### Table S1. Effect of Prototype Antiseizure Compounds on Seizure Burden in the TMEV Model: Seizures Observed at the Time of Drug Injection.

| Compound                  | Mechanism of Action                  | Mouse 6 Hz (44 mA) ED<sub>50</sub><sup>a</sup> | Dose mg/kg, IP | % VEH Cumulative Seizure Burden |
|---------------------------|-------------------------------------|-----------------------------------------------|----------------|----------------------------------|
| Vehicle                   |                                     |                                               |                | 100 ± 24.7                       |
| Carbamazepine             | Na<sup>+</sup> Channel Blocker       | 38.2                                          | 40             | 61.7 ± 18.7                      |
| Lacosamide                | Na<sup>+</sup> Channel Blocker       | 12.9                                          | 13             | 18.3 ± 4.6**                     |
| Lamotrigine<sup>b</sup>   | Na<sup>+</sup> Channel Blocker       | 43.4                                          | 20             | 49.6 ± 10.3**                    |
| Phenytoin                 | Na<sup>+</sup> Channel Blocker       | 44.6                                          | 20             | 15.6 ± 4.5**                     |
| Ezogabine                 | K<sup>+</sup> Channel Opener         | 32.5                                          | 20             | 41.6 ± 13.4                      |
| Clonazepam                | GABA<sub>4</sub> Receptor Modulator | 0.17                                          | 0.2            | 60.4 ± 12.6                      |
| Phenobarbital             | GABA<sub>4</sub> Receptor Modulator | 35.3                                          | 35             | 1.7 ± 1.3****                    |
| Tiagabine                 | GABA Reuptake Inhibition            | 1.0                                           | 1.3            | 48.0 ± 7.6                       |
| Ethosuximide              | T-Type Ca<sup>2+</sup> Channel Blocker | 271                                          | 300           | 112 ± 20.2                       |
| Gabapentin                | α2δ Ca<sup>2+</sup> Channel Modulator | >500                                         | 350           | 9.8 ± 3.3****                    |
| Levetiracetam             | SV2A Ligand                         | >1000                                         | 1000          | 11.3 + 5.4****                   |
| Topiramate                | Mixed                               | >300                                          | 300           | 57.2 ± 8.8                       |
| Valproic Acid             | Mixed                               | 239                                           | 239           | 0.6 ± 0.6****                    |

Vehicle (0.5% methylcellulose)

<sup>a</sup>Metcalf et al., 2017

<sup>b</sup>Lamotrigine was administered once daily (QD), whereas other compounds noted were administered twice daily (BID).

*P<0.05, **P<0.01, ****P<0.0001 compared to VEH seizure burden from the same testing cohort; Mann-Whitney U test.

The vehicle-treated group was in the same testing cohort as topiramate (300 mg/kg) and ethosuximide (300 mg/kg) and was representative of other vehicle treatment groups.