Prime Scholars Library

Advances in Life Science and Biotechnology

Vol.10 (4), pp.06-07, December, 2022

Perspective

Available online at
https://primescholarslibrary.org/

End-phase athletic Phenotype in racehorses

Williams Alun*

Department of Molecular Biology and Genetics, Federal Research, Moscow, Russia.

Received: 04-Nov-2022, Manuscript No. ALSB-22-84228; **Editor assigned:** 07-Nov-2022, Pre QC No.ALSB-22-84228 (PQ); **Reviewed:** 21-Nov-2022, QC No. ALSB-22-84228; **Revised:** 29-Nov-2022, Manuscript No.ALSB-22-84228 (R); **Published:** 07-Dec-2022, DOI**:** 10. 51268/2736-1837.22.10.079.

DESCRIPTION

Selection for system-wide morphological, physiological, and metabolic adaptations has led to extreme athletic phenotypes among geographically diverse horse breeds. We use genomic approaches for racing performance, an end-point athletic phenotype, to identify genes that contribute to exercise adaptation in racehorses. We identify protein-coding variants in genes of interest in galloping racehorse breeds using an integrative genomics strategy that first combines population genomics results with skeletal muscle exercise and training transcriptomic data, followed by whole-genome sequencing of Asian horses. G6PC2, HDAC9, KTN1, MYLK2, NTM, SLC16A1, and SYNDIG1 are key drivers of the racing phenotype, with important roles in muscle, metabolism, and neurobiology. Although racing potential is a multifactorial trait, the genomic architecture shaping the common athletic phenotype in racing horse populations provides evidence for the impact of protein-coding variants in fundamental exercise-relevant genes. Variation in these genes may thus be used to genetically improve horse populations for specific types of racing. Horse racing is one of the oldest known sports, with the general concept of horses, either mounted or harnessed, travelling at high speeds over a set distance and terrain, with the horse finishing first being declared the winner, remaining largely unchanged for millennia.

The quest for wealth and status in racing crosses cultures and borders, and mounted horse racing is now a globally popular sport. Different populations of horses have been developed for racing through a process of selective breeding for characteristics required to excel in specific types of competition; these include breeds that compete in harness and trotting races, as well as galloping breeds such as the Arabian, Mongolian, and Thoroughbred.

CONCLUSION

The Mongolian horse is one of the oldest extant horse populations, and while domesticated, most animals are free to roam and receive little human intervention. Mongolian horse populations have relatively high genomic diversity when compared to other breeds, which may reflect the central Asian steppe region's importance as a centre for horse domestication. The Mongolian is classified as a breed in general, but there are several phenotypically and genetically distinct subpopulations that are used for meat, milk, transportation, and racing. Racing is celebrated in Mongolia every year during the Nadaam festival of racing, in which adult horses race over long distances and over difficult terrain. Thoroughbred stallions have been imported in recent years for crossbreeding to improve speed traits in racing populations. The Arabian horse is also an ancient breed with high levels of genetic diversity. The Arabian horse, which has been bred for millennia and developed by Bedouin

nomads for transportation and military use, has traditionally excelled in long-distance endurance racing, often in extreme climatic conditions. Recently, there has been strong selection among subgroups for an aesthetically pleasing conformation phenotype, which is valued in show competition and short-distance track racing.

There is evidence of recent Thoroughbred crossbreeding among track racing Arabians, presumably for the introduction of speed, with some horses having up to 60% Thoroughbred ancestry. Despite being considered a highly polygenic trait, sequence variants at several genes have been linked to performance traits in the Arabian breed.