

# Anaemia and Nutrition

## What is anaemia?

Anaemia is a deficiency in the number or quality of erythrocytes (red blood cells) that are circulating in the blood and that are stored in the body.

There are several types of anaemia, each with different causes and treatments. As treatments vary depending on the type of anaemia, it is important for the vet to advise you on the type of anaemia your horse is suffering. These include:

1. Blood loss anaemia – ulcers, parasites, trauma, haemophilia
2. Haemolytic anaemia – infectious, toxic causes autoimmune, eg isoimmunisation of foals
3. Dyshaemopoietic anaemia – selective depression of red cell production due to poor nutrition (deficiencies of iron, copper, cobalt, protein and B vitamins), parasites, viruses, bacterial toxins. In the case of horses having viral infections there is often bone marrow suppression and a subsequent anaemia and lymphopaenia (reduction in white cells) occurs. These are generally self limiting and with recovery the cell counts return to normal. Extra iron supplementation is of no value in these kinds of anaemia.
4. Aplastic anaemia – red and white cells are depressed as are platelets- typically caused by radiation poisoning, toxins (eg. pesticides, arsenic)

Anaemia can also be described by its appearance – cell size changes are described as normocytic, macrocytic and microcytic.

The haemoglobin content is described as normochromic or hypochromic. These descriptions can help to determine the cause of the anaemia.

## What is the function of erythrocytes?

They are needed to transport oxygen from the lungs to all the cells and tissues of the body. Oxygen is the fuel that enables cells to function in order to maintain life. The life span of an erythrocyte is approximately 145 days in the horse. The cells are broken down in the liver, spleen and bone marrow. The proteins are conjugated in the liver and excreted in bile. The iron is stored in the liver and then transported to the bone marrow for the manufacture of new red blood cells.

## How does a laboratory measure erythrocyte numbers?

The packed cell volume (pcv) is a percentage measure of the mass of erythrocytes in the fluid component of blood. A normal pcv is in the range of 32 – 53%. The spleen is a reservoir of erythrocytes should extra ones be needed in the circulation for exercise, trauma, shock and excitement. The pcv can be falsely elevated by splenic contraction and dehydration.

A laboratory can also look at red cells in blood smears to check for their size, shape and colour. This then determines the type of anaemia that is present.

## What causes anaemia?

Anaemia can be caused by blood loss, chronic inflammation and viruses. Increased destruction of erythrocytes can occur with auto immune diseases and toxic chemicals. Reduced production of erythrocytes can occur with major nutritional deficiencies and cancer of the bone marrow. It is important to remember that anaemia is a symptom of an underlying primary problem that needs to be correctly diagnosed in order to ascertain the cause.

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## What are the clinical signs that might suggest anaemia?

Depression, lethargy and poor performance, pale gum tissue and increased heart rate at rest could indicate anaemia. These signs are all non specific and could also indicate many other conditions. Veterinary examination and testing are needed to confirm whether anaemia is present.

## What role does nutrition play in erythrocyte production?

The diet needs to supply good quality protein and adequate amounts of minerals and vitamins for red cell production and maintenance.

Iron, copper, zinc and cobalt are essential for red cells. Iron requires the presence of copper in order for it to be incorporated into hemoglobin. Cobalt is essential for Vitamin B12 production in the hind gut as is folic acid. Vitamin B12 and folic acid are needed for the normal cell size and shape of erythrocyte. Vitamin B6 is needed for amino acid utilization and therefore for the production of hemoglobin.

Iron deficiency rarely occurs in the horse as there are usually good iron supplies in forage. The horse is also very efficient at recycling and storing iron from red cells that are broken down every 90 days. Horses in heavy work can lose some iron in sweat. It is recommended that iron levels be topped up in horses in heavy work by using a multimineral and vitamin supplement such as Equilibrium or Lexvet.

Care must be exercised when feeding garlic or onions in horses. They contain a toxic chemical called N-propyl disulfide which causes the red cells to start breaking down from oxidation. There is increased destruction of the cells leading to jaundice and anaemia. It can be an acute poisoning or a chronic low grade toxicity depending upon the dose fed.

## What is the treatment for anaemia?

If your horse is diagnosed with anaemia, a vet needs to explain exactly what kind of anaemia is present so that appropriate treatment can be started. Specific

medications and treatments can then be put in place to deal with the primary problem. As an adjunct therapy, a correctly balanced multivitamin mineral supplement should be fed to give the body the minerals and vitamins it needs to regenerate and maintain healthy red blood cells. This is required whether the cause was blood loss, autoimmune disease or viral infections etc.

It is not advisable to add large amounts of iron to the diet as horses are rarely deficient in iron and it can be fatal when the body tries to store it in the liver. Iron deficiency anaemia's can be seen in other animals but rarely in the horse.

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