Differences in mitochondrial gene expression profiles, enzyme activities and myosin heavy chain types in yak versus bovine skeletal muscles

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ABSTRACT. Hypoxia can affect energy metabolism. We examined gene expression and enzyme activity related to mitochondrial energy metabolism, as well as myosin heavy chain (MyHC) types in yaks (Bos grunniens) living at high altitudes. Real-time quantitative PCR assays indicated that the yak has significantly lower levels of carnitine palmitoyltransferase (CPT) mRNA in the biceps femoris and lower levels of uncoupling protein 3 (UCP3) mRNA in both biceps femoris and longissimus dorsi than in Yellow cattle. No significant differences between yak and Yellow cattle were observed in the activities of mitochondrial β-hydroxyacyl-CoA dehydrogenase, isocitrate dehydrogenase and cytochrome oxidase in the same muscles. Semi-quantitative RT-PCR analysis showed that the MyHC I mRNA levels in yak biceps femoris is lower than in Yellow cattle. We conclude that the yak has significantly lower mRNA levels of CPT, UCP3, and MyHC I in biceps femoris than in Yellow cattle, suggesting that the
yak biceps femoris has lower fatty acid oxidation capacity and greater glycolytic metabolic potential.

**Key words**: Carnitine palmitoyltransferase; Uncoupling protein; Myosin heavy chain; Hypoxia adaptation; *Bos grunniens*