

Your name and address

Your Vet's name and address

Date

Dear

**Multi Drug Resistance MDR1 and My Smooth Collie/s**

You are probably aware that the Smooth Collie is one of a number of breeds that can be affected by the mutant MDR1 gene. It is now proven that the Collie breeds (Rough, Smooth, Border and Shelties) are hypersensitive to certain drug compounds which even in minute doses can cause severe, sometimes lethal, toxicity.

*Either*

I have had my dog/s ..... tested and enclose a copy of their test results.

*Or*

I have not had my dogs tested and therefore wish you to treat them as if affected for the purposes of administering any medication.

I would be grateful if you would attach a warning to my dog's record and proceed with extreme caution when prescribing medication. Some of the preparations known or suspected to have caused adverse reactions are listed overleaf and I would be grateful if alternative, safer medications could be used wherever possible.

For the latest information on MDR1, please see <https://vcpl.vetmed.wsu.edu/>

Yours sincerely,

MDR1 is a genetic disorder found in many dog breeds. Affected dogs, when treated with certain common drugs such as Ivermectin and loperamide (Imodium), are unable to pump out these drugs from the brain resulting in poisoning and neurologic symptoms ranging from tremors, anorexia and excess salivation to blindness, coma and even death. Some of these drugs such as Ivermectins, which vets prescribe extensively for the treatment of parasite infections, are able to cause toxicity at 1/200th of the dose required to cause toxicity in healthy dogs.

Scientists discovered that these dogs lack a protein (P-Glycoprotein), which is responsible for pumping out many drugs and toxins from the brain, and that affected dogs show signs of toxicity because they are unable to stop drugs from permeating their brains. Researchers have identified that this condition is due to a mutation in the multi-drug resistance gene [MDR1].

#### LIST OF DRUGS THAT CAUSE SENSITIVITY TO DOGS WITH MDR1 MUTATION

<p><b>Class A</b></p>	<p><b>Do not use these drugs in dogs with MDR1 Gene Defect</b></p>	<p><b>Ivermectin substances "Anti parasites":</b> (Diapec<sup>®</sup>, Ecomectin<sup>®</sup>, Equimax<sup>®</sup>, Eqvalan<sup>®</sup>, Ivomec<sup>®</sup>, Noromectin<sup>®</sup>, Paramectin<sup>®</sup>, Qualimec<sup>®</sup>, Sumex<sup>®</sup>, Virbamec<sup>®</sup>)</p> <p><b>Doramectine substances "Anti parasites":</b> (Dectomax<sup>®</sup> )</p> <p><b>Loperamide substances "ant diarrheal ":</b> (Imodium<sup>®</sup>)</p> <p><b>Moxidectine substances "Anti Parasites"</b> (Cydectin<sup>®</sup>, Equest<sup>®</sup>)</p>
<p><b>Class B</b></p>	<p><b>Use only under close control of veterinarian</b></p>	<p><b>Cytostatics "Chemotherapy":</b> (Vinblastine, Vincristine, Doxorubicine, Paclitaxel, Docetaxel, Methotrexat, Vincristine)</p> <p><b>Immunosuppressive:</b> (Cyclosporine A)</p> <p><b>Heart glycosides:</b> (Digoxine, Methylidigoxine)</p> <p><b>Opioids:</b> (Morphium)</p> <p><b>Antiarrhythmics:</b> (Verapamil, Diltiazem, Chinidine)</p> <p><b>Antiemetics</b> (Ondansetron, Domperidon, Metoclopramide )</p> <p><b>Antibiotics</b> (Sparfloxacin, Grepafloxacin, Erythromycin)</p> <p><b>Antihistamin</b> (Ebastin)</p>

		<p><b>Glucocorticoid</b> (Dexamethason)</p> <p><b>Acepromazine (tranquilizer and pre-anaesthetic agent) *</b></p> <p><b>Butorphanol "analgesic and pre-anaesthetic agent" *</b></p> <p><b>Other drugs:</b> Etoposide, Mitoxantrone, Ondansetron, Paclitaxel, Rifampicin</p>
<b>Class C</b>	<b>Can be used only in the permitted application form and dose!</b>	<b>Selamectin (Stronghold®), Milbemax® and Advocate®.</b>

\* In dogs with the MDR1 mutation, acepromazine and butorphanol tend to cause more profound and prolonged sedation in dogs. It is recommended to reduce the dose by 25% in dogs heterozygous for the MDR1 mutation (MDR1 / N) and by 30-50% in dogs homozygous for the MDR1 mutation (MDR1 / MDR1).

#### **Clear**

Genotype: N / N [ Homozygous normal ]

The dog is noncarrier of the mutant gene.

It is very unlikely that the dog will develop MDR1 Gene Defect / Ivermectin Sensitivity \*. The dog will never pass the mutation to its offspring, and therefore it can be bred to any other dog.

#### **Carrier**

Genotype: N / MDR1 [ Heterozygous ]

The dog carries one copy of the mutant gene and one copy of the normal gene.

The dog may develop MDR1 Gene Defect / Ivermectin Sensitivity.

Since it carries the mutant gene, it can pass it on to its offspring with the probability of 50%.

#### **Affected**

Genotype: MDR1 / MDR1 [ Homozygous mutant ]

The dog carries two copies of the mutant gene and therefore it will pass the mutant gene to its entire offspring.

The dog is likely to develop MDR1 Gene Defect / Ivermectin Sensitivity \* and will pass the mutant gene to its entire offspring