

Multidrug Sensitivity

By Sue Floyd, VMD

Some dog breeds are more sensitive to certain drugs than other breeds. Collies and related breeds, for instance, can have a genetic predisposition to adverse drug reactions involving many different drugs. These drug sensitivities result from a mutation in the multidrug resistance gene (MDR1 gene.) Dogs with the mutant gene cannot pump some drugs out of the brain as a normal dog would, which may result in severe neurologic signs.

Test Your Dog

Finding out if your dog has the MDR1 mutation is easy. A simple cheek swab can be taken at home and mailed to the Veterinary Clinical Pharmacology Laboratory at Washington State University. Click here to order a test kit: www.vetmed.wsu.edu/vcpl . Alternatively, a blood sample may be taken and mailed in by your veterinarian.

Explanation of Test Results

Normal/Normal – These dogs do not carry the mutation, and will not pass on the mutation to their offspring. These dogs would not be expected to experience unexpected adverse drug reactions to normal doses of ivermectin, loperamide (Imodium) and some anticancer drugs.

Mutant/Mutant – These dogs carry the mutation and will pass on the mutant gene to their offspring. These dogs would be expected to experience toxicity after normal doses of loperamide (Imodium,) and some anticancer drugs, and high doses of ivermectin (greater than 50 micrograms per kilogram.)

Mutant/Normal – These dogs carry the mutation and may pass on the mutant gene to their offspring. These dogs may experience toxicity after normal doses of loperamide (Imodium,) and some anticancer drugs, and high doses of ivermectin (greater than 50 micrograms per kilogram.)

Problem Drugs

Drugs that have been documented to cause problems in dogs with the MDR1 mutation include:

Acepromazine

Butorphanol

Emodepside

Erythromycin

Vincristine

Vinblastine

Doxorubicin

Ivermectin – While the dose of ivermectin used to prevent heartworm infection is SAFE in dogs with the mutation (6 micrograms per kilogram,) higher doses, such as those used for treating mange (300-600 micrograms per kilogram,) will cause neurologic toxicity in dogs that are mutant/mutant, and can cause toxicity in dogs that are mutant/normal.

Loperamide – (Imodium.) At doses used to treat diarrhea this drug will cause neurologic toxicity in dogs with the MDR1 mutation. This drug should be avoided in all dogs with the MDR1 mutation.

Selamectin, milbemycin, and moxidectin (antiparasitic agents.) Similar to ivermectin, these drugs are safe in dogs with the mutation if used for heartworm prevention at the manufacturer's recommended dose. Higher doses (generally 10-20 times higher than the heartworm prevention dose) have been documented to cause neurologic toxicity in dogs with the MDR1 mutation.

For more information on these drugs and an updated list of problem drugs please click here: www.vetmed.wsu.edu/depts-vcpl/drugs.aspx

For more general information on Multidrug Sensitivity: www.vetmed.edu/depts-vcpl/