

New deer mouse study examines muscle performance and high altitude adaptation

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Life has adapted to all sorts of extreme environments on Earth, among them, animals like the deer mouse, shimmying and shivering about, and having to squeeze enough energy from the cold, thin air to fuel their bodies and survive.

Now, in a new publication in the journal *Molecular Biology and Evolution*, Scott, Cheviron et al., have examined the underlying muscle physiology from a group of highland and lowland [deer mice](#). Deer mice were chosen because they exhibit the most extreme altitude range of any North American mammal, occurring below sea levels in Death Valley to more than 4,300 meters high in the mountains.

The research team took mice native to high or low altitude habitats, and after rearing the lab, measured the population differences in the mice, as well as their offspring. Many muscle physiology traits tended to show heritable differences between populations, whereas many were more plastic, changing with acclimation to a new altitude environment.

These differences were associated with changes in the expression of in a number of genes involved in energy metabolism, muscle plasticity, vascular development and cellular stress. At the intracellular level, genes that influence the proliferation of the powerhouses of the cell, mitochondria, were also more highly expressed in highland [mice](#). Together these genetic changes resulted in increasing the oxidative capacity and blood supply to [skeletal muscle](#), where rivers and tributaries of blood vessels and capillaries serve to enrich and energize skeletal

[muscle](#).

The results add to the growing knowledge and underlying mechanisms of fitness-related physiological performance under hypoxic conditions.

Provided by Oxford University Press

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