

# Liver: metabolism & detoxification centre

Author: Maike RAKEBRANDT; Senior Product Management Equine & Pet, Leiber GmbH

## What role does the liver play in metabolism?

Metabolism comprises the totality of all chemical reactions that take place in a cell and in multicellular organisms. The liver is the most important metabolic organ. It is the basis of all vital processes of the body, such as the production of energy, the building of muscles, cell regeneration, and the transport of nutrients such as minerals and vitamins.



## The liver is the detoxification centre

Important nutrients such as fats, carbohydrates and proteins pass through the portal vein from the intestine to the liver. In the liver, they are processed into endogenous substances that can then be utilized in other organs of the horse. The so-called hepatocytes are responsible for the metabolic processes in the liver. They make up between 60% and 70% of the total liver cells. The liver is also the only place where the synthesis of albumin (a transport protein of the blood) and fibrinogen (a protein with a coagulating function) takes place. The liver is also responsible for the synthesis and excretion of the bile acid.

By the way: a horse does not have a gall bladder. Bile must be produced continuously. Therefore, the liver removes up to 90% of the bile acid from the intestine-liver circulation.

However, the liver is best known for its central function as a detoxification organ. It takes care of the elimination of toxins, especially ammonia.

## Diseases of the liver

Liver diseases in horses are common. However, they often go unnoticed because the liver has a high reserve and compensation capacity. Liver diseases are usually only noticed when 80 to 90% of the liver are already damaged.

Common symptoms of liver insufficiency are, for example, **anorexia** (emaciation), **colics**, **hepatoencephalopathy** (a functional disorder of the central nervous system), **diarrhoea**, **fever**, **oedema**, and the disease known colloquially as **jaundice** (yellowing of the visible organs or mucous membranes).

## What can be the causes of a liver disease?

- | Mycotoxins in the feed (e.g. due to poor hay quality)
- | Poisonous plants
- | Polluted drinking water
- | Improper or excessive medication
- | Poor feeding management (e.g. too much concentrated feed)

## Diagnosis

A much-practised method of diagnosis is the anamnesis by the veterinarian. By specifically asking the owners about the symptoms that have occurred, the husbandry conditions and poisonous plants with which the horse may have come into contact, an initial picture of the disease is obtained. Furthermore, laboratory diagnostics of the blood values of the sick horse can bring light into the darkness. For example, a high level of liver enzymes in the blood or an increased level of bile acid indicates a liver disease. If the bile acid content increases, this is a sign that the liver can no longer fulfil its function of removing bile acid from the circulation and that there is a disorder. A part of the liver can also be imaged and examined by ultrasound. In extremely serious cases, a liver biopsy can also be performed.





## Feed what supports the liver!

- | Matching energy intake precisely to the needs
- | Reduce protein quantity in the case of liver damage, increase protein quality (= high content of essential amino acids)
- | Feeding of vitamins (A, E, C, B vitamins) and antioxidants
- | Feed of best quality, especially basic feed
- | Frequent, small meals
- | Avoid too many carbohydrates from cereals

Brewers' yeast is particularly suitable for providing the horse with highly available amino acids. Brewers' yeast is produced in the brewery under strict food guidelines and is rich in valuable, bioavailable active ingredients and nutrients. These include amino acids and B vitamins. The content of the essential amino acid lysine is 3.2%, the content of the essential amino acid methionine is 0.6%.

Only real brewers' yeast also has the so-called hop effect. Hops contain humulones, lupulones, malucidin as well as polyphenols and flavonoids. They thus have, among other things, antioxidant, anti-inflammatory and antimicrobial effects.



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