ETALON DIAGNOSTICS

REPORT DATE: OCTOBER 16, 2021
HORSE: ECHO ETERNAL
OWNER: AMY ASHBY

Genetic profile test results

HORSE ID: 042021_019
PACKAGES: APHA

Horse and owner information

Horse
Echo Eternal

Date of birth
06-06-2014

Breed
Paint (Tovero)

Age
7 y.o.

Color
Black

Sex
Stallion

Discipline
Breeding

Height
16 Hands

Registry
American Paint Horse Association

Reg number
1050037

Sire
BBF DR DIXON

Dam
PRISSY PUDDIN

Sire Reg & No.
American Paint Horse Association
386443

Dam Reg & No.
American Paint Horse Association
521784

Owner
Amy Ashby

Address
2118 PINE ROAD

Phone
7135031180

City, State
CLEVELAND, TX

Email
ashbyakgm@gmail.com

Postal code
77328

Results Summary

Variant summaries:

Color: **a/a, E/E, TO/n, LWO/n, nd1/nd2**

Speed: **Sprint Type**

Temperament: **Curious**

Gait: **Neg for DMRT3**

Performance and Abilities:

Curious
Two Curiosity variants; horse may be more curious than vigilant.

Non-"Gaited" DMRT3
No DMRT3 variants; likely non-gaited (*variants for novel "gait" abilities are currently in research).

Sprint
Two Sprint type variants; horse may accel at short distance, quick bursts of speed over endurance type activity.

Coat color:

Black (base, E) - E/E
Black (E) is the base coat color for this horse and is a relatively uncommon coat color on its own (usually it is found in combination with other colors or modifiers such as in Bay horses). A visible difference between a true black (Ee or EE), a dark chestnut (ee) or a bay (Aa or AA + E) can sometimes be seen in the fine hairs around the eyes and muzzle. On a true black these hairs typically remain black even if the horse is sun-bleached, while on other colors they will be lighter. For a horse to be "homozygous black", it must have TWO copies of the Black variant (EE) and horse has 100% chance of passing Black to any offspring.

Tobiano (TO) - TO/n
TO/n - One Tobiano (TO) variant detected; may result in large white markings on body, face and legs (occasionally produces 'minimal' or 'slipped' Tobiano horse with very little white only on face and lower legs (ongoing heritability study for minimal Tobiano). Horse has 50% chance of passing to any offspring.

Overo (LWO) - LWO/n
LWO/n - One Frame/Lethal White Overo (LWO) variant detected; may result in White markings and possibly blue eye(s). Horse has 50% chance of passing to any offspring.

non-Dun Primitive Markings (nd) - nd1/nd2
nd1/nd2 - Non-Dun (nd) Primitive Markings may result in dorsal striping, leg barring and "shadows" on the face and shoulder. Still in research, it is suspected in some cases that nd1 may also cause mild coat color dilution, though not as extensive as the Dun (D) variant. Horse with one copy of nd1 variant will pass nd1 to 50% of any offspring.

Blue Eyes Possible
Horses with the Tobiano variant (TO/n or TO/TO) in addition to the Lethal White Overo variant (LWO/n) have an increased likelihood of having one or two blues eyes.

Tovero (TO/TO, LWO/n or TO/n, LWO/n)
Horses with at least one Tobiano variant (TO/n or TO/TO) and one Lethal White Overo variant (LWO/n) are often referred to as "Tovero"

Health Variants:

Lethal White Overo (LWO) - LWO/n

LWO/n - One Frame/Lethal White Overo (LWO) variant detected, resulting in "Carrier" status and may exhibit White markings. Caution is recommended when breeding to avoid another carrier and thus a 25% chance of foal fatality. Read more about LWO by clicking the name of the variant above.

Coat color

Base

Agouti (A) - a/a	ASIP		Negative

Gene or region: **ASIP**

a/a - No Dominant Agouti variants detected. Agouti (A) restricts black pigment to the outer regions of the body, the legs, mane & tail, nose, ear tips causing the otherwise black horse to appear Bay. Agouti is invisible on the red based coat.

Black (E) - E/E	MC1R		Black Based

Gene or region: **MC1R**

E/E - Two Black variants detected and no Red.

Modifiers

Grey (G) - n/n	STX17A		Negative

Gene or region: **STX17A**

No Grey (G) variants detected.

Brindle (BR1) - n/n	MBTPS2BR1		Negative

Gene or region: **MBTPS2BR1**

n/n - No Brindle (BR1) variants detected. Horse with Brindle (BR1) may display overall haircoat showing streaks of darker and lighter hair, similar to the brindle coat color in other species.

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non-Dun Primitive Markings (nd) - nd1/nd2	TBX3		Possibly Affected

Gene or region: **TBX3**

nd1/nd2 - One non-Dun Primitive Markings variant detected. Non-Dun Primitive Markings can appear as a dorsal stripe, leg barring, shadows on the face and shoulders even in the absence of the Dun variant.

Dilutes

Champagne (CH) - n/n	SLC36A1		Negative

Gene or region: **SLC36A1**

No Champagne (CH) variants detected.

Silver (Z) - n/n	PMEL17		Negative

Gene or region: **PMEL17**

No Silver (Z) variants detected. Silver affects only black base (E) coat colors and is invisible on a red-based coat. On black or bay, It has a disproportionate diluting effect on the mane and tail, and is sometimes called, "Chocolate Flaxen".

Cream (CR) - n/n	SLC45A2		Negative

Gene or region: **SLC45A2**

No Cream (CR) variants detected.

Pearl (PRL) - n/n	SLC45A2		Negative

Gene or region: **SLC45A2**

No Pearl (prl) variants detected.

Dun (D) - n/n	TBX3		Negative

Gene or region: **TBX3**

No Dun (D) variants detected. Dun is a modifier that dilutes the base coat color often revealing Primitive Markings such as a dorsal stripe, leg barring, shadows on the face and shoulders.

Whites

Frame/Lethal White Overo (LWO) - LWO/n	EDNRB		Likely Affected

Gene or region: **EDNRB**

LWO/n - One Frame/Lethal White Overo variant detected. May result result in White markings and possibly blue eye(s).

Tobiano (TO) - TO/n	ECA3		Likely Affected

Gene or region: **ECA3**

TO/n - One Tobiano variant detected; likely white markings. This horse may pass Tobiano to 50% of any offspring.

Leopard Spotting Complex (LP) - n/n	TRPM1		Negative

Gene or region: **TRPM1**

No Leopard Complex Spotting (SP) variants detected.

Pattern 1 (PATN1) - n/n	RFWD3		Negative

Gene or region: **RFWD3**

No Pattern (PATN1/n) 1 variants detected.

Sabino1 (SB1) - n/n	KIT	Negative

Gene or region: **KIT**

No Sabino (SB1) variants detected.

Splashed White (SW1) - n/n	MITF	Negative

Gene or region: **MITF**

No Splashed White 1 (SW1) variants detected.

Splashed White (SW2) - n/n	PAX3	Negative

Gene or region: **PAX3**

No Splashed White 2 (SW2/n) variants detected.

Splashed White (SW3) - n/n	MITF	Negative

Gene or region: **MITF**

No Splashed White 3 (SW3) variants detected.

Splashed White (SW4) - n/n	PAX3	Negative

Gene or region: **PAX3**

No Splashed White 4 (SW4) variants detected.

Dominant White (W) - n/n	KIT	Negative

Gene or region: **KIT**

No Dominant White (1-21) variants detected.

Health Variants

Color Related Risk

Lethal White Overo (LWO) - LWO/n	EDNRB		Carrier

Gene or region: **EDNRB**

LWO/n - One Frame/Lethal White Overo (LWO) variant detected, resulting in "Carrier" status and may exhibit White markings. Caution is recommended when breeding to avoid another carrier and thus a 25% chance of foal fatality. Read more about LWO by clicking the name of the variant above.

Congenital Stationary Night Blindness (CSNB) - n/n	TRPM1		Negative

Gene or region: **TRPM1**

n/n - No Leopard Complex Spotting (LP) variants detected, which is related to the presence of Congenital Stationary Night Blindness (CSNB) if horse is LP/LP. Horses with one copy of the Leopard Complex Spotting (LP) variant are not currently known to suffer any ill effects as a result. Horses with Congenital Stationary Night Blindness (CSNB) which may experience the inability to see in low to no-light conditions. Read more about CSNB by clicking the name of the variant above.

Multiple Congenital Ocular Anomalies (MCOA) - n/n	PMEL17		Negative

Gene or region: **PMEL17**

n/n - No Silver variants detected which is related to the presence of Multiple Congenital Ocular Anomalies (MCOA). Read more about MCOA by clicking the name of the variant above.

Immune System

Foal Immunodeficiency Syndrome (FIS) - n/n	SLC5A3		Negative

Gene or region: **SLC5A3**

No Foal Immunodeficiency Syndrome (FIS) variants detected. Read more about FIS by clicking the name of the variant above.

Severe Combined Immunodeficiency (SCID) - n/n	DNAPK		Negative

Gene or region: **DNAPK**

No Severe Combined Immunodeficiency (SCID) variants detected. Read more about SCID by clicking the name of the variant above.

West Nile Virus Symptom Susceptibility Risk (WNVR) - n/n	OAS1		Negative

Gene or region: **OAS1**

No West Nile Virus Symptom Susceptibility Risk (WNVR) variants detected. Normal susceptibility to West Nile Virus symptoms. (*NOT a test for West Nile Virus). Read more about WNVR by clicking the name of the variant above.

Immune-mediated Myositis (IMM)	MYH1	Not ordered

Muscle Disorders

Glycogen Branching Enzyme Deficiency (GBED) - n/n	GBE1		Negative

Gene or region: **GBE1**

No Glycogen Branching Enzyme Deficiency (GBED) variants detected. Read more about GBED by clicking the name of the variant above.

Hyperkalemic Partial Paralysis (HYPP) - n/n	SCN4A		Negative

Gene or region: **SCN4A**

No Hyperkalemic Partial Paralysis (HYPP) variants detected. Read more about HYPP by clicking the name of the variant above.

Malignant Hyperthermia (MH) - n/n	RYR1		Negative

Gene or region: **RYR1**

No Malignant Hyperthermia (MH) variants detected. Read more about MH by clicking the name of the variant above.

Myotonia (MYT) - n/n	CLCN4		Negative

Gene or region: **CLCN4**

No Myotonia (MYT) variants detected. Read more about MYT by clicking the name of the variant above.

Polysaccharide Storage Myopathy type 1 (PSSM1) - n/n	GYS1		Negative

Gene or region: **GYS1**

No Polysaccharide Storage Myopathy type 1 (PSSM1) variants detected. Read more about PSSM1 by clicking the name of the variant above.

Neurologic Disorders

Cerebellar Abiotrophy (CA) - n/n	MUTYH		Negative

Gene or region: **MUTYH**

No Cerebellar Abiotrophy (CA) variants detected. Read more about CA by clicking the name of the variant above.

Lavender Foal Syndrome (LFS) - n/n	MYO5A	Negative

Gene or region: **MYO5A**

No Lavender Foal Syndrome (LFS) variants detected. Read more about LFS by clicking the name of the variant above.

Hydrocephalus (HDC)	B3GALNT2	Not ordered

Recurrent Laryngeal Neuropathy (RLN)	ECA3	Not ordered

Reproductive Disorders

Androgen Insensitivity Syndrome (AIS) - n/n	AR	Negative

Gene or region: **AR**

No pattern of Androgen Insensitivity Syndrome (AIS) variants detected. Read more about AIS by clicking the name of the variant above.

Impaired Acrosomal Reaction - Subfertility Risk (IAR) - iar/iar, iar/n	FKBP6IAR1...	Not Affected

Gene or region: **FKBP6IAR1, FKBP6IAR2**

No pattern for Impaired Acrosomal Reaction (IAR) - Subfertility Risk variants detected. Read more about IAR by clicking the name of the variant above.

Skin, Hoof and Connective Tissue Disorders

Hereditary Equine Regional Dermal Asthenia (HERDA) - n/n	PPIB	Negative

Gene or region: **PPIB**

No Hereditary Equine Regional Dermal Asthenia (HERDA) variants detected. Read more about HERDA by clicking the name of the variant above.

Junctional Epidermolysa Bullosis type 1 (JEB1) - n/n	LAMC2	Negative

Gene or region: **LAMC2**

No Junctional Epidermolysa Bullosis type 1 (JEB1) variants detected. Read more about JEB1 by clicking the name of the variant above.

Junctional Epidermolysa Bullosis type 2 (JEB2) - n/n	LAMA3	Negative

Gene or region: **LAMA3**

No Junctional Epidermolysa Bullosis type 2 (JEB2) variants detected. Read more about JEB2 by clicking the name of the variant above.

"Warmblood" Fragile Foal Syndrome (FFS)	PLOD1	Not ordered
Hoof Wall Separation Disease (HWSD)	SERPINB11	Not ordered
Naked Foal Syndrome (NFS)	st14nfs	Not ordered

Occular Disorders

Equine Recurrent Uveitis Susceptibility Risk (ERUR)	BIEC2536712WB	Not ordered

Equine Recurrent Uveitis Symptom Severity (ERUS)	BIEC2421990WB	Not ordered
Squamous Cell Carcinoma Susceptibility Risk (SCC)	DDB2	Not ordered

Skeletal Disorders

Dwarfism (D)	ACAND1...	Not ordered
Friesian Dwarfism (FD)	B4GALT7	Not ordered
Lordosis	ECA20... 	Not detected

Gene or region: **ECA20, ECA20, ECA20, ECA20**

Horses with one copy in each of the four Lordosis regions are not currently known to suffer any ill effects as a result. Horses with two copies in each of the four Lordosis regions exhibit signs of swayback. Currently studies are only proven in the N. Am. Saddlebred breed.

Endocrine Disorders

Equine Metabolic Syndrome Susceptibility Risk (EMS)	BIEC2263524EMS	Not ordered
Laminitis Susceptibility Risk - Equine Metabolic Syndrome related (LAM)	BIEC2263524_LAM	Not ordered

Additional Traits

Height (LCORL)	LCORL	Not ordered

Performance and Abilities

Gait Type

Non-"Gaited" DMRT3	DMRT3		Detected

Gene or region: **DMRT3**

No DMRT3 variants; likely non-gaited (*variants for novel "gait" abilities are currently in research).

Performance

Sprint	MSTN		Detected

Gene or region: **MSTN**

Two Sprint type variants; horse may accel at short distance, quick bursts of speed over endurance type activity.

Temperament

Curious	DRD4		Detected

Gene or region: **DRD4**

Two Curiosity variants; horse may be more curious than vigilant.
