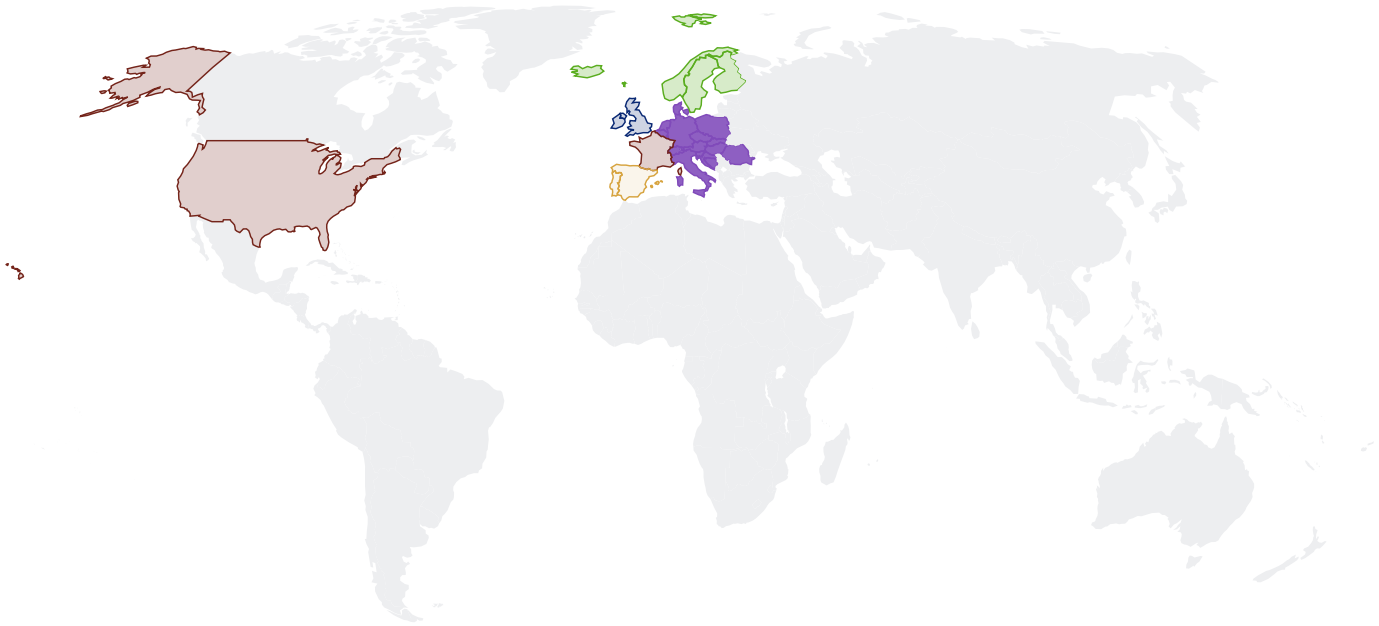
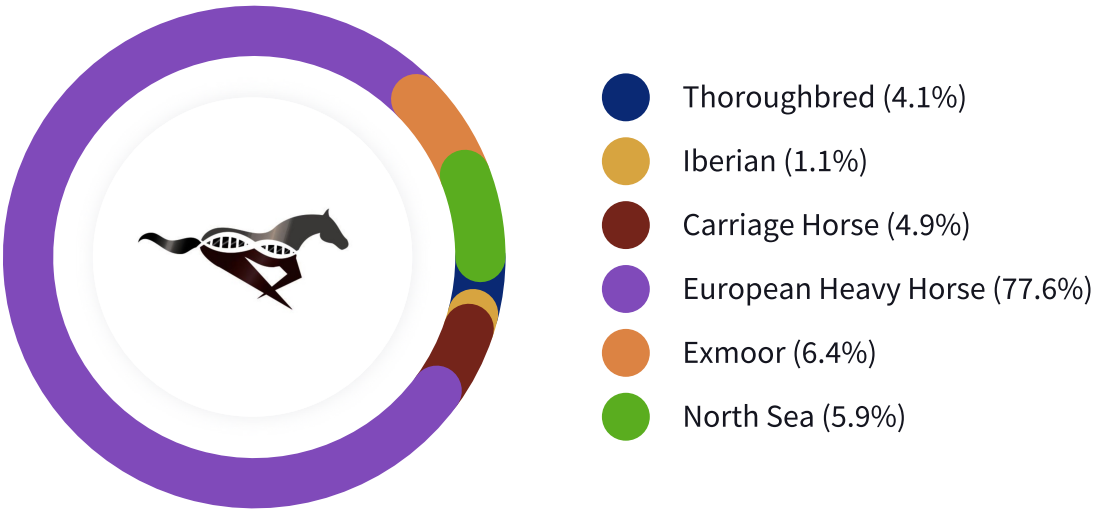
Gitt A Hunka Burn 'N Love

Composition Map



Ancestry Identified



**Your analysis is ongoing and may include discovery or beta-stage data/calculations that may change over time as equine science evolves. The current defined/known population for the equine ancestry project may include unintended bias toward specific "breeds" or regions based on sample sizes/availability. It is assumed to have an estimated error range of 5-7% which may change with growth and education in the sample population. The Etalon Ancestry and Composition testing is intended to assist in better understanding equine science, health & performance. As populations, disciplines and breeding trends change over time, so too will the results of each horse when compared within the population at that time. This service is not intended as a tool to provide specific breed or definitive registry information.

Genetic Composition Key

British Isles Native/Exmoor

Exmoor

Carriage Horse

French Trotter, Morgan, Saddlebred, Standardbred, Tennessee Walking Horse

Heavy Horse

Belgian, Clydesdale, Fell Pony, Franches Montagnes, Percheron

Iberian

Andalusian, Lusitano, Mangalara Paulista, Pura Raza Espanola

Near East

Arabian, Akhal Teke, Caspian

North Sea

Fjord, Icelandic, North Swedish, Shetland

Thoroughbred

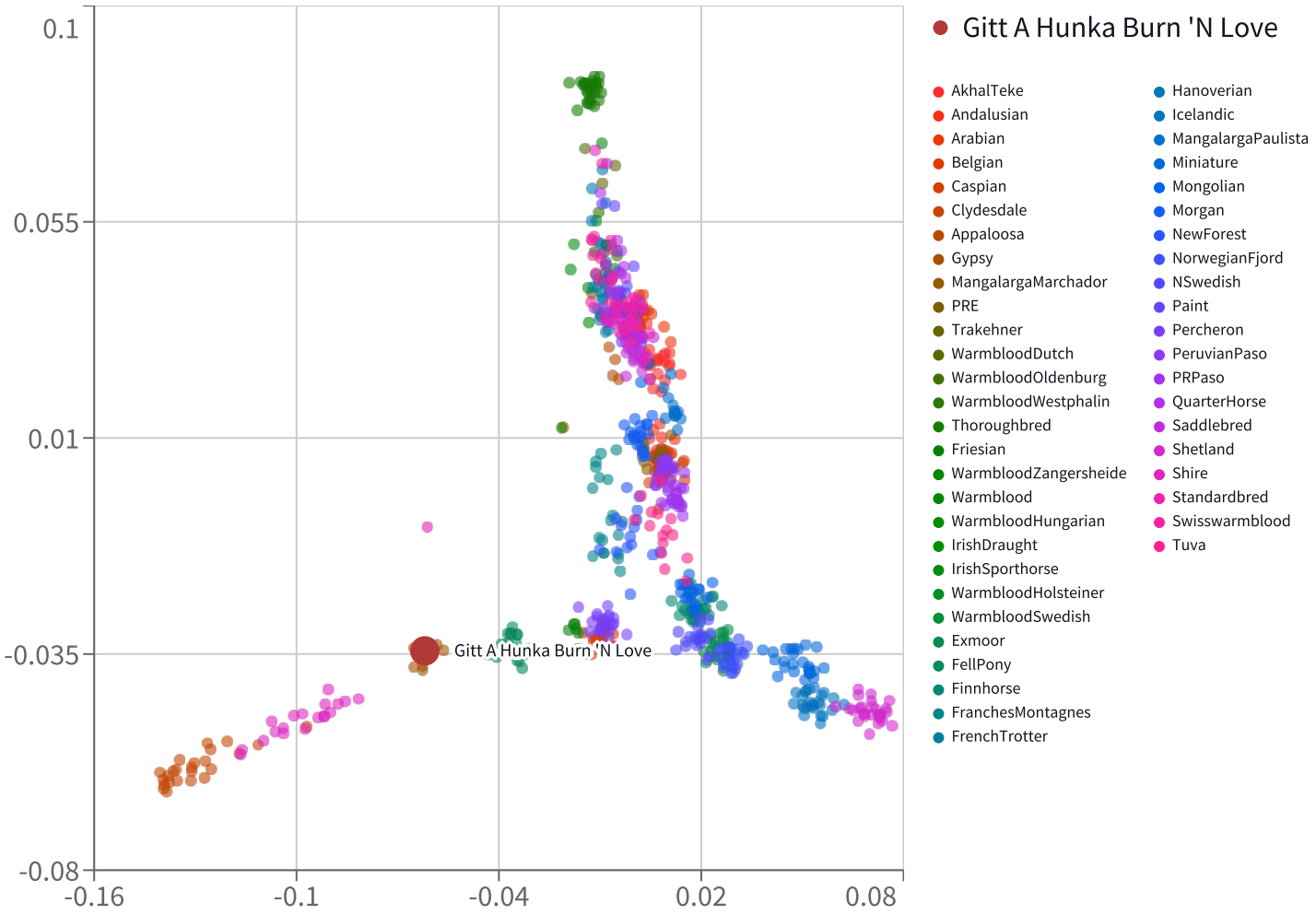
Thoroughbred

Equine ancestry is analyzed based on regional breeding practices and evolutionary drift. Horses from each region of the world, group or "breed" will have genes in common and overlapping regions that can be identified, compared and graphed. Where horses have been closely bred (due to close proximity) or purposely bred by man (to suit a discipline or need) the genetic content of those horses will "cluster" together on a graph and may correlate with "breed" labels. Registries, breeds or closed groups of horses bred through longer periods of history will have more clearly defined gene clusters. Often, these clusters will be entirely separated from most horse samples. Take a look at the scatterplot on the following page to see an illustration of the reference horse population and where your horse falls on the graph.

Ancestry Breakdown

- Thoroughbred 4%
  - Thoroughbred 4%
- Iberian 1%
  - PRPaso 1%
- Carriage Horse 5%
  - French Trotter 5%
- European Heavy Horse 78%
  - Fell Pony 19%
  - Clydesdale 41%
  - Franches Montagnes 10%
  - Belgian 7%
- Exmoor 6%
  - Exmoor 6%
- North Sea 6%
  - North Swedish 3%
  - Icelandic 3%

Ancestry Population Comparison



Heterozygosity: 30.20%

"Heterozygosity" is a measure of genetic diversity (the number of variants or unique versions of genes within an individual). It can be correlated with overall health or resilience due to the diverse nature of the genetic "tool kit". An organism that has more flexibility is more likely to survive and prosper.

F Value: 9.525%

The "F" value is a measure of inbreeding derived from the actual genetic diversity within an individual. The value seen in this report is based on actual genetic measures as opposed to the more commonly pedigree derived "inbreeding coefficient".

Thoroughbred "Blood": 4.06%

The genetic percentage shared with a reference population of known Thoroughbreds (Petersen, et al.) Referred to in Eventing circles as, "% Blood", this measure may differ from pedigree calculations by as much as 30%.

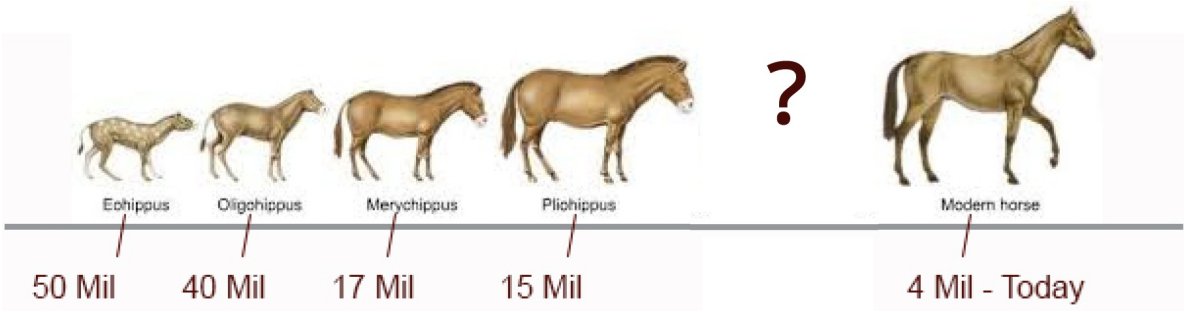
In the above graph (called a Principal Component Analysis or "PCA" chart) your horse's genealogy was compared to a known reference population. These horses represent the genomes of varying "breeds" and regions throughout the world. Horses from each region of the world, group or "breed" will have genes in common and overlapping regions that can be identified, compared and graphed as above. Where horses have been closely bred (due to proximity) or purpose- bred by man (to suit a discipline or need) the genetic content of those horses will "cluster" together whereas horses that are less related (either due to breeding or global proximity) will appear in regions farther away from one another. Horses bred through longer periods of history will have more clearly defined and tighter gene clusters (they clump together in the above illustration). Often, these clusters will be entirely separated from other horse groups or samples. Where does your horse fall on the graph?Are the groups or individual horses nearby more or less like your horse? Because horses are continually bred for ever-changing disciplines and desired traits (i.e. speed, height, bone density, color, temperament, etc.) the ancestry graph and PCA will also continue to change and morph over time based on the population tested.

Ancestry Fun Facts

Did you know? Some of the horse "breed" category percentage calculations are more accurate than others! While certain groups of horses have been closely bred and tracked for centuries ("closed stud book") making their gene pool quite limited and easily tracked, other breeds have rapidly or more recently developed for a variety of reasons. Many of the newer breeds were selectively bred to yield a specific look, size, conformation or ability for different disciplines and emerging trends. While some sports or purposes remain specific with a stable focus (i.e., racing or carriage) others are constantly changing with the times, competition demands and styles (hunter/jumper, color breeds, reining, etc.). This means a look at your standard Reining Quarter Horse will have a dramatically different look today than it may have in 1980, whereas the Racing Harness horses may appear largely similar with minor changes in step with each leading sire. Your horse's composition within its own group will change over time to reflect larger samples sizes (more horses included in the study) and changing demands for the discipline (see winning halter horses today versus 30 years ago - it's dramatic!).

Most white markings may be nouveau but they are not new! Although we "discover" variants in the genome for white markings constantly, some of the most fashionable have been around for a long time. "Tobiano" (famously making a lovely Pinto spotting pattern on the coat) can be found in ancient horses from as far back as 3000-5000 years ago.

Finding the first domestic horse has been challenging. To date, the origin of the first domesticated equine remains a mystery. Archaeologists and genealogists find clues in the fossilized remains of varying equids through time. Those who are suspected of being "domestic" often carry the tell-tale signs of wear on teeth and other jaw bony regions indicating this horse wore a bit - clearly placed there by a human.



The Science of Ancestry

Really geeky stuff

OK, folks...here's where we get hardcore about our equines. Below you can find the scientific references, information on the specific methods and genes we use to try and understand this noble species:

Genetic diversity in the modern horse illustrated from genome-wide SNP data.

Petersen JL, Mickelson JR, Cothran EG, Andersson LS, Axelsson J, Bailey E, Bannasch D, Binns MM, Borges AS, Brama P, da Câmara Machado A, Distl O, Felicetti M, Fox-Clipsham L, Graves KT, Guérin G, Haase B, Hasegawa T, Hemmann K, Hill EW, Leeb T, Lindgren G, Lohi H, Lopes MS, McGivney BA, Mikko S, Orr N, Penedo MC, Piercy RJ, Raekallio M, Rieder S, Røed KH, Silvestrelli M, Swinburne J, Tozaki T, Vaudin M, M Wade C, McCue ME.

Runs of homozygosity reveal signatures of positive selection for reproduction traits in breed and non-breed horses.

Metzger J, Karwath M, Tonda R, Beltran S, Águeda L, Gut M, Gut IG, Distl O.

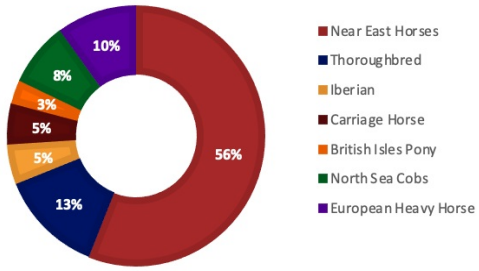
Prehistoric genomes reveal the genetic foundation and cost of horse domestication

Mikkel Schubert, Hákon Jónsson, Dan Chang, Clio Der Sarkissian, Luca Ermini, Aurélien Ginolhac, Anders Albrechtsen, Isabelle Dupanloupd, Adrien Foucald, Bent Petersen, Matteo Fumagalli, Maanasa Raghavan, Andaine Seguin-Orlando, Thor nn S. Korneliussen, Amhed M. V. Velazquez, Jesper Stenderup, Cindi A. Hoover, Carl-Johan Rubin, Ahmed H. Alfarhan, Saleh A. Alquraishi, Khaled A. S. Al-Rasheid, David E. MacHugh, Ted Kalb eisch, James N. MacLeod, Edward M. Rubin, Thomas Sicheritz- Ponten, Leif Andersson, Michael Hofreiter, Tomas Marques-Bonet, M. Thomas, P. Gilberta, Rasmus Nielsen, Laurent Exco er, Eske Willerslev, Beth Shapiro, and Ludovic Orlando.

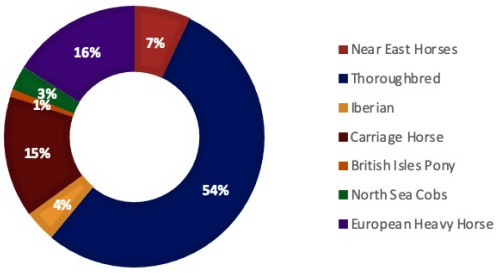
Glossary of Terms

What do other horse compositions look like?

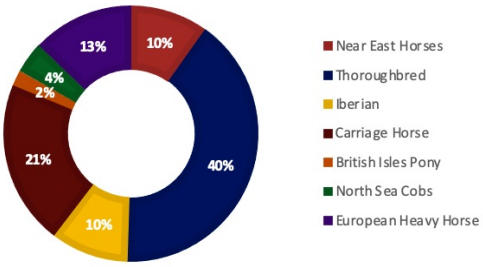
AKHAL TEKE



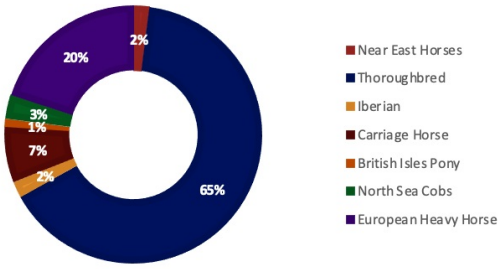
WARMBLOOD



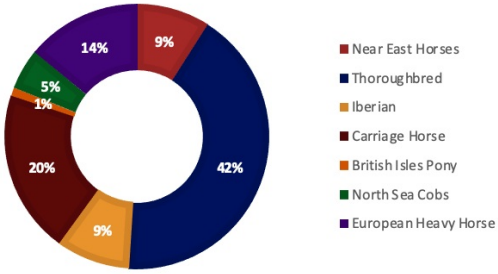
QUARTER HORSE



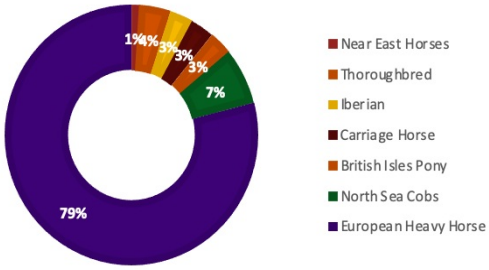
IRISH SPORT HORSE



PAINT HORSE



GYPSY



Glossary of Terms

Links for additional information and services

Click here for more about Ancestry/Composition Testing

Click here for more about Color and Health Variant Testing

Click here for more about how colors work

Click here for more about Etalon Genetic Services

Click here to request a genetic consult call about your results

Thank you from Team Etalon!