

Genetics, Color and Pattern Explained

Polysaccharide Storage Myopathy – Dominant

PSSM1 present can cause a horse to have episodes of their muscles tying up causing inability to move and muscle damage.

n/n – PSSM1 is not detected.

n/PSSM1 – one gene has been detected. This horse should be carefully managed through diet and exercise. Limit dietary sugar to help prevent the onset of the disease. Consideration should be given to not breed this horse and perpetuate the disorder.

PSSM1/PSSM1 – two genes detected. This horse should be carefully managed through diet and exercise. Limit dietary sugar to help prevent the onset of the disease. This horse should not be bred because it will pass on a PSSM1 gene 100% of the time.

Foal Immunodeficiency Syndrome

n/n – FIS mutation not detected.

n/FIS – one copy of FIS mutation detected. Great care must be taken to not breed an FIS carrier to another FIS carrier. If both sire and dam pass on the FIS gene the foal will not survive.

FIS/FIS – two copies of FIS mutation detected. Any foal born homozygous FIS will not survive past three months of age. Most are humanely euthanized prior to that age.

E-Loci (Red/Black Factor)

e/e- Only red genes detected. The basic color is chestnut in the absence of other modifying genes.

E/e – Both a black and a red gene detected. E is dominant. The basic color is black, bay or brown in the absence of other modifying genes.

E/E- No red gene detected. Horse cannot have red foals regardless of the color of the mate. The basic color is black, bay or brown in the absence of other modifying genes.

Agouti

A/A - Black pigment distributed in points pattern. The basic color is bay or brown in the absence of other modifying genes.

A/a - Black pigment distributed in points pattern. The basic color is bay or brown in the absence of other modifying genes.

a/a - Only recessive alleles detected. The black pigment distributed uniformly. The basic color is black in the absence of other modifying genes.

Cream

n/n - No Cream dilution detected. The basic color is chestnut, bay or black in the absence of other modifying genes.

n/Cr - Heterozygous dilute, one copy of the Cream gene detected. Typical colors will be palomino (ee, n/Cr), buckskin (Ee or EE, Aa or AA, nCr) or smoky black (Ee or EE, nCr) in the absence of other modifying genes.

Cr/Cr- Double dilute, two copies of Cream gene detected. Typical colors will be cremello (aa, Cr/Cr), perlino (Ee or EE, Aa or AA, Cr/Cr) and smoky cream (EE or Ee, Cr/Cr) in the absence of other modifying genes.

Pearl

n/n -No evidence of the pearl dilution detected.

n/Pr1 - One copy of the pearl gene detected. If a cream gene is also present the coat color will be affected.

Pr1/Pr1 - Two copies of the dilution detected. The horse will have a dilute color appearance.

Dun – Dominant gene

n/n – The horse does not carry a dun gene.

D/D – The horse has one Dun gene and will express the coat color. All offspring will be dun dilute.

D/n – The horse has one copy of the Dun gene and will express the coat color. Chance of passing the dun gene to offspring is 50%.

Silver – Dominant gene

n/n - No silver gene detected.

n/Z - One copy of the silver gene detected. Black-based horses will be a chocolate body with flaxen or lightened mane and tail, Bay-based horses will have lightened legs with flaxen mane and tail. The silver gene has no effect chestnut color.

Z/Z - Two copies of silver gene detected. The color effect is the same as n/Z, however this horse will pass a silver gene to its offspring 100% of the time.

Gray – Dominant gene

n/n – no modifying gray gene detected. The horse will not turn gray.

n/Gr – one gray gene detected. The horse will start out its base color and turn gray. The final phenotype will vary from steel gray to completely depigmented white.

Gr/Gr – two gray genes detected. The horse will start out its base color and turn gray. The final phenotype will vary from steel gray to completely depigmented white. This horse will pass the gene 100% of the time, all offspring will turn gray.

Champagne – Dominant gene

n/n – No champagne gene detected.

n/Ch • One copy of the champagne gene detected. Horse will have a diluted color, which depends on its base color.

Ch/Ch- Two copies of the gene detected. Horse will have a diluted color, which depends on its base color. The Champagne gene will be passed to the offspring 100% of the time.

Tobiano coat pattern - Dominant

t/t – no tobiano gene detected

n/T – one copy of the tobiano gene detected. The horse will have a broken coat pattern consisting of patches of the base color along with patches of no color (white). The base color can also be diluted or modified by other genes.

T/T – two copies of the tobiano gene detected. The horse will have a broken coat pattern consisting of patches of the base color along with patches of no color (white). The base color can also be diluted or modified by other genes. This horse will produce offspring with tobiano coat patterns 100% of the time no matter what pattern the mate has. ↓

Leopard Coat Pattern – Dominant

n/n – no LP gene detected

n/LP – one gene detected. The horse will display an appaloosa type coat spotting pattern.

LP/LP – two genes detected. The horse will display an appaloosa type coat spotting pattern and will produce Lp offspring 100% of the time.

Congenital Stationary Night Blindness (CSNB) is linked to the LP gene.

Pattern 1

n/n – no PATN1 gene detected.

n/PATN1 – one gene detected. When LP is also present will result in a leopard or near leopard pattern. If LP/LP is also present will result in a few spot leopard pattern.

PATN1/PATN1 – two genes detected. When LP is also present will result in a leopard or near leopard pattern. If LP/LP is also present will result in a few spot leopard pattern. This horse will pass the PATN1 to offspring 100% of the time.

Dominant White

n/n – no W20 gene detected.

n/W20 – one gene detected. The horse will display anywhere from small white patches to an almost all white body. The eyes are usually dark.

W20/W20 – two genes detected. The horse will display anywhere from small white patches to an almost all white body. The eyes are usually dark. This horse will pass the W20 to offspring 100% of the time.

Overo Lethal White- Frame Overo - Dominant

n/n- No overo gene detected.

n/OLW - One copy of the gene detected. The horse will display a frame overo coat pattern.

OLW/OLW – If two horses with n/OLW are bred and they both pass on the OLW gene it will result in a Lethal White foal. The foal will die shortly after birth and are usually humanely euthanized.

Sabino

n/n – no sabino gene is detected.

n/SB1 – the horse will have a broken coat with color and lack of color (white). The edges of the markings will be irregular and often have roaning. The white will be present in varying degrees.

SB1/SB1- the horse has two sabino genes and will be almost all white, called max sabino. The sabino gene will be passed to offspring 100% of the time.

Splash White (Blagdon)

n/n – no splash white gene detected.

n/SW1 – one gene detected. Horse will appear to be splashed with white from underneath. Can be any degree from high white on legs above the knee and/or hocks to entire belly with base color covering top of horse. Usually have white on face.

SW1/SW1 – two genes detected. Will pass the gene on to offspring 100% of time.

SW2 – same as SW1 only identified in some breeds.

SW3 – suspected lethal to foals born as SW3/SW3

SW4 – suspected lethal to foals born as SW4/SW4.

Roan - Dominant

Roan is inherited as dominant but the specific mutation has not yet been identified, so there is no direct genetic test for the gene. The only testing being done is a zygosity test that is done based on markers associated breeds that show classic roan.

n/n – no variant is detected. There are horses that show roaning but are still negative. This is a different type of roan (white hairs through the base color)

n/Rn – one copy of the variant is detected. The horse will display the classic roan look of white hairs evenly distributed throughout the body. The head and often time the legs remain dark. A black based horse with a Rn gene is called a Blue Roan.

Rn/Rn – two copies of the variant are detected. This horse will only produce roan offspring.