

# Meloxicam

**BRAND NAME: ELOXIORAL, LOXICOM, MELONEX, MELOXIDYL,  
METACAM, MOBIC, MOBICOX, OROCAM, OSTILOX**

AVAILABLE IN  
7.5 & 15 mg TABLETS  
(HUMAN FORMULATIONS)  
TRANSMUCOSAL SPRAY  
& TWO STRENGTHS  
OF ORAL SUSPENSION  
(VETERINARY FORMULATIONS)

## BACKGROUND

Meloxicam is a member of the class of drugs known as NSAIDs (non-steroidal anti-inflammatory drugs), the same class as such common over-the-counter remedies as Advil (Ibuprofen), Aleve (Naproxen), Orudis (ketoprofen), and Aspirin as well as more controversial prescription drug such as Celebrex (celecoxib) and Vioxx (rofecoxib). This class of drug is used for pain relief successfully in humans but the development of safe NSAIDs for dogs has only been achieved relatively recently and continues to be problematic in the cat. With the possible exception of aspirin, none of the human drugs listed above can be safely used in pets and even aspirin has its issues.

While most humans are quite tolerant of NSAIDs, dogs and cats are more sensitive. The issues of concern that have prevented human NSAID use in pets are:

- Stomach ulceration - even perforation and rupture of the stomach can occur. This is not only painful but life-threatening.
- Platelet deactivation - platelets are the cells controlling the ability to clot blood and, as a general rule, it is preferable not to promote bleeding. We would prefer platelets to remain active and able to function should we need them.
- Decreased blood supply to the kidney - this could tip a borderline patient in to kidney failure.

The veterinary profession had been in need of an NSAID that could effectively relieve pain without the above risks. Meloxicam is a human NSAID which turns out to offer important safety aspects to both dogs and cats.

A new plane of safety for pets was made possible by new biochemical knowledge. Inflammatory biochemicals responsible for the pain and inflammation we want to allieviate are produced by an enzyme called "cyclo-oxygenase 2" or simply "COX-2." The goal is to inhibit this enzyme without inhibiting its counterpart "cyclo-oxygenase 1." Cyclo-oxygenase 1, abbreviated COX-1, is what is called a "constitutive" enzyme. This means it is involved in producing regulatory biochemicals (called "prostaglandins") which are important in maintaining the normal health and function of our bodies. We want to leave this enzyme alone. Cyclo-oxygenase 2, abbreviated COX-2, produces inflammation but also is important in regulating kidney blood flow and in some reproductive and central nervous system function. We want to inhibit COX-2 in such a way that we do not disrupt its healthful functions.

In the past, NSAIDs could not distinguish the COX enzymes and inhibited them both. With the development of "COX preferential" and "COX selective" NSAIDs, we can inhibit COX-2 and leave COX-1 alone. The introduction of COX-2 preferential NSAIDs has reduced stomach and intestinal side effects by 50% in humans and has made FDA approval of certain NSAIDs possible for pets. Meloxicam was already available for human use but human doses were way too high to be safe for most small animals. With understanding of the COX system, oral liquids which can be precisely dosed for pets are now available.

## HOW THIS MEDICATION IS USED

Meloxicam is generally given to control arthritis pain in dogs though it can be given for many other painful conditions such as injuries, cancer, surgery, dental infections, and more. In dogs, it is typically given as a once a day as a pleasantly flavored liquid. The veterinary approved product comes with a special dosing syringe marked to show how much to give for the pet's weight (rather than in milliliters as most syringes are marked).

Feline use of meloxicam is of some controversy. In Europe, Canada, Australia and New Zealand, long term use of the 0.5 mg/ml meloxicam formula in cats is registered, approved, and heavily marketed; however, this formula is not legally approved for cats in the United States. Further, the manufacturer has specifically discouraged feline use of meloxicam beyond its approved use in the U.S. (one dose for post surgical pain relief). This paradox of marketing the product one way for most of the world and another way in the U.S. has been frustrating as there are substantially fewer oral pain relief options for cats available compared to what is available for dogs. Meloxicam is still used by many veterinarians for cats but the advent of robenacoxib has provided a less controversial feline NSAID. Further, there are other medications and supplements for feline pain relief that can be combined into a less controversial regimen.

**If a dose is skipped, do not double up on the next dose. Give the dose when it is remembered and schedule the next dose accordingly. Store this product at room temperature.**

## SIDE EFFECTS

Stomach upset: vomiting, diarrhea, and/or appetite loss are the important side effects to watch for, especially in the three weeks or so after beginning long term meloxicam. These symptoms can have multiple meanings so it is important to sort them out.

- Some pets are simply sensitive to NSAIDs, despite the COX-preferential nature of carprofen described above. These pets simply need nausea relief in the short term and a different pain management regimen after recovery.
- Some dogs have an unrecognized liver problem. Meloxicam is removed from the body by the liver which means that the liver on meloxicam has extra work. This is not a problem for a normal liver but a diseased liver could be tipped into failure from the extra load. This is why screening tests are so important prior to long term use.
- Another problem manifesting with upset stomach is an idiosyncratic hepatopathy (a liver condition that is not dose-dependent or predictable in any way). While this only occurs in 1 in 5000 dogs, it is a more serious problem which likely would require hospitalization.
- Altered kidney function (especially in cats) is a concern with any NSAID and might also manifest as an upset stomach. This is another reason why pre-screening of kidney function before long term use is especially important before beginning meloxicam

If a pet on meloxicam develops an upset stomach, discontinue the medication and report the problem to your veterinarian. It is prudent to check liver enzymes and kidney function (a blood test) to rule out the two liver side effect issues and kidney issues described that could manifest with upset stomach.

Other side effects typically require other pre-existing conditions that could be made worse by giving an NSAID (even a COX-preferential one). See the Concerns and Cautions section.

## INTERACTIONS WITH OTHER DRUGS

Drugs of the NSAID class should not be used concurrently as the potential for the aforementioned side effects increases. For similar reasons, NSAIDs should not be used in conjunction with corticosteroid hormones such as prednisone, dexamethasone, etc. A 5 to 7 day rest period is recommended when changing from one NSAID to another. Aspirin poses an exception due to its strong platelet inactivating abilities so 10 to 14 days is recommended when switching to another veterinary NSAID from aspirin. Allow at least one week between prednisone and meloxicam.

ACE inhibitors such as enalapril, or benazepril may not be as effective in the presence of meloxicam. (ACE inhibitors are used in the treatment of hypertension or heart failure.) This is because ACE inhibitors depend on the dilation of blood vessels in the kidneys and such dilation can be interfered with by NSAIDs).

Concurrent use of diuretics may increase the potentially for kidney toxicity.

## CONCERNS AND CAUTIONS

- Meloxicam works as well when given on an empty stomach as when given on a full stomach. If a patient has had some upset stomach issues with meloxicam these can often be minimized by administering the drug on a full stomach.
- Maximum effect is seen approximately 8 hours after administration. When beginning a trial course of meloxicam, a response may take 3 or 4 days to show. If no response has been seen in 10 days, meloxicam has failed and a different pain medication should be tried. If one NSAID fails, another may well work.
- The veterinary formulations of meloxicam are oral liquids (either 1.5mg/ml or 0.5 mg/ml). The liquid formulation allows for accuracy in dosing. The human tablets are available in much higher strengths and will be inappropriate except possibly for very large dogs. It is important not to use human medications on pets unless your veterinarian has provided detailed dosing instructions.
- Meloxicam should not be used in pregnancy or in lactation.
- Meloxicam can be used in cats but with caution (see above regarding use in countries outside the U.S.). The original oral solution of meloxicam was commonly dosed in drops from the bottle. Since the wrong dose of meloxicam can be very dangerous for cats, it is important not to drop the drops directly into the cat's mouth from the bottle as squeezing too strongly could easily deliver an overdose. The low dose (0.5 mg/ml) formula can be dosed with the provided syringe. In the cat this product is given either as a single one time injection in association with surgery (its FDA approved use) or long term 2-3 times per week (its non-U.S. dose). Long term use of this product in cats is "off label" in the U.S.
- As with all veterinary NSAIDs periodic monitoring tests are important to check liver enzymes and kidney function, and to generally screen the patient's health. Typically an every 6 months schedule is recommended for dogs. There is no general consensus on what is appropriate for cats but because of feline sensitivity towards NSAIDs, feline monitoring is especially important. If you are using this product in the cat, be sure you understand what monitoring schedule your veterinarian is recommending for your specific pet.
- Patients being considered for long term meloxicam use should be evaluated with a complete physical examination and initial screening blood test to identify any factors, such as liver or kidney disease, that might preclude the use of this or any other NSAID.
- Meloxicam should be avoided, if possible, in patients with impaired function of the liver, kidney or heart. It should also be avoided in dehydrated patients and patients with known GI ulcers.

**ALWAYS SHAKE THE BOTTLE OF MELOXICAM BEFORE DRAWING UP THE DOSE**

## FOR MORE INFORMATION

The manufacturer of veterinary meloxicam (Boehringer Ingelheim) has launched a web site for more information at:

[www.metacam.com](http://www.metacam.com)

The Food and Drug Administration's page on veterinary non-steroidal anti-inflammatory drugs may be viewed at:

[www.fda.gov/AnimalVeterinary/SafetyHealth/ProductSafetyInformation/ucm055434.htm](http://www.fda.gov/AnimalVeterinary/SafetyHealth/ProductSafetyInformation/ucm055434.htm)

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Additional drug and general pet care information can be found on our world wide web site:

<http://www.marvistavet.com>

