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Myostatin signals through Pax7 to regulate myoblast proliferation and differentiation via differential pathways in Texel and Ujumqin sheep

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Myostatin and Pax7 are important myogenic regulators in animals. Our recent findings suggest that myostatin mutation changes Pax7 expression in muscle during fetus development. However, up to date, only the Erk1/2 signal is demonstrated to be involved in Pax7 expression by myostatin in myoblasts and satellite cells. Whether there are another pathways associated with Pax7 expression by myostatin or not remains unclear. In the present study, based on the differentially expressed genes from muscle transcriptome analysis between Textel and Ujumqin sheep, we builded the regulatory pathways from myostatin to Pax7 using the IPA platform. Quantitative RT-PCR analysis suggests that *SRC, Histone h3, AKT, p38MAPK, BMI1, MYF5, MYOD, MYOG,* and *RB* are associated with expression of Pax7 regulated by myostatin. To confirm the differential pathways through which myostatin regulates Pax7 between Texel and Ujumqin sheep, we constructed the lentiviral vector of siRNA for MSTN and performed the sheep myoblast proliferation and differentiation experiments, respectively. We show that myostatin inhibits the proliferative surge of sheep myoblasts ahead of time by increasing Pax7 transcription via the p38MAPK, Erk1/2, Akt, mTOR, and EZH2 signal pathways at mRNA and protein levels. On the other hand, myostatin promotes the sheep myoblast differentiation by down-regulating Pax7 transcription via the Erk1/2, p38MAPK, Akt, mTOR, EZH2, and SRC signals. Our findings expand the myogenic signals by which myostatin regulates Pax7 to affect the myogenic progression. We also indicate that myostatin participates in the epigenetic events during myoblast proliferation and differentiation.

Biography

Hang-Xing Ren has completed his Ph.D. in 2010 from Chinese Academy of Agricultural Sciences. He is an expert in muscle developmental biology and genomics in sheep. In 2006 and 2007, he achieved Awards for Science and Technology Advancement in XinJiang Province, China. Scince 2010, he has published 8 papers in SCI journals such as BMC Genimics, PLos One, et al.

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