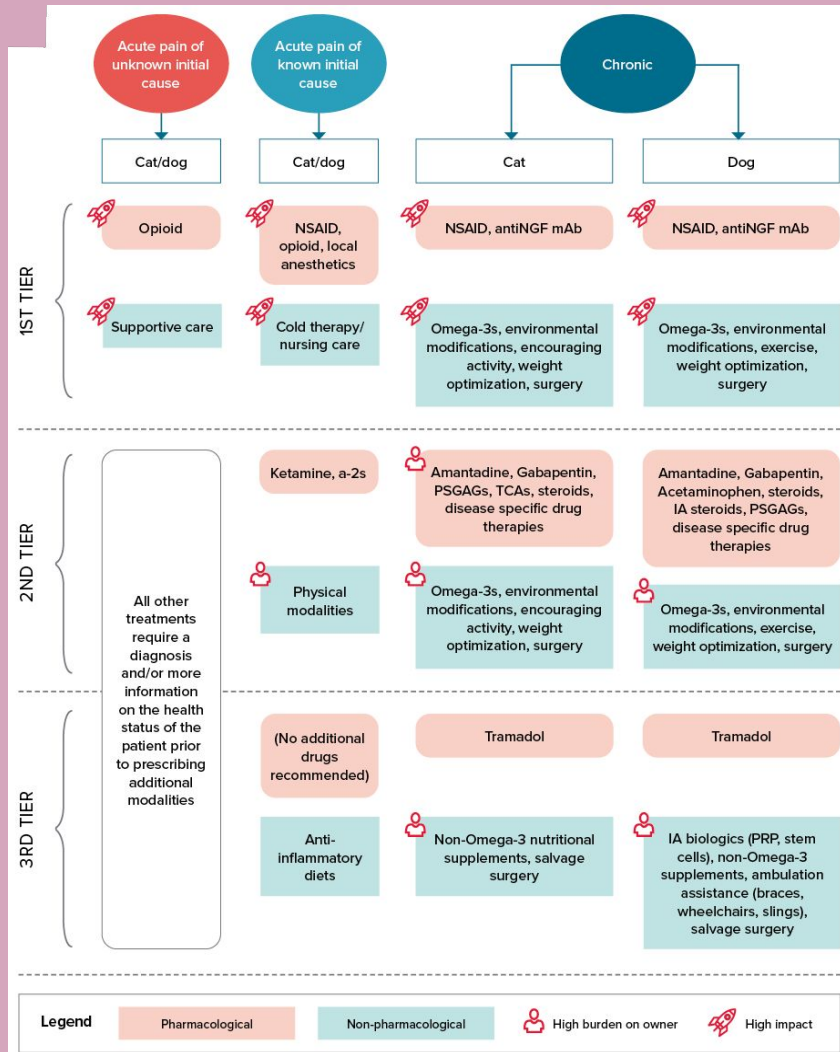
Pain Pathways

Osteoarthritis (DJD) stems from cartilage degradation, synovial inflammation, and abnormal bone remodeling. This chronic condition involves chronic inflammation, pain sensitization (where the nervous system overreacts to stimuli), and reduced mobility.



2022

AAHA Pain Management Guidelines



In Office Assessment of Chronic OA pain

Client observation and concerns

Detailed history taking

Physical exam as well as including range of motion, gait evaluation, posture, watching patient move thru sitting, laying down and moving to standing.

Focus on muscle mass (comparing to the opposite limb)

Resources: Zoetis for evaluating patients for OA-<https://www2.ph.zoetis.com/oa-pain/canine-oa-pain>

Resources to assess pain in our canine patients

COAST (Canine Osteoarthritis Staging Tool)

- Veterinary framework used to identify and monitor osteoarthritis in dogs
- Stages disease progression from **0–4**
- Helps veterinarians tailor treatment plans based on severity
- Supports ongoing monitoring of disease progression and response to therapy

Canine Brief Pain Inventory (CBPI)

- Standardized questionnaire used by veterinarians and dog owners
- Evaluates:
 - Severity of pain
 - Impact of pain on daily activities
- Commonly used for dogs with osteoarthritis
- Helps track treatment effectiveness over time

Liverpool Osteoarthritis in Dogs (LOAD)

- Owner-completed questionnaire
- Designed to assess canine joint (articular) disorders
- Provides a structured way to evaluate mobility and pain in dogs

Feline OA pain evaluation tools

- **Feline Musculoskeletal Pain Index – Short Form (FMPI-sf)**

- Owner-completed assessment tool
- Evaluates severity and impact of musculoskeletal pain in cats
- Contains **9 items** focused on activities affected by joint pain
- Helps identify functional limitations related to osteoarthritis

Client Specific Outcome Measures (CSOM)

- Owner-based, individualized assessment tool
- Evaluates how pain affects activities specific to each cat
- No fixed questionnaire items
- Activities are selected by the owner with guidance from a veterinarian or technician
- Can include context-specific factors such as time and environment

Montreal Instrument for Cat Arthritis Testing – Caregiver Version (MI-CAT(C))

- Owner-completed tool for assessing clinical signs of osteoarthritis
- Contains **38 items**
- Assesses multiple domains, including:
 - Agility
 - Social behavior
 - Play and exploratory behavior
 - Self-maintenance
 - Physical condition

Feline tier one options

NSAIDS(Onsior)

- Inhibit **cyclooxygenase (COX-1 & COX-2)** → ↓ prostaglandin synthesis
- ↓ peripheral inflammation → reduced sensitisation of nociceptors ↓ central sensitisation → improved pain control
- Risks:
 - a. **Renal effects**
 - Prostaglandins maintain renal perfusion → inhibition may ↓ GFR
 - Risk ↑ with **CKD, dehydration, hypotension, anesthesia**
 - **Gastrointestinal toxicity**
 - Vomiting, diarrhea, ulceration (less common than dogs but possible)
 - **Drug interactions**
 - Avoid combining with **other NSAIDs or corticosteroids**
 - Use caution with drugs affecting renal perfusion (e.g., ACE inhibitors)
 - **Dosing sensitivity in cats**
 - Limited glucuronidation → **longer drug half-life**
 - Use **lowest effective dose and extended dosing intervals**

Tier One continued

Anti Nerve Growth Factor Monoclonal Antibody

Solensia

- **Felinized monoclonal antibody designed to recognize and attach to a protein called nerve growth factor which is involved in the regulation of pain**
- **When Frunevetmab binds to NGF it prevents the bound NGF from attaching to its receptors on the nerve cells and therefore regulates pain signals**

Omega-3 Fatty Acids / Joint Diets

- Evidence supports benefit in OA
- Improves mobility, activity, behaviour
- Suggested dose: ~60–70 mg/kg EPA+DHA
- Start low (1/4–1/2 dose) to minimize GI upset
- Therapeutic “joint diets” may help

Feline Tier Two Options

Gabapentin

- May be used alone or with NSAIDs for DJD pain
- Improved impaired activities but ↓ activity (sedation effect)
- Dose: ~10 mg/kg PO q12h
- Adverse effects: sedation (most common), ataxia, weakness, tremors
- Consider ↓ blood pressure risk (especially with CKD or NSAIDs)

Amantadine

- NMDA receptor antagonist → targets central sensitisation
- May reduce overall activity

Tramadol

- Effective oral analgesic in cats (good bioavailability but not in dogs)
- Improves mobility & QoL at ~2 mg/kg PO q12h
- Reduces central sensitisation
- Adverse effects: GI upset, sedation, euphoria; bitter tablets
- Longer half-life → q12h dosing
- Avoid transdermal (poor absorption)

Feline Tier Three Options

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FELINE CHRONIC PAIN MANAGEMENT: RECOMMENDED DRUG DOSES

Drug	Formulation/Class	Dose
OPIOIDS		
Buprenorphine	Injectable solution (0.3 mg/mL)	<ul style="list-style-type: none"> • Transmucosal: Using the injectable formulation (0.3 mg/mL), administer 0.01–0.03 mg/kg, which equates to 0.033–0.1 mL/kg, Q 6–8 H
Tramadol	Tablets, oral compounded liquid	<ul style="list-style-type: none"> • Starting dose: 2 mg/kg PO Q 12 H commonly used • Dose range: 1–4 mg/kg PO Q 8–12 H
NSAIDS		
Meloxicam*	Oral suspension (0.5 mg/mL)	<ul style="list-style-type: none"> • ISFM/AAFP Guidelines: Initial dose, 0.1 mg/kg PO; then 0.05 mg/kg PO Q 24 H • Alternative long-term dosing: 0.05 mg/kg EOD or 0.025 mg/kg Q 24 H
Robenacoxib[†]	Tablets	<ul style="list-style-type: none"> • 1 mg/kg PO Q 24 H for up to 3 days[‡]
ADJUNCT MEDICATIONS		
Amantadine	Antiviral drug	<ul style="list-style-type: none"> • 3–5 mg/kg PO Q 24 H
Amitriptyline	Tricyclic antidepressant	<ul style="list-style-type: none"> • 0.5–2 mg/kg PO Q 24 H
Gabapentin	Anticonvulsant	<ul style="list-style-type: none"> • 5–10 mg/kg PO Q 8–12 H
Prednisolone	Glucocorticoid	<ul style="list-style-type: none"> • 0.5–1 mg/kg PO Q 24 H

*Use of meloxicam oral suspension in cats is extra-label; [†]Approved for short-term use in cats \geq 5.5 lb (2.5 kg) and \geq 6 months of age; [‡]ISFM/AAFP Guidelines recommend administration up to 6 days

Assistive devices Cats

Raised bowls





HELPS ME INTO
MY LITTER BOX



LOW-SIDED
BEDS



FURNITURE
RAMPS

Heated beds

Heated beds- Knead



BuzzFeed

WIRED

BUSINESS INSIDER

Tier One Options in Dogs

NSAIDS:

Carprofen, Meloxicam, Deracoxib, Firocoxib, Grapiprant (EP4 receptor antagonist; non-COX pathway)

Drug Selection Considerations

- Patient factors: age, comorbidities (renal, hepatic, GI)
- Owner factors: cost, dosing convenience, compliance

Long-Term Use: What Matters

- Use **lowest effective dose**; consider dose taper after stabilization
- Some patients benefit from **intermittent vs continuous therapy**

Monitoring Strategy

- Baseline CBC/Chem/UA before initiation
- Recheck at 2–4 weeks, then every 3–6 months
- Monitor for subtle trends (ALT, creatinine, BUN)

Adverse Effects

- GI: chronic vomiting, melena, inappetence
- Renal: cumulative risk with dehydration or concurrent disease
- Hepatic: rare, often idiosyncratic

Anti NGF Monoclonal Antibody

Librela (Bedinvetmab): Anti-NGF Therapy for Canine OA

Mechanism of Action

- Monoclonal antibody targeting **nerve growth factor (NGF)**
- Prevents NGF binding to TrkA receptors → ↓ peripheral pain sensitization
- Does **not** inhibit COX pathways → non-NSAID option

Clinical Role

- Monthly SQ injection
- Effective for **chronic osteoarthritis pain**, especially when NSAIDs are inadequate or contraindicated
- Can be used as part of a **multimodal pain plan**

Efficacy

- Improves mobility and owner-assessed quality of life
- Onset typically within days to weeks
- Consistent benefit with repeated monthly dosing

Advantages

- Minimal GI, renal, or hepatic toxicity compared to NSAIDs
- Good option for geriatric patients or those with comorbidities
- Convenient dosing → improved compliance

Safety & Adverse Effects

- Generally well tolerated
- Reported: mild injection site reactions, lethargy

Neurologic Concerns

- Post-marketing reports of **worsening neurologic signs** (e.g., ataxia, paresis)
- Unclear causality vs **unmasking of underlying neurologic disease** as pain improves
- Theoretical concern: increased activity → exacerbation of subclinical conditions (IVDD, DM)

Clinical Approach to Risk

- Perform thorough neuro exam prior to initiation
- Avoid in dogs with **pre-existing neurologic disease**
- Monitor closely after first 1–2 injections
- Counsel owners on signs: weakness, knuckling, gait changes

Omega-3 Fatty Acids

Mechanism of Action

- Provides EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid)
- Reduces production of pro-inflammatory mediators (e.g., prostaglandins, cytokines)
- Helps decrease joint inflammation and cartilage degradation

Clinical Benefits

- Improves mobility and weight-bearing
- Reduces pain and stiffness
- May decrease reliance on NSAIDs in some patients

Dosing Considerations

- Dose based on **EPA + DHA content**, not total fish oil
- Typical target: **~50–100 mg/kg EPA+DHA daily** (confirm per product)

Key Points

- Requires consistent, long-term administration
- Best used as part of a **multimodal pain management plan**



Tier 2 options for Canine OA

Role in Chronic Pain

- Used when NSAIDs/anti-NGF therapy are insufficient or contraindicated
- Target **central sensitization and neuropathic components**
- Always part of a **multimodal plan**, not monotherapy

Gabapentinoids

- **Gabapentin**
 - Mechanism: $\alpha 2\delta$ calcium channel modulation \rightarrow \downarrow excitatory neurotransmitter release
 - Use: chronic OA with central sensitization, neuropathic pain
 - Notes: variable oral bioavailability; sedation common early
- **Pregabalin**
 - More predictable PK vs gabapentin; longer dosing interval
 - Consider when gabapentin response is inconsistent

NMDA Antagonist (Oral)

- **Amantadine**
 - Mechanism: NMDA receptor antagonism \rightarrow \downarrow “wind-up” pain
 - Use: **adjunct to NSAIDs/anti-NGF** for refractory OA
 - Delayed onset (days–weeks); generally well tolerated

Other Oral Option

- **Acetaminophen (Paracetamol)**
 - Central COX inhibition; weak anti-inflammatory effect
 - Use: adjunct analgesic when NSAIDs limited/contraindicated
 - **Caution:** avoid in cats; monitor liver; avoid combination with other hepatotoxins

Tier 2 options for Chronic Canine OA- injectable

Ketamine (NMDA Antagonist)

- **Single Injection**
 - Low-dose IV/IM for short-term modulation of central sensitization
 - Useful for flare-ups or peri-procedural support in chronic pain patients
- **One-time CRI (Constant Rate Infusion)**
 - 12–24 hr (protocol-dependent) to “reset” wind-up pain
 - Can improve response to ongoing oral/NSAID/anti-NGF therapy

When to Consider Ketamine

- Refractory OA pain with suspected **central sensitization**
- Patients failing standard multimodal regimens

Safety & Monitoring

- Dose-dependent dysphoria, sedation, hypersalivation
- Monitor HR/BP; use caution in cardiac disease
- Combine with sedatives as needed to smooth recovery

Tier 3 options for Canines

Regenerative Medicine (PRP & Stem Cell Therapy)

Role in Chronic Pain

- Consider for **refractory osteoarthritis** or when standard multimodal therapy is insufficient
- Aimed at **modifying joint environment**, not just analgesia

Platelet-Rich Plasma (PRP)

- Autologous concentration of platelets → growth factors (PDGF, TGF- β , VEGF)
- Mechanism: ↓ inflammation, ↑ tissue repair signaling
- Typically intra-articular injection
- Evidence: variable but growing; some dogs show improved lameness/function
- Limitations: variability in preparation methods and response

Stem Cell (MSC) Therapy

- Sources: adipose or bone marrow-derived
- Mechanism: immunomodulation, anti-inflammatory cytokine release, potential tissue repair
- Admin: intra-articular ± IV (protocol dependent)
- Evidence: mixed; some benefit in OA, but **standardization lacking**

Mechanical Support & Mobility Assistance

Role in Chronic Pain

- Address **biomechanics and function** alongside pharmacologic therapy
- Particularly valuable in **advanced OA, neurologic disease, or limb instability**

Assistive Devices

- **Splints/Orthotics**
 - Provide joint stabilization (e.g., carpal/hock instability)
 - May reduce pain by limiting abnormal motion
 - Require proper fitting and monitoring for sores
- **Wheelchairs/Carts**
 - Restore mobility in non-ambulatory or severely weak patients
 - Improve quality of life and allow continued activity
- **Harnesses & Support Slings**
 - Aid ambulation, reduce caregiver strain
 - Useful for hindlimb weakness or post-exertional fatigue

Risks & Limitations

- Poor fit → pressure sores, compliance issues
- Some dogs require acclimation period
- Does not treat underlying pathology → **supportive, not curative**

Assistive devices

Help'em up harness-<https://helpemup.com/>



IVDD-L'il Back

Bracer-<https://lilbackbracer.com/products/lil-back-bracer>



Assistance with slipping-

- 1.PawFriction kits- adhesive with non slip granules
- 2.Non slip booties
- 3.Non skid pads
- 4.Toe Grips



Carts



Non Pharmacologic Options for Cats & Dogs

Acupuncture

- Safe, nonpharmacologic intervention with minimal adverse effects
- Well tolerated by most animals
- Endorsed by:
 - American Animal Hospital Association
 - American Association of Feline Practitioners
 - World Small Animal Veterinary Association
- Recommended as a safe adjunct treatment for pain management in dogs and cats
- Increases endogenous opioid production (natural pain relief)

Laser Therapy

- Reduces inflammatory mediators:
 - Interleukin-1 (IL-1)
 - Interleukin-6 (IL-6)
 - Tumor Necrosis Factor (TNF)
 - Cyclooxygenase-2 (COX-2)
- Helps decrease inflammation that contributes to cartilage degeneration

PEMF (Assisi Loop and Assisi Bed)

- Uses pulsed electromagnetic fields to penetrate deep into tissues
- Stimulates cellular activity and healing processes
- Increases nitric oxide production, helping reduce inflammation
- Promotes faster healing and pain relief
- Encourages vasodilation (widening of blood vessels)
- Improves oxygen delivery to affected tissues



THAT'S ODD... MY NECK SUDDENLY FEELS BETTER...

EARLY ACUPUNCTURE

off the wall

PSGAG

PSGAGs (Adequan®)

PSGAGs are FDA-regulated drugs (NOT nutraceuticals)

- Adequan Canine
 - FDA-licensed for IM use in **noninfectious degenerative/traumatic arthritis** (dogs)
 - Semi-synthetic GAG derived from **bovine tracheal cartilage**

Administration

- Best used **early in OA** (chondroprotective)
- Dose: **2 mg/lb IM**, twice weekly × 4 weeks

Proposed Mechanisms

- ↓ proteoglycan degradation
- ↓ aggrecanases, MMPs, nitric oxide, PGE₂
- ↑ glycosaminoglycan (GAG) synthesis
- ↑ hyaluronan (synovial fluid support)

Supplements

Green lipped muscle

- Green lipped muscle powder (GLMP; *Perna canaliculus*) Contains a unique omega-3 fatty acid, eicosatetraenoic acid (ETA), which appears to act as a dual inhibitor of arachidonic acid oxygenation by both the cyclooxygenase and lipoxygenase pathways.³ 6 of 7 studies in dogs treated with greenshell muscle extract showed beneficial effects for alleviating symptoms of osteoarthritis.

Glucosamine/ Chondroitin

- Glucosamine is an amino monosaccharide that, once modified as N-acetylglucosamine, is proposed to act as a precursor of the disaccharide units of GAGs such as hyaluronan and keratin sulfate. Chondroitin sulfate is a GAG consisting of alternating disaccharide subunits of glucuronic acid and sulfated N-acetylgalactosamine. Chondroitin sulfate is a normal constituent of cartilage. Oral absorption concerns in dogs Pharmacokinetic studies in dogs reveal that glucosamine hydrochloride is only 10-12% bioavailable from single or multiple doses 12% bioavailability for glucosamine and 5% for chondroitin

Avocado/Soybean Unsaponifiables (ASU)

- Definition o ASUs are plant extracts derived from unsaponifiable residues of avocado and soya bean oils, commonly mixed at a ratio of one-third to two-thirds, respectively.⁶ o ASU contain many compounds including fat-soluble vitamins, sterols, triterpene alcohols, and possibly furan fatty acids.

Boswellia serrata extract

- Boswellia trees and shrubs are native to tropical regions of Africa and Asia¹ Works synergistically with ASU+glucosamine+chondroitin sulfate to suppress the production of PGE₂ in IL-stimulated cell cultures¹ An open multicenter veterinary clinical trial of dogs with manifestations of chronic joint and spinal disease treated with Boswellia resin showed a reduction in lameness, local pain, and stiffness compared to baseline but there was no placebo group.

