Multidrug Sensitivity in Herding Breeds: MDR1 Gene Mutation

**MDR1 Gene Mutation:** The MDR1 gene encodes P-glycoprotein, a drug transport pump that plays an important role in limiting drug absorption and distribution (particularly to the brain), as well as enhancing the excretion of many drugs used in dogs. Some dogs, particularly herding breeds, have a mutation in the MDR1 gene, leaving them defective in their ability to limit drug absorption and distribution. These dogs also have delayed excretion of drugs that are normally transported by P-glycoprotein, making them susceptible to severe drug toxicity.

**Drugs Affected by the MDR1 Gene Mutation:**

- Acepromazine
- Butorphanol
- Doramectin
- Doxorubicin
- Erythromycin
- Ivermectin
- Loperamide
- Milbemycin
- Moxidectin
- Paclitaxel
- Selamectin
- Vinblastine
- Vincristine
- Vinorelbine

**Breeds affected by the MDR1 mutation (frequency %)**

<table>
<thead>
<tr>
<th>Breed</th>
<th>Approximate Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Shepherd</td>
<td>50%</td>
</tr>
<tr>
<td>Australian Shepherd, Mini</td>
<td>50%</td>
</tr>
<tr>
<td>Border Collie</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>Collie</td>
<td>70%</td>
</tr>
<tr>
<td>English Shepherd</td>
<td>15%</td>
</tr>
<tr>
<td>German Shepherd</td>
<td>10%</td>
</tr>
<tr>
<td>Herding Breed Cross</td>
<td>10%</td>
</tr>
<tr>
<td>Long-haired Whippet</td>
<td>65%</td>
</tr>
<tr>
<td>McNab</td>
<td>30%</td>
</tr>
<tr>
<td>Mixed Breed</td>
<td>5%</td>
</tr>
<tr>
<td>Old English Sheepdog</td>
<td>5%</td>
</tr>
<tr>
<td>Shetland Sheepdog</td>
<td>15%</td>
</tr>
<tr>
<td>Silken Windhound</td>
<td>30%</td>
</tr>
</tbody>
</table>

**Testing a Dog for the MDR1 Mutation is Easy:**

Order a testing kit by contacting the Veterinary Clinical Pharmacology Laboratory at Washington State University: [www.vcpl.vetmed.wsu.edu](http://www.vcpl.vetmed.wsu.edu) or by phone 509-335-3745