

Infographic

Importance of mitochondrial phenotype in equine athletes

Athletic performance in horses is determined, in part, by their capacity for energy production in the mitochondria. Mitochondrial phenotype is dependent on genetics, diet, and exercise. Matching mitochondrial phenotype to athletic performance goals has the potential to improve performance (Latham et al, 2022).

Reference

Latham, C.M., C.P. Guy, L.T. Wesolowski, and S.H. White-Springer. 2022. Fueling Equine Performance: Importance of Mitochondrial Phenotype in Equine Athletes. *Anim. Front.* 12(3):6–14. <https://doi.org/10.1093/af/vfac023>

Fueling Equine Performance: Importance of Mitochondrial Phenotype in Equine Athletes

[HTTPS://DOI.ORG/10.1093/af/vfac023](https://doi.org/10.1093/af/vfac023)

How well horses naturally perform in different types of competitions is determined in part by the composition of their muscles. The quantity and quality of the primary source of cellular energy in the muscle, the mitochondria, may impact a horse's performance potential. The mitochondrial phenotype of an individual is affected by three main factors:

Genetics



Exercise



Diet



Selection for specific types of athletic performance in horse breeds has resulted in differences in the way in which mitochondria produce energy between breeds.



Horses regularly trained for competitions will show increased mitochondrial efficiency and capacity.



Supplementation of organic sources of selenium, zinc, magnesium, and copper improves mitochondrial health.

Tailoring mitochondria to improve a horse's performance depends on the type of competition:



Horses in **endurance competitions** need to go long distances at lower speeds.

- Higher mitochondrial densities
- Slower, less powerful contractions



Horses in **sprint competitions** perform over short distances at high speeds.

- Lower mitochondrial densities
- Quick, more powerful contractions



Regardless of the mitochondrial density, the way in which mitochondria produce energy differs depending on the type of exercise needed for competition.

Improving the understanding of mitochondrial profiles of energy production in horses may help inform **breeding, training, and nutrition decisions**, with the goal of reducing incidences of injury.