HELP & ADVICE

Summary

PSSM
polysaccharide
storage myopathy

Breeds
Quarter Horses, Paint Horses, Appaloosas, draft horses, warmblood horses and ponies

inheritance
Genotype N/N
Genotype N/PSSM1
Genotype PSSM1/PSSM1

PSSM – what to do?
selective feeding and regular exercise

DNA testing
EDTA blood, hair roots from mane or tail

Lab profile

Name:	LABOKLIN GmbH & Co. KG
Office:	Bad Kissingen
Founded:	1989
Type:	Laboratory for clinical diagnostics
Qualifications:	One of the leading laboratories in Europe
Operating in:	Europe, Asia, Arabian Peninsula
Team:	Over one hundred specialists and veterinarians
Specialty:	Research projects at the federal level

Handed out directly from your vet

(stamp)

Service
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PSSM
IN HORSES

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What is polysaccharide storage myopathy (PSSM) in horses?

Polysaccharide storage myopathy (PSSM) is characterised by excessive accumulation of normal sugar molecules (glycogen) as well as an abnormal form of sugar (polysaccharide) in muscle tissue. The condition has been observed in many different horse breeds. Horses with PSSM1 show clinical signs typically associated with tying-up. Most commonly these signs are muscle tremors, muscle stiffness, sweating, reluctance to move and lameness. The signs are most often seen in horses when they are put into initial training or after a layup period when they receive little active turn-out. Episodes usually begin after very light exercise such as 10 – 20 minutes of walking and trotting. Frequently, the muscles of the hindquarters are sore and hard. Horses with PSSM can exhibit symptoms without exercise. Most horses with PSSM have a history of numerous episodes of muscle stiffness at the commencement of training; however, mildly affected horses may have only one or two episodes/year.

Affected breeds

PSSM is a muscle disease in horses of Quarter Horse bloodlines such as Quarter Horses, American Paint Horses and Appaloosas. PSSM also occurs in many other breeds including Drafts, Draft crossbreeds, warmbloods and ponies.

The inheritance of PSSM1

PSSM type 1 is inherited as a dominant trait and the mutation has been identified.

There are 3 possible genotypes:

1. Genotype N/N: This horse does not carry the mutated allele responsible for PSSM1 and will not pass it on to its offspring.

2. Genotype N/PSSM1: This horse carries one copy of the mutated allele and has a high risk of developing PSSM. There is a 50 % chance that it will pass on the mutation to its offspring.

3. Genotype PSSM1/PSSM1: This horse carries two copies of the mutated allele and has a very high risk of developing PSSM. It will pass on the mutation to 100 % on to its offspring.

PSSM type 1 is inherited in an autosomal dominant fashion, meaning that only one copy of the mutation can cause PSSM. Horses with genotype PSSM1/PSSM1 are often more severely affected and harder to manage.

There appears to be a second genetic mutation (EMH = equine malignant hyperthermia) that enhances the clinical signs of PSSM in Quarter Horses and related breeds. The EMH genetic test is also available in our lab.

How to prevent tying-up and other clinical signs

To prevent muscle stiffness, horses with PSSM should be turned- out as frequently as possible and exercised regularly. If they have been laid-up for more than a few days, they should be returned to work very gradually. Stall rest or an irregular exercise program may result in another episode of tying-up.
Minimising stress and providing regular routines and daily exercise are highly beneficial. Turn-out each day for as long as possible with other horses will keep the horse active. The amount of time the horse is left in the stable should be decreased as much as possible. Keeping the horse fit will change the muscle metabolism, this seems to be the best prevention against further episodes of tying-up.
Adherence to a strict diet will also help horses with PSSM.
A highquality grass or oat hay should form the basis of the diet. If feeding alfalfa hay, a mixture (half alfalfa and half grass or oat hay) may be best. A vitamin and mineral supplement that contains Vitamin E and Selenium is also beneficial, however, make sure that there is not already enough Selenium and vitamin E in the feeds you are using. Eliminate grain and sweet feed from the diet and replace these calories with a fat supplement. There are a number of fat supplemented commercial diets available, but it is very important to find out the non-soluble starch (NSC) or starch content.

DNA testing

In 2008 a mutation in the GYS-1 gene was recognised to be responsible for the disease by Professor James Mickelson and his coworkers at the University of Minnesota.

This mutation is called classic or type 1 form more of PSSM. The genetic test for this mutation is now commercially available for horse owners and veterinarians at LABOKLIN.
Professor Mickelson kindly agreed to pass on an exclusive license to LABOKLIN for Europe so we can offer the test for all horses within the European countries.

By DNA analysis, the responsible mutation can be determined directly. This method provides a very high accuracy and can be done at any age. It offers the possibility to not only distinguish between affected and unaffected horses, but also to identify clinically healthy carriers.
The DNA test does not provide information about the probable onset of clinical signs or severity of clinical symptoms.