

Analgesic Use in Virginia Opossums: *Metacam*<sup>®</sup> Advisory

*AT A GLANCE*

- *Metacam*<sup>®</sup> is potentially dangerous to Virginia opossums.
- *Metacam*<sup>®</sup> (meloxicam) is not recommended in opossums due to evidence of organ damage seen in cats and other domestic species with its use.
- *Metacam*<sup>®</sup> is an NSAID (non-steroidal anti-inflammatory drug) often used by veterinarians for pain and inflammation.
- NSAIDs like *Metacam*<sup>®</sup> treat pain by reducing inflammation caused by underlying conditions, meaning they are analgesic (pain-relieving) as well as anti-inflammatory.
- NSAIDs, while routinely used in human medicine, are not well tolerated by animals.
- Severe pain, such as from vehicle collisions, may require opioids, a different class of analgesic drugs which includes buprenorphine, tramadol, and fentanyl. These block pain signals from reaching the brain.
- Botanical supplements and other natural remedies such as *Boswellia*, curcumin, and green-lipped mussel are suitable choices for addressing chronic pain due to inflammation, such as with joint disorders like osteoarthritis.
- REMINDER: Always include vitamins and supplements as part of a complete medication record, and disclose all such information to your veterinarian.

*Metacam*<sup>®</sup>: *The Basics*

*Metacam*<sup>®</sup>, generic name meloxicam, is an NSAID (non-steroidal anti-inflammatory drug) approved to treat pain and inflammation in dogs. Most commonly used to combat effects associated with osteoarthritis, it is also often prescribed by veterinarians for rheumatoid arthritis, postoperative pain, and pain and inflammation from infections and cancer.

*Metacam*<sup>®</sup> is available both as a 5 mg/mL injectable solution intended for dosing at 0.20 mg/kg of body weight and as an oral suspension commonly available at 0.5 mg/mL and 1.5 mg/mL intended for dosing at 0.10 mg/kg of body weight.<sup>1</sup>

**Figure 1:** Metacam<sup>®</sup> in its manufacturer packaging



<https://petvm.com/pain/61-metacam.html>

NSAID use, while relatively safe in humans, can be problematic in other species. Few such drugs are approved for canine application in the United States, and the use of most NSAIDs is contraindicated in cats. For example, in the case of Metacam<sup>®</sup>, the manufacturer warns on the packaging of the association between renal failure and resultant death in cats with the drug's repeated use.<sup>2</sup>

Some veterinarians with ample Virginia opossum experience rely on Metacam<sup>®</sup> for pain management. However, there is sufficient literature to suggest Metacam<sup>®</sup> poses a serious threat to major organ function. In cases of palliative care, where potential long-term organ damage is not a concern, Metacam<sup>®</sup> is an option to treat pain, though it may quicken or exacerbate extant organ failure in hospice patients. For use in opossums, erring on the side of caution is recommended here.

#### *Alternate NSAIDs and Other Analgesics*

There is a difference between an anti-inflammatory drug and an analgesic drug. Some drugs, like NSAIDs, are both anti-inflammatory and analgesic, meaning they relieve pain by way of relieving inflammation. Other drugs, like opioids, are analgesic in that they address pain, but they do so by blocking pain signals to the brain and do not address the root causes of that pain.

NSAIDs are used routinely in human medicine to fight pain, fevers, and inflammation. Use of these drugs in animals, however, can be fraught. Metacam<sup>®</sup> belongs to the cyclooxygenase inhibitory class of NSAIDs, which is associated with kidney, liver, and gastrointestinal side effects. Other NSAIDs regularly used in veterinary medicine, mainly in dogs and/or horses, include carprofen (Rimadyl<sup>®</sup>), robenacoxib (Onsior<sup>®</sup>), and firocoxib (Equioxx<sup>®</sup>). Tepoxalin (Zubrin<sup>®</sup>), a discontinued dual-action NSAID, would have likely been the best alternative to Metacam<sup>®</sup> for Virginia opossums as well as domestic species, as it was believed to induce fewer side effects while maintaining cyclooxygenase inhibition.<sup>3</sup> (NOTE: If any members of the wildlife rehabilitation/veterinary community have experience with Zubrin<sup>®</sup>, please contact us at [sanctuari.org@gmail.com](mailto:sanctuari.org@gmail.com)).

A major limitation of these medications in general is that they cannot target only *inflammatory* cyclooxygenase species. Normal cellular function involves other, non-inflammatory cyclooxygenases. As NSAIDs cannot discriminate between constructive cyclooxygenase species and the inflammatory ones, NSAID use can compromise cellular function, leading to serious side effects. This class of drugs is therefore risky to use in species other than those expressly studied.

For opossums with traumatic injuries, for example from vehicle collisions or dog attacks, veterinarians may prescribe opioid analgesics such as buprenorphine, fentanyl, and/or tramadol to combat severe pain. NSAIDs and anti-inflammatory supplements are not substitutes for treatment of this kind.

### *Natural Remedies and Supplements*

Botanical medicines and other alternative natural anti-inflammatory supplements are options for management of chronic inflammatory conditions or to complement analgesic drug therapy. For example, mature Virginia opossums who are “down in the rear” despite proper diets could be suffering from an inflammatory joint condition such as osteoarthritis. Herbal dietary supplementation with *Boswellia*, an extract from the *Boswellia serrata* tree, otherwise known as Indian frankincense, has been demonstrated to reduce the effects of chronic inflammatory joint disease in dogs.<sup>4</sup>

Additionally, curcumin, an active component found in turmeric, has been demonstrated in both veterinary and human medicine to possess significant anti-inflammatory properties when administered in a properly bioavailable form. Most forms of the supplement marketed for medicinal use are therefore accordingly chemically altered in some way. Though curcumin constitutes only a small percentage of turmeric, using the spice in cooking can also achieve suitable bioavailability if prepared properly.

A Sanctuari-affiliated veterinarian who has treated numerous Virginia opossums over many years was asked for their input on Metacam<sup>®</sup> alternatives for this advisory. Because of the paucity of effective and safe analgesic/anti-inflammatory drugs available to veterinary medicine, this veterinarian created their own supplement combining curcumin and *Boswellia*. In their experience, the combination has demonstrated synergistic effects which significantly increased treatment efficacy versus each supplement independently. The veterinarian prescribes this supplement combination most often to patients for management of pain due to post-op inflammation or inflammatory joint conditions. The supplement usually takes effect within a few days, which is acknowledged to be slower-acting than NSAIDs but which spares the patient the risk of organ damage. (To reiterate, this supplement combination is *anti-inflammatory*, relieving pain arising from inflammation in a manner distinct from that of NSAIDs).

We have found the taste of the above supplement combination to be surprisingly objectionable to opossums. Daily doses of ~90 mg must be consumed by the average-sized adult opossum for best results, with noticeable effects expected to be observed within days. (For chronic inflammation, results may take

several weeks of consistent dosing.) We have found the most success in terms of palatability when mixing the supplement combination into a small amount of sardine oil, and a slightly lower rate of success when mixed into yogurt. As we build empirical knowledge as to the efficacy of this treatment, we will update this advisory. Since both curcumin and *Boswellia* are known to be relatively safe and strongly anti-inflammatory, we are motivated to continue investigating the combination as a possible alternative to NSAIDs for long-term control of inflammation.

**Figure 2:** Green-lipped mussel supplement used with success by Sanctuari



<https://www.naturitas.us/p/supplements/green-lipped-mussel-500mg-60-capsules-swanson>

Green-lipped mussel extract is another choice for controlling inflammation and has been found in several animal studies to inhibit cyclooxygenase pathways.<sup>5</sup> Sanctuari has had success in opossums with daily dosages ranging from 50 mg to 200 mg. This supplement has to date been very well tolerated in dozens of instances. (For more, please see our *Avascular Necrosis in Virginia Opossums* advisory).

### *Conclusion*

For a wildlife rehabilitator looking to relieve inflammatory pain in a patient, there are currently limited options. Wildlife medicine to date has yielded few drugs that treat pain by addressing underlying inflammation, and rehabilitators and veterinarians often either accept or are ignorant to the potential harms of NSAIDs like Metacam<sup>®</sup>. The significant medical value of NSAIDs in humans is not mirrored in many other species. At a minimum, bloodwork to ensure healthy organ function would need to be performed before, during, and after administering drugs of this class, often making the process more stressful for the animal. Narcotic analgesics are a good option for relieving moderate to severe pain, but these are problematic to obtain and do not combat inflammation in the long-term. Natural supplements can be worthwhile in many cases that would normally call for NSAIDs in humans, but there is currently limited efficacy data. It is also important to note that mixing botanical remedies can be just as dangerous as mixing medications, as many naturally occurring substances may have harmful interactions.

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