

RUSSELL, G.A.*; HAMMOND, K.A.; CARDULLO, R.A.; Univ. of California, Riverside; Univ. of California White Mountain Research Station; Univ. of California, Riverside; Univ. of California, Riverside: **Effects of development at high altitude: aerobic metabolism in the deer mouse, *Peromyscus maniculatus***

Studies of high altitude (HA) physiology have traditionally focused on two groups: populations that have resided at HA for many generations, or low altitude (LA) residents who make short sojourns to HA. There have been very few studies looking at the direct effects of *in utero* development on an organism's adult physiology. The purpose of this study was to determine what effects *in utero* development at HA has on oxidative enzyme capacity (citrate synthase, CS and cytochrome c oxidase, CCO) and fuel use (glycogen concentration) in the deer mouse, *Peromyscus maniculatus*. Our experimental design incorporated four groups of mice: low born/high acclimated, low born/low acclimated, high born/high acclimated, and high born/low acclimated. Mice were caged individually after weaning and were acclimated to either LA (380 m) or HA (3800 m) for 5-8 weeks. After acclimation, VO₂max was determined via treadmill exercise and skeletal muscle, heart, and liver was frozen. We then determined the concentrations of CS and CCO in heart and skeletal muscle. Finally, we determined the concentration of glycogen in skeletal muscle and liver. Heart CCO was 41-52% higher in HA-born mice, regardless of test altitude ($p = 0.001$). Skeletal muscle CCO was 40-44% higher in HA-born mice, regardless of their test altitude ($p = 0.01$). We did not find any differences in CS in either heart or skeletal muscle. Both natal and acclimation altitude played a role in determining liver glycogen concentration, where the HA-born mice tended to have higher glycogen concentration ($p = 0.002$). There were no significant differences between groups in skeletal muscle glycogen ($p = 0.23$). We conclude that *in utero* development at HA does play a role in altering an adult's metabolic physiology.