

MDR1: Multi-Drug Resistance Gene

Short easier to understand Version:

MDR1 is a mutation that causes a dangerous sensitivity to some commonly used medications such as Ivermectin, which is found in commonly used medications for heartworm prevention. The dogs affected by MDR1 are not able to pump these drugs out of the cells as a normal dog would, leading to toxic levels building up within cells. About 50% of Australian Shepherds are affected by MDR1. Carrying one copy of MDR1 is considered affected; however, dogs that are clear have in some cases been known to react to these same drugs.

Longer more detailed version:

MDR1 is a mutation involving the ABCB1 gene, which is responsible for the production of a protein, P-glycoprotein (P-GP). P-GP is a drug efflux pump that aids in controlling drug absorption and distribution specifically in the brain. This causes increased levels of the medications inside the cells.

Imagine a partially clogged drain; when you run water into the sink, the water will build up in the sink similar to the way the medications do in a cells of an MDR1 affected animal.

Sensitivity to (not limited to):

- **Acepromazine**- prescription tranquilizer
- Butorphanol - pain control
- Cyclosporin - immunosuppressive agent
- Digoxin - used to treat congestive heart failure
- Doxorubicin – Cancer treatment
- Doramectin - anti-parasitic medication
- Emodepside - anti-parasitic medication
- Erythromycin - antibiotic used to treat diarrhea, skin infections and prostate infections
- **Ivermectin**- Found in many anti-parasitic medications such as wormers.
- **Loperamide**– Found in many anti-diarrhea medications such as Imodium.
- Milbemycin - used for treatment and prevention of heartworm
- Moxidectin - anti-parasitic medication
- Paclitaxel - chemotherapy drug
- Rifampin - used to treat many bacterial infections
- Selamectin - anti-parasitic medication
- Vinblastine – Cancer treatment
- Vincristine – Cancer treatment