Min Du, J Cell Sci Ther 2011, 2:4
doi: http://dx.doi.org/10.4172/2157-7013.S1.09

International Conference & Exhibition on
Cell Science & Stem Cell Research
29 Nov - 1 Dec 2011 Philadelphia Airport Marriott, USA

AMP-activated protein kinase and myogenesis

Min Du

Department of Animal Science, Washington State University, USA

An accumulating body of evidence points to the crucial role of AMP-activated protein kinase (AMPK) in the regulation of mesenchymal stem cell differentiation. Activation of AMPK inhibits adipogenesis and enhances myogenesis. We have demonstrated that muscle growth is correlated with AMPK. Using C3H10T1/2 cells, for the first time, we observed that AMPK phosphorylates b-catenin at Ser 552, which stabilizes b-catenin and enhances its targeted gene expression. In addition, our preliminary data also show that AMPK promotes b-catenin mRNA expression through phosphorylation of histone deacetylase 5 (HDAC5) in mouse C3H10T1/2 cells. HDAC5 belongs to the class IIa HDAC family, and acts as a conserved transcriptional repressor. HDAC5 interacts with myocyte enhancer factor-2 (MEF2) to target specific gene promoters. We identified a MEF2 binding site on the b-catenin promoter. These data prompted us to hypothesize that AMPK regulates b-catenin expression through phosphorylation of HDAC5, which was proven in mouse C3H10T1/2 cells. In summary, our recent studies clearly show that AMPK enhances b-catenin signaling, which points to the notion that AMPK regulates MSC differentiation via enhancing Wingless in Int (Wnt)/b-catenin signaling.

Biography

Min earned his B.S. from Zhejiang University in 1990, M.S. from China Agricultural University in 1993, and Ph.D. in Meat Science and Muscle Biology from Iowa State University in 2001. He was a Canadian NSERC postdoctoral fellow in Biochemistry and Cell Signaling at University of Alberta from 2001 to 2003. After that, he joined Animal Science Department at University of Wyoming as an Assistant Professor and was later promoted to Associate Professor. In 2011, he moved to Washington State University as a Professor and Endowed Chair in Muscle Biology. His research focuses on molecular mechanisms controlling mesenchymal stem cell differentiation into myocytes and adipocytes, and fetal skeletal muscle development.