Multiple Ocular Anomalies / Silver Coat Colour

Applicable breeds: Icelandic horses, Rocky Mountain horses and related breeds, American Shetland ponies, Morgan horses and Belgian Drafts

Silver Coat Colour: The Silver gene dilutes the coat colour of horses with a black basic coat colour, but has no effect on horses with a red basic coat colour. A black horse with the Silver gene will have a lightened body colour, frequently described as chocolate and often with dapples, and a white mane and tail. A bay horse will have an unchanged body colour but the lower legs, mane and tail will be diluted to a grey/white, and can be mistaken for a chestnut with a flaxen mane and tail. A chestnut horse will remain unchanged, as will other horses with a basic red body colour such as palominos.

Since the Silver gene is dominant, horses that carry either one or two Silver genes are similar in appearance. Horses with one Silver gene will pass it on to 50% of their offspring, while horses with two Silver genes will pass it on to all of their offspring. Note: chestnut horses that carry the Silver gene will still pass it to their offspring.

Reference: Brunberg E, Andersson L, Cothran G, Sandberg K, Mikko S and Lindgren G. 2006. A missense mutation in PMEL17 is associated with the Silver coat color in the horse. BMC Genetics 7:46

Multiple Congenital Ocular Anomalies (MCOA) syndrome is a severe inherited eye defect recognised in Rocky Mountain horses and Icelandic horses. Recently MCOA was shown to be inherited alongside the Silver gene, and it is possible that both MCOA and Silver coat colour are caused by the same genetic variant. Horses with two Silver genes are at risk of developing MCOA, while horses with one Silver gene are at risk of developing ocular cysts, a minor condition that may only be detected when the eye is examined by an opthalmologist.
In breeds where Silver coat colour is not very common, horses are likely to carry only one Silver gene and have ocular cysts that are not apparent. In this situation owners and breeders may not be aware of this disease in their horses, which may require veterinary attention.

Reference: Andersson LS, Axelsson J, Dubielzig RR, Lindgren G, Ekesten B. 2011. Multiple Congenital Ocular Anomalies in Icelandic Horses. BMC Veterinary Research 7:21.
Andersson LS, Lyberg K, Cothran G, Ramsey DT, Juras R, Mikko S, Ekesten B, Ewart S, Lindgren G. 2011. Targeted analysis of four breeds narrows equine Multiple Congenital Ocular Anomalies locus to 208 kilobases. Mammalian Genome 22:353.

This test is particularly useful for breeders to determine:

- whether their chestnut or bay horse carries hidden copies of the Silver gene
- whether their horse has one or two copies of the Silver gene, and is therefore at risk of MCOA or ocular cysts
- whether their horse has one or two copies of the Silver gene, and will therefore pass it to 50% or 100% of their offspring

This test will be reported as:

ZZ two Silver genes; risk of developing MCOA; the Silver gene will be passed to all offspring

ZN one Silver gene; risk of developing ocular cysts; the Silver gene will be passed to 50% of offspring

NN no evidence of Silver gene; no risk of ocular defect due to this gene