

ausrichter liver health newsletter

Number 48

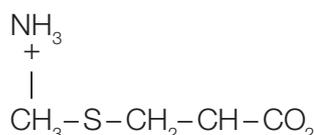
Methionine Injection for horses

Introduction

Methionine is an essential amino-acid not produced by the body and therefore needs to be supplemented. It is a lipotropic agent, vital for healthy liver function. Methionine has a number of other important functions including as an antioxidant to protect the muscle from damage to the lymphatic system.

Methionine pharmacological actions includes the reduction of free-radical formation in cells is particularly important for muscles. This novel, indirect antioxidant action is relevant for prevention of inflammation and oxidative stress⁴.

DL-ACETYL METHIONINE



PROTECTS AND DE-TOXIFIES THE LIVER: A LIVER TONIC

Laboratory studies indicate methionine protected the liver from damage or injury when it was exposed to a liver toxin (chloroform). Methionine was administered prior to or within 2 or 4 hours following the administration of the toxin.

Methionine protects the liver against damage from toxins, it aids in the repair of the liver.³

Methionine assists in the breakdown of fats in the liver (fatty liver disease – cattle) it also it detoxifies the liver and the body of heavy metals. It increases liver metabolism.

LIVER DISEASE IN HORSES

The clinical signs of hepatic insufficiency in horses are highly variable, nonspecific and depend on the extent and duration of hepatic disease. Their onset is often abrupt, because typically at least 75 percent of the liver mass must be affected before the signs become apparent, regardless of the cause of hepatic disease.

The common clinical signs are weight loss, hepatic encephalopathy, icterus and colic. Less common signs are hepatogenic photosensitization, diarrhoea, bilateral laryngeal paralysis, haemorrhage and fever.

Weight loss and failure to thrive are most consistently present during chronic hepatic insufficiency. However, chronic liver disease may be present without apparent weight loss. Weight loss is due to anorexia and the loss of normal hepatocellular metabolic activities.

DIARRHOEA AND HOMEOSTASIS

Diarrhoea may infrequently accompany chronic hepatic insufficiency in horses. Alterations in the intestinal microflora, portal hypertension and deficiency of bile acids may be involved in the pathogenesis.

Although not common, a fever may be present in horses with hepatic abscesses, acute hepatitis, chronic active hepatitis, obstructive cholelithiasis, fatty liver failure or neoplasia.

Light sensitivity – skin – liver

Hepatic photosensitization refers to abnormally heightened reactivity of the skin to ultraviolet sunlight, owing to the increased blood concentration of the photodynamic agent phylloerythrin. Phylloerythrin is normally formed in the gastrointestinal tract, as a result of bacterial degradation of chlorophyll. It is then absorbed into the general circulation, conjugated and excreted by the liver. During hepatic insufficiency, the blood concentrations of phylloerythrin are increased. Ultraviolet light is absorbed most efficiently in unpigmented areas; thus the lesions of photosensitization are restricted to white skin which first appears erythematous and edematous. Pruritus, pain, vesiculation, ulceration, necrosis and sloughing may ensue.



This mare has hepatic photosensitization characterized by erythema and necrosis involving only the white blaze on her face.

DL-ACETYL METHIONINE INJECTION FOR HORSES

DISEASE/CONDITION	TREATMENT RATIONALE	DOSE AND FREQUENCY
Liver toxicity	Methionine is indicated in managing liver toxicity due to: <ul style="list-style-type: none"> ▶ Heavy metal toxicity. ▶ Alkaloid/plant poisonings. ▶ Increased levels of phyloerythrin resulting in photosensitization^{1,5}. ▶ Elevated GGT levels¹. 	By IV, IM or SC injection. 10 mL/100 kg b.w. Repeat weekly until symptoms of liver toxicity are resolved and GGT levels return to the normal range.
Liver tonic	Methionine promotes liver health by detoxification and increased metabolism and turnover of the liver ² .	By IV, IM or SC injection 10 mL/100 kg b.w. (or 50% dose two days apart). Dose weekly or as required.
Muscle energy	Methionine converts to cystine an immediate source of muscle energy. Methionine is muscle protecting, as well as reducing muscle enzymes AST, ALT and GGT.	By IV, IM or SC injection 10 mg/100 kg b.w. Repeat weekly or as required.
Amino-acid supplement	Methionine is not produced by the body. It is only available through feed intake or injection. Regular methionine supplementation by injection is beneficial to augment dietary intake ² .	By IV, IM or SC Injection 10 mL/100 kg b.w. Repeat once a week or as required.

LABORATORY FINDINGS OF HEPATIC INSUFFICIENCY

Significant hepatic disease must be present before alterations are seen with some laboratory tests.

The most useful diagnostic tests for evaluation of hepatic disease in horses are quantification of sorbitol dehydrogenase (SDH) and gamma-glutamyl transpeptidase or transferase (GGT) activity and serum bile acid concentration (SBA).

Gamma-glutamyl transpeptidase or transferase (GGT) is primarily associated with microsomal membranes in the biliary epithelium. Production and release of GGT are induced by cholestasis. Some clinicians consider GGT the test of highest sensitivity in evaluating horses for liver disease. The half-life of GGT is about three days, and it is stable two days in serum at room temperature.

Mild increases may be seen following acute hepatocellular necrosis and may continue to rise for one to two weeks despite improvement in clinical signs. Increases are more persistent in chronic disease, especially with cholestasis. Normal values for GGT in adult horses typically are less than 30 units/L, but may be two to three times greater in healthy donkeys, burros and asses.



Other cytosolic liver enzymes include aspartate aminotransferase (AST), alkaline phosphatase (ALP), lactate dehydrogenase (LD) and alanine aminotransferase (ALT). These enzymes are also found with high activity in other tissues, or are inducible. Thus, increases in these enzymes are not specific for liver disease in horses. Because some of these enzymes are frequently reported in equine biochemical profiles, they may serve as a crude indicator of liver disease; however, the limitations of their usefulness must be recognized.

OTHER NONSPECIFIC TESTS

Additional nonspecific tests of liver disease in the horse include quantification of bilirubin, albumin, globulins, ammonia, BUN, coagulation proteins, glucose and esterified triglycerides.

The concentration of blood triglycerides increases during hepatic insufficiency as a result of increased mobilization from adipose tissue to support energy-requiring processes, coupled with decreased clearance by the liver¹.

LIVER METABOLISM

Apart from measuring more specific liver enzymes, total bilirubin, and a by-product of liver metabolism, if there is more than a 25 per cent increase in bilirubin, then liver function should be evaluated.

Alkaline phosphatase (ALP) and gamma glutamyl transferase (GGT) are two of the commonly-measured liver enzymes. Unfortunately, ALP is not liver-specific. GGT is much more liver-specific¹.

GAMMA-GLUTAMYL TRANSPEPTIDASE

Gamma-glutamyl transferase or gamma-glutamyl transpeptidase is an enzyme that transfers gamma-glutamyl functional groups. It is found in many tissues, the most notable one being the liver, and has significance in medicine as a diagnostic marker.

Happy hooves – happy horse

We have all heard the old proverb “No hoof – No horse” and this statement could not be more accurate for today’s horse. Just like the skin, the appearance and integrity of the hoof is a reflection of the health, environment and nutritional state of the horse. Many performance horses are unable to perform to their potential because hoof problems keep them out of work, limit their workload or reduce performance. Horse owners must work together with their farrier, veterinarian and nutritionist to achieve optimal hoof care and maintain proper hoof function to help reduce the risk of hoof disorders.



Happy hooves

PREDOMINANTLY PROTEIN

The hoof is primarily composed of the protein keratin, which accounts for 93% of the hoof wall. Amino acids are the building blocks of all protein and hence are essential

nutrients for proper hoof growth. For this reason, most of the commercially available hoof supplements contain amino acids, **specifically methionine**, which has been identified as an essential amino acid linked to hoof quality.

A methionine deficiency can contribute to poor hoof quality. Methionine is one of several essential amino acids (including lysine and threonine) contained in the protein of the hoof. Amino acids that are considered essential cannot be synthesised in the body in sufficient quantities to meet the horse’s demand for them⁶.

EVALUATION OF THE EFFECT OF METHIONINE AND GLUCOSAMINE ON ADJUVANT ARTHRITIS

In the study the effects of individual administration of methionine or glucosamine (GlcN) was compared with the combined administration of methionine and GlcN on an adjuvant arthritis model.

The combined methionine and GlcN administration suppressed the increase in the levels of nitric oxide, prostaglandin E₂ and hyaluronic acid in the plasma of the adjuvant induced arthritis. The individual administration of methionine or GlcN suppressed arthritis only slightly. The combined administration of methionine and GlcN is more effective in suppressing the progression of adjuvant arthritis (identified as swelling of joints and arthritis score), possibly by synergistically inhibiting synovial inflammation (identified as synovial hyperplasia and the destruction of the cartilage surface and articular meniscus) and the production of inflammatory mediators⁷.

1. Michelle Henry Barton, DVM, PhD, Dipl. ACVIM DVM360 MAGAZINE May 1, 2007.
2. Data on file.
3. The Journal of Experimental Medicine, Vol 76, 421-435.
4. Erdmann, K *et al*; *AAPS Journal* 2005; 7 (01) (<http://aapsj.org>).
5. George M. Barrington, DVM, PhD, DACVIM Merck Veterinary Manual Last full review/revision January 2014.
6. www.equestrian D. E. ANDERSON and H. P. EWALT Oregon State University, Corvallis FS 173.
7. Yamagishi *et al*; *Exp Ther Med*. 2012 Oct; 4(4): 640-644.





PRODUCT INFORMATION

DL-Acetyl Methionine

ACTIVE CONSTITUENT:

Acetyl-dl-Methionine 200 mg/mL – 50 mL vial.

Methionine is an essential sulfa – containing amino-acid.

An injectable amino-acid for Horses, Cattle, Sheep, Goats, Pigs, Dogs and Cats.

Hepto-protective, detoxification of the liver, liver insufficiency supportive treatment of liver disease (protection of the formation of free-radicals in tissues).

INDICATIONS:

For use as supportive therapy in the treatment of liver disease in horses cattle, sheep, goats, pigs, dogs and cats.

COMPLEMENTARY TREATMENT FOR:

- ▶ Reproduction
- ▶ Hepatitis
- ▶ Hepatic steatosis
- ▶ Metabolic disorders
- ▶ Acetonemia
- ▶ Hypocalcemia
- ▶ Tetany
- ▶ For acidification of urine
- ▶ Joint disease
- ▶ Hoofs

DIRECTIONS FOR USE:

By slow intramuscular injection, it is approved for IV administration in other registration jurisdictions.



DOSAGE:

Horses, Cattle, Sheep, Goats and Pigs –
10 mL per 100 kg bodyweight

Dogs – 10 mL per 20 kg bodyweight

Cats – 1 mL/kg bodyweight

Repeat after one week or as directed by a veterinarian.

The intramuscular IM injection is sometimes slightly painful. To avoid this the required dose may be diluted in twice the volume of the injection dose in sterile water.

WITHHOLDING PERIOD:

Meat/Milk – NIL.

Racing – NIL, it is preferable to suspend administration 48 hours before racing.

EXPORT SLAUGHTER INTERVAL (ESI):

NIL.

FIRST AID:

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 13 11 26.

STORAGE:

Store below 25°C (air conditioning). Protect from Light.

DISPOSAL:

Dispose of empty containers by wrapping in paper and putting in garbage. Discarded needles/sharps should immediately be placed in a designated and appropriately labelled 'sharps' container.

APVMA APPROVAL No. 36730 / 50 mL / 0108.

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