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Pre-analytical Validation of Serum Paraoxonase-1 in Horses

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What if there was a better way to diagnose and monitor metabolic diseases such as Cushing's and EMS?

Pituitary Pars Intermedia Dysfunction (PPID), also known and Cushing's, and Equine Metabolic Syndrome (EMS) are commonly seen health problems in horses and ponies, particularly in our much-loved older companions. These diseases can have a major impact on the physical wellbeing of horses as well as placing emotional and financial stress on their owners. One struggle, in particular, is the difficulty in diagnosing these conditions due to the available tests being strongly affected by factors such as the time of year or how recently the horse ate. So what if we could develop a test that more accurately and easily diagnosed these conditions? Without having to wait until a certain time of year such as when ACTH is measured to diagnose Cushing's, or when horses must be fasted to measure blood glucose?

Our research project focused on a new marker in blood that could potentially provide a more accurate and convenient test for diagnosing inflammatory or metabolic conditions in horses. This marker, known as paraoxonase-1 (PON1), has already been shown to have important roles in metabolic diseases in humans and other animals such as dogs and cattle but hasn't yet been measured in horses. The project measured levels of serum PON1 in horses and assessed whether it was affected by seasonal variations, different storage conditions (room temperature, refrigerated or frozen), and interference from blood particles such as lipids, haemoglobin and bilirubin.

The study found that it is best to measure the serum PON1 immediately after collection, haemoglobin can affect measurements but lipids and bilirubin do not and that there is a significant pattern of seasonal variation with levels on PON1 being at their highest in Autumn. This pre-analytical validation on PON1 is the initial step in discovering whether it could be a valuable diagnostic tool in equine medicine. Further research will hopefully establish reference intervals and whether PON1 is significant to diseases in equine medicine such as PPID and EMS.