

61 AMP-activated protein kinase is negatively associated with intramuscular fat in beef cattle. K. R. Underwood*, W. J. Means, M. J. Zhu, and M. Du, *University of Wyoming, Laramie.*

Marbling, or intramuscular fat, is an important factor in meat quality and greatly affects market value. AMP-activated protein kinase (AMPK) is a cellular energy regulator protein with the ability to promote fatty acid oxidation and inhibit fatty acid synthesis. Thus, AMPK may be associated with marbling. Our objective was to evaluate the association between AMPK, as well as AMPK signaling mediators, and marbling in beef cattle. Intramuscular fat content of *longissimus* muscle from 40 steers was determined using chemical analysis. Five steers with high intramuscular fat content (5.71 ± 0.36 %) and low fat content (2.09 ± 0.19 %) respectively were selected for western blot analysis. AMPK, acetyl-CoA carboxylase (ACC), mammalian target of rapamycin (mTOR), S6 kinase, eIF4E-binding protein-1 (4EBP1), protein kinase B (Akt), extracellular signal-regulated kinase 1/2 (ERK1/2), and their phosphorylated forms were measured to investigate the relationship of AMPK with intramuscular fat. Also, peroxisome proliferator activated receptor- γ (PPAR γ) content was determined. AMP-activated protein kinase activity was determined using a peptide assay. *Longissimus* muscle with high intramuscular fat showed a decreased amount of phosphorylated AMPK at Thr172 ($P = 0.04$), reduced AMPK activity ($P = 0.009$), increased phosphorylated ACC ($P = 0.03$), and reduced total mTOR ($P = 0.02$) content. However, no difference in ACC, S6 kinase, 4EBP1, ERK1/2, Akt and their phosphorylated forms ($P > 0.05$) was observed. Also, no difference in PPAR γ ($P > 0.05$) was observed between muscle from high and low intramuscular fat steers. This data provides evidence that AMPK is involved in intramuscular fat deposition in beef cattle.