Vet Watch

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Blood Disorders in Horses

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Taking a blood sample for analysis in the laboratory is one of the most common diagnostic procedures carried out in equine practice. Vets use results of blood tests to help diagnose a huge range of conditions. Sometimes we will also use a blood test to reassure ourselves that there is no underlying illness or disease. However, for a horse owner the results of a blood test can be quite confusing; they are not always black and white and sometimes we identify things that aren't necessarily related to the initial problem.

Taking a blood test

Taking a blood test is usually a simple procedure ***(Figure 1)***. Most blood samples are collected from the jugular vein in the neck - a large vein with a diameter of 3-4cm. For most tests, 10-20mls of blood is sufficient. Alert your vet if your horse (or you!) is afraid of needles! The blood is collected into specific tubes to allow for different types of analysis ***(Figure 2)***. Some tubes contain anti-coagulant to stop the blood from clotting which allows the red blood cells to be analysed in the laboratory. Some tubes contain specific factors to speed up clotting to allow the components of blood (red blood cells and serum) to be separated from each other for analysis. Once blood is collected it needs to be taken to a laboratory for analysis. Many vets will have basic analysis equipment within their practice. Many specialist tests will need to be sent to a laboratory. It is very important that a laboratory that specialises in analysis of equine samples is used to get reliable results ***(Figure 3)***.

Figure 1

A blood sample can be collected from the jugular vein in the horse's neck.

Haematology

Haematology is the analysis of the cellular component of the blood. This basically involves analysis of the red and white blood cells. A reduced number of red blood cells in a blood sample indicates anaemia. Red blood cells are essential to carry oxygen around the body and hence severe anaemia can lead to signs of weakness and depression in a horse ***(Figure 4)***. Milder anaemia is more likely to be associated with mild lethargy. The most common cause of anaemia in the horse is a non-specific response to illness, often called 'anaemia of chronic disease'. This can frequently be seen in horses that have experienced a recent viral infection or any other type of illness. Other causes of anaemia are bleeding (e.g. in a horse that has experienced a severe kick injury and is suffering from internal bleeding) or haemolysis, which means the breakdown of red blood cells. This is often quite a serious condition in horses and most commonly occurs as an autoimmune disease or secondary to drug reactions or severe illness. When anaemia is identified, special laboratory tests can be used to help work out the underlying cause.

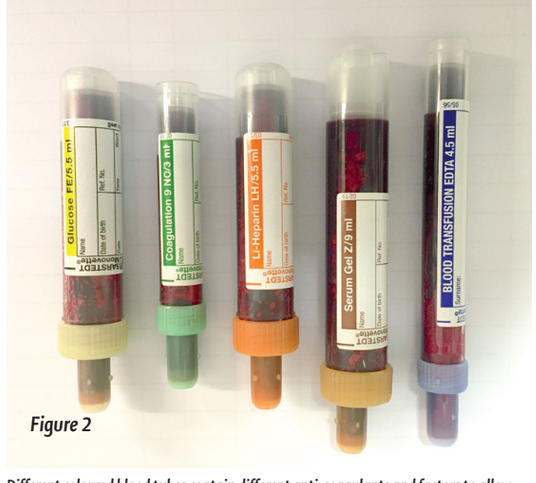
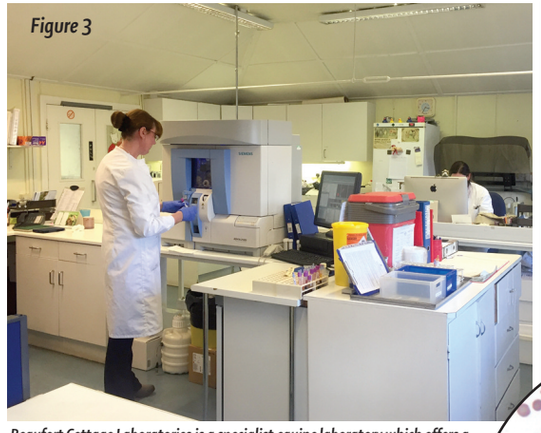


Figure 2

Different coloured blood tubes contain different anti-coagulants and factors to allow specific laboratory tests to be carried out.

Figure 3



Beaufort Cottage Laboratories is a specialist equine laboratory which offers a huge range of dedicated equine blood tests.

Analysis of the white blood cells can help identify the presence of infection in a horse's blood. A high white blood cell count (leucocytosis) usually indicates a response to infection. This can be a bacterial infection (for example pneumonia) but can also occur in response to endoparasites (intestinal worms) or other diseases that cause inflammation without an infectious cause (e.g. sand colic). There are multiple types of white blood cells and analysis of the different sub groups can help identify the cause of the problem ***(Figure 5)***. Neutrophils are

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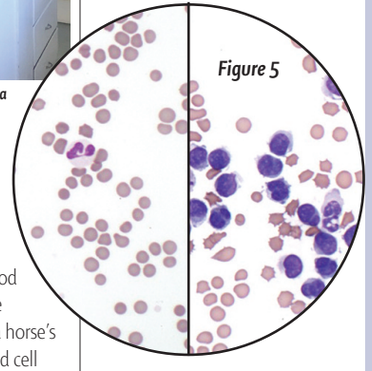
Figure 5



Analysis of a blood smear can help look at the different cell types in a horse's blood. These images show a blood smear from a normal horse (left) and a horse with leukaemia (right).

Figure 4

Pale mucous membranes can be a sign of anaemia in a horse.

VET PROFILE

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Emily is a member of the internal medicine team at Rossdales Equine Hospital and has a particular interest in equine neonatology.
Emily joined Rossdales in 2009 and her main role is working within the Neonatal Intensive Care Unit, in addition to working within the internal medicine department.
In 2012, she became an RCVS Specialist in Equine Medicine (Internal Medicine), having been awarded recognised specialist status by the Royal College of Veterinary Surgeons (RCVS).
Emily is also a Diplomate of the American College of Veterinary Internal Medicine, which she achieved during 3 years at the University of California's Veterinary Medical Teaching Hospital at Davis prior to joining Rossdales.
She has completed a number of research projects related to neonatal foal conditions and has published and lectured widely on the subject

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commonly increased in response to bacterial infections, eosinophils in response to allergic reactions or endoparasites and lymphocytes in response to viral infection.
A very low white blood cell count (leucopenia) can also be a sign of infection. This often occurs in response to a sudden severe infection and is seen before the horse has time to increase the production of white blood cells to respond to an infection or other inflammatory challenge. If your horse is unwell and a blood sample indicates a very low white blood cell count then your vet may wish to carry out more tests to try and identify the source of the problem. These might include ultrasound of the chest and abdominal cavities, rectal examination, collection of a peritoneal fluid sample etc.
Primary blood disorders such as leukaemia are identified very rarely in horses. They are usually identified when an extremely high white blood cell count is identified on a blood test and analysis of a blood smear shows white blood cells that are abnormal in appearance.

Biochemistry

Biochemistry involves the analysis of serum or plasma, which is the yellow watery part of the blood that is left once the red and white blood cells have been removed (***Figure 6***). Biochemistry tests are commonly used to evaluate the following:

Liver function

Certain enzymes such as gamma glutamyl transferase (GGT) and aspartate aminotransferase (AST) are present in normal liver tissue. When liver tissue is damaged or diseased, these enzymes are released into the bloodstream. The extent of the increase can often be an indicator of the severity of the problem. Mild increases in liver enzymes can be seen quite commonly and are often not a cause for concern. Bile acids can also be measured in blood. An increased bile acid concentration is often a sign that the function of the liver is reduced.

Kidney function

Urea and creatinine concentrations can be measured in blood and are an indicator of renal function. Increased concentrations indicate that the kidneys are not functioning normally.

Muscle disease

Aspartate aminotransferase (AST) and creatine kinase (CK) are enzymes present in muscle tissue. When muscle tissue is damaged, these enzymes are released into the blood and can be detected in high concentrations. For example, this occurs in horses that have

'tied-up' or in horses that have atypical myopathy.

Blood proteins

Albumin and globulin are important blood proteins. A low albumin concentration can occur for a number of reasons but is most commonly a sign of intestinal disease. Low concentrations can be seen in horses with weight loss that have inflammatory bowel disease or in horses with acute diarrhoea. Increased globulin concentrations can be a sign of inflammation in the horse.

Electrolytes

Measurement of blood electrolytes (sodium, potassium, chloride, magnesium etc.) is important in horses with diarrhoea or renal disease.

Other tests

A huge number of other specific tests are available. These range from endocrine tests to look for hormonal diseases such as Equine Cushing's Disease, to tests that look for antibodies to specific diseases (e.g. Strangles infection). Your vet will select these tests if they have specific concerns about your horse.

Summary

Blood analysis in horses can provide a huge wealth of information about the health of your horse. A general blood screen should help identify any signs of ill health or infection and identify any specific problems with organ function. Sometimes however, a blood test doesn't give all the answers and will often need to be followed up by a further investigation from your vet.

Figure 6

A biochemistry analyser is used for a variety of tests involving the analysis of serum or plasma