

## Genetic testing results for Silvery Moon xx

Silvery Moon xx is a bay Thoroughbred with the Frame Overo pattern. On average, 50% of his offspring will inherit the Frame Overo genetic variant and have the potential for white spotting.

Agouti (Bay/Black)	Extension (Chestnut)	Frame Overo	White Spotting W20	Height - Horse
A/a	E/E	O/n	W20/W20	T/T

### What do the genetic testing results mean?

**Color:** Silvery Moon is bay. He also carries black. Depending on the mare to which Silvery Moon is bred, he can have bay or black foals. Silvery Moon does not carry the red factor and cannot have chestnut foals, even with a chestnut mare.

Silvery Moon's white patterning is caused by a combination of the Frame Overo and two copies of the White Spotting variant called W20. The White Spotting variant may give his foals white socks or a blaze.

Frame Overo is not always visible, so any mare which has Frame Overo in her pedigree should be tested (especially Quarter Horses and Paints), even if she does not have white spotting herself. A mare with Frame Overo should not be bred to Silvery Moon, as there is a 25% chance of having a foal with OLWS (Overo Lethal White Syndrome). OLWS is a lethal digestive tract disorder. A mare with any other white spotting pattern can be bred without problem.

Silvery Moon has tested negative for (doesn't have) the Sabino-1, Tobiano and Splashed White 1 patterns.

Silvery Moon's major **height** variant has also been tested genetically. 83% of height in horses can be explained by a combination of 4 genes. One of these, called *LCORL*, limits body size.

The *LCORL* gene is especially important in Warmbloods. Knowing the combination of variants at the *LCORL* gene, it is possible to predict, with 70% certainty, the average final height of a foal.

Even though Silvery Moon is 164cm, he does not have the "tall" genetic variant. He has two copies of the gene variant for "normal" height (T/T).

That means that depending on the mare, his foals will either be "normal" or "medium" in height.

Was do "normal", "medium" or "tall" mean?

	Combination of variants	Height at Withers (Average, +/- 5 cm)
"Normal"	T/T	159 cm
"Medium"	T/C	164 cm
"Tall"	C/C	169 cm

## Silvery Moon xx: What happens when...?

Possible physical traits of Silvery Moon's foals, depending upon the mares to which he is bred.

Silvery Moon xx	Mare	Foals
 <p>©Gille</p> <p>(A/a) (E/E) (O/n) (W20/W20) (T/T)</p>	<b>Color</b>	
	Bay not carrying black (A/A)	<ul style="list-style-type: none"> <li>100% bay foals, 50% will carry black</li> </ul>
	Bay carrying black (Aa)	<ul style="list-style-type: none"> <li>75% bay foals (25% A/A, 50% A/a)</li> <li>25% black foals (a/a)</li> </ul>
	Black (a/a)	<ul style="list-style-type: none"> <li>50% bay foals, all will carry black (A/a)</li> <li>50% black foals (a/a)</li> </ul>
	Chestnut (e/e)	<ul style="list-style-type: none"> <li>no foals will be chestnut, but 100% will carry the red factor</li> </ul>
	<b>Pattern</b>	
	any	<ul style="list-style-type: none"> <li>100% foals will inherit one copy W20</li> </ul>
	any (not carrying Frame Overo)	<ul style="list-style-type: none"> <li>50% foals will inherit one copy of Frame Overo</li> </ul>
	<b>Height</b>	
	"Normal" (T/T)	<ul style="list-style-type: none"> <li>100% foals will be "Normal" height (T/T)</li> </ul>
	"Medium" (T/C)	<ul style="list-style-type: none"> <li>50% foals will be "Normal" height (T/T)</li> <li>50% foals will be "Medium" height (T/C)</li> </ul>
	"Tall" (C/C)	<ul style="list-style-type: none"> <li>100% foals will be "Medium" height (T/C)</li> </ul>

## Glossary

**Agouti:** The Agouti gene is responsible for the colors of bay and black in horses. When a horse has one or two copies of the normal Agouti gene (Aa or AA), the horse will be bay. Both dark and light pigments will be put into the horse's hair, but only dark pigment will be put into the mane, tail, legs, and face. If a horse has two copies of the mutated Agouti gene (aa) the dark pigment will be put all over the body, not just into the mane and tail.

**Overo:** generic name for any white spotting pattern other than tobiano. It can include White spotting (dominant white), Splashed White, Frame Overo, Sabino, etc.

**Frame Overo:** a spotting pattern caused by a mutation in the *EDNRB* gene. It has great variability in expression. This means that some horses with the mutation may show very little white, such as socks, and sometimes a white belly spot, while others will show a pattern of irregular white spotting, especially across the middle of the body. It rarely goes over the topline. The face is often white, and one or more eyes may be blue. When accompanied by another white spotting or splash gene, the Frame Overo pattern will usually be more extensive. The variant is found in many breeds, but in Quarter Horses and Paint the Frame Overo pattern may be hidden.

The gene that causes the Frame Overo pattern is also involved in the development of the horse's digestive tract. When a horse has two copies of the Frame Overo variation, the digestive tract does not develop properly. The foal is born all white, and will die (or must be euthanized) shortly after birth because of the problem with the intestines. This is called Overo Lethal White Syndrome (OLWS). Two horses with the Frame Overo mutation should never be mated, because there is a probability of 25% that a resulting foal will have OLWS.

For this reason, horses with any chance of Frame Overo in the pedigree, especially Quarter Horses and Paints, should be tested for the Frame Overo gene variant, even if they do not show the Frame Overo pattern.

**White Spotting (dominant white):** White spotting is the generic name for a wide variety of spotting patterns caused by mutations in the KIT gene. It was previously known as "dominant white". These include the Sabino pattern, and other mutations known by the W1 – W27 series of names. The KIT gene mutates often, and most of these variants are lines or pedigrees going back to a specific originating horse. Horses with a W variant may be partly or completely white.

The W20 variant is a White Spotting allele that is common in most breeds. Alone, it has little effect (perhaps a white sock or a small blaze), but when it is paired with any other variant that causes a white pattern, the horse's overall amount of white will increase.

**Splashed White:** There are currently four Splashed White (SW) variants known. They are caused by variants in the MITF and PAX3 genes. SW1 is found in many breeds, and generally has no deleterious effects. Splashed white variants 2 and 3 (SW2, 3) are found only in specific lines of Quarter Horses, and may be associated with deafness. SW4 is found in some Appaloosa horses.

Splashed White horses usually have high white socks and a white face.