RESEARCH UPDATE 4

Ongoing and recent projects funded by Grayson-Jockey Club Research Foundation

Dr. Jon Cheetham describes his project on Early Diagnosis of Recurrent Laryngeal Neuropathy at Cornell University

Recurrent laryngeal neuropathy (RLN) or "Roaring" is a major cause of poor athletic perfomance affecting 8% of racehorses and a higher percentage of sport horses. The disease affects the ability of the nerve to conduct a signal from the brain to the muscle that opens the larynx or voice box at exercise -the CAD muscle. This CAD muscle is the only muscle that opens the larynx during exercise. In affected horses the impulses carrying this signal down the nerve travel more slowly and do not reach the muscles as effectively as in normal horses. This leads to a reduction in the size and strength of the CAD muscle causing collapse of the larynx with reduced airflow and abnormal noise production.

Over the last three years we have developed two non-invasive techniques to assess the CAD muscle and the nerve that supplies it. We will use an ultrasound probe placed through the nose, into the esophagus and directly over the CAD muscle to assess the cross-sectional area of this muscle in twenty four horses with a full spectrum of naturally occurring disease (normal to completely paralysis). We will compare these ultrasound measurements against a known method used to determine muscle volume – computed tomography or CAT scan. **This is clinically important as close relation exists between a muscle's volume and its ability to generate force; and the degree of force the CAD muscle can produce determines how well it can open the larynx at exercise.** In the same horses we will also measure the speed at which impulses travel down the nerve that supplies the CAD muscle –known as nerve conduction velocity. Finally, we then test the ability of these two techniques, perfromed at rest to predict laryngeal dysfunction at exercise. We will use treadmill endoscopy to determine laryngeal function at exercise and then use a standard statistical method to assess which of these techniques (ultrasound or nerve conduction velocity) is most likely to be useful in the early detection of horses that will become 'roarers'.

The information from this study will provide valuable insights into the mechanisms that cause 'roaring' by determining the relationship between nerve health and laryngeal function. Once validated, these two techniques will be assessed in future work by applying them to detect disease at an early stage in a large population of weanlings and yearlings.