A clinical study of induced perennial ryegrass (lolitrem-B) intoxication in NZ horses.

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Perennial Ryegrass Staggers is caused by mycotoxins from the endophyte *Neotyphodium lolii* that grows in perennial ryegrass, *Lolium perenne. The major toxin is* Lolitrem – B that acts as a BK potassium channel blocker as shown in Figure 1.

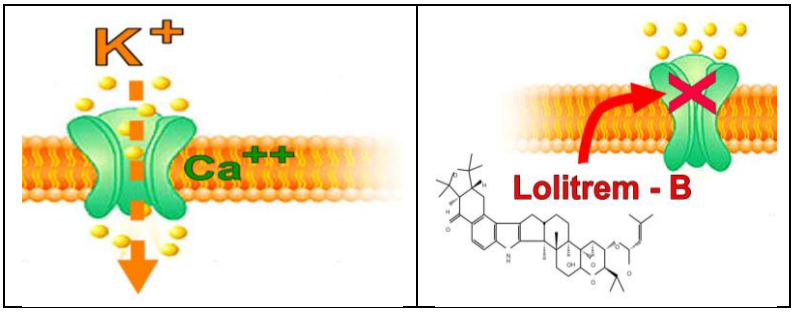

Figure 1: *Action of lolitrem-B.*

We fed 9 horses with known amounts of Lolitrem-B contained in perennial ryegrass hay and seed, according to Massey University Animal Ethics Committee guidelines. Clinical, neurologic, **e**lectrolyte, and electrodiagnostic monitoring proceeded for at least 2 weeks before, during and 2 weeks after feeding the trial feed. All horses showed clinical signs and all recovered.

Major neurologic signs documented were:

- Muscle tremor
- Muscle fasciculation
- Vestibular ataxia
- Eyeball tremor
- Behaviour change

Heart rate and evidence for the presence of allodynia (excessive response to a physiologic, non-painful stimulus) were obtained (see Figure 2).

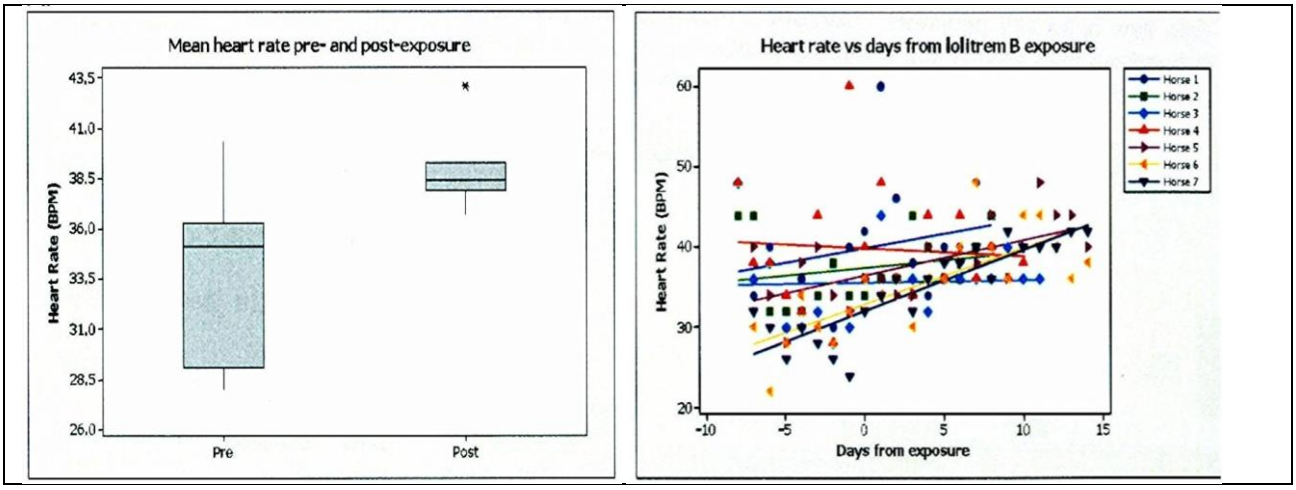

Figure 2: *Heart rates before and during exposure to Lolitrem-B containing feed.*

Possible causes of this include effect via BK channel receptors in adrenal glands, dorsal root ganglia or hypothalamus, or via contaminating ergovaline (dopamine-D_2 agonist).

Magnetic motor evoked potentials (mMEPs) were recorded and demonstrated possibly impaired motor conduction (Figure 3), in spite of there being no clinical weakness evident to the examiners.

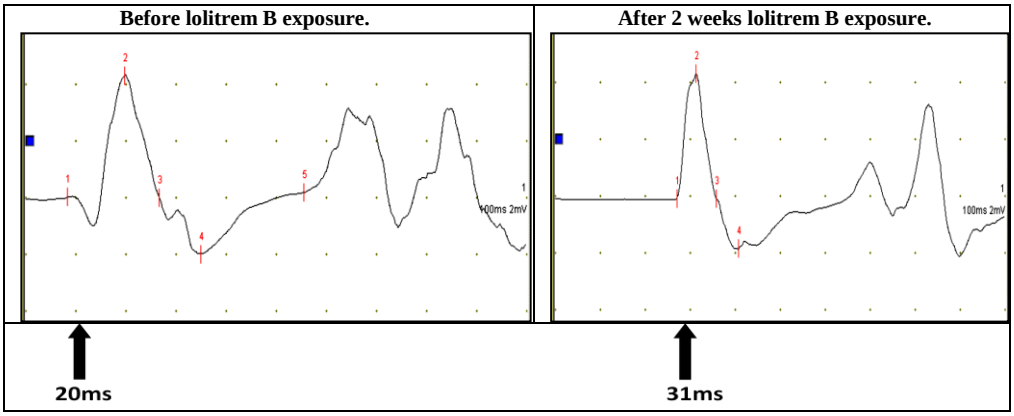

Figure 3: *Examples of right extensor carpi radialis mMEP latencies for Horse #1.*

Early change in the fractional excretion of solutes (Δ FE_x), induced by frusemide (frusemide ~ Δ $FE_{x(0\ -\ 15min)}$), before and after 2 weeks of exposure to lolitrem B (Figure 4), was observed. This parameter reflects how renal BK channels handling electrolytes respond to hi-pressure urine flow.

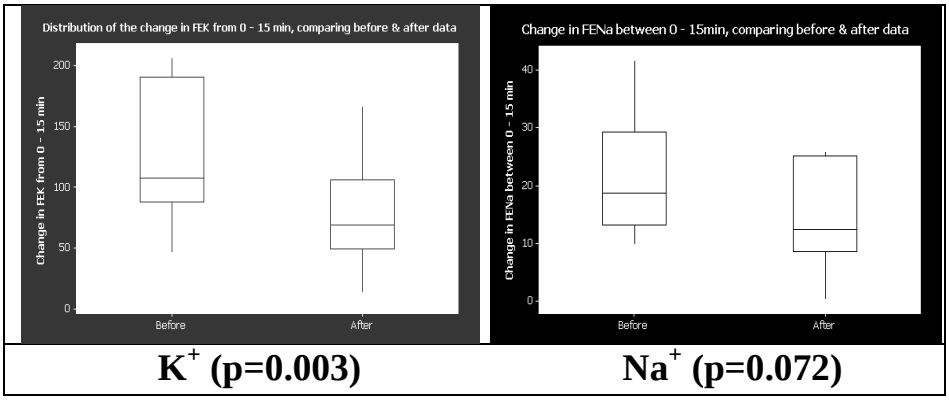

Figure 4: *Changes in <frusemide ~ Δ $FE_{x(0\ -\ 15min)}$> before and after 2 weeks exposure to lolitrem-B.*

Summative reports of these studies were presented to Massey Equine, Southern North Island Equine and NZ Equine Veterinary Practitioners and at the Pan-Pacific Veterinary Conference, Brisbane.Two papers are currently under review for Equine Veterinary Journal.

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