Analysis of the spatiotemporal expression of major genes in the TGF-β/Smad signaling pathway and correlation analysis using Hu sheep muscle tissue

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ABSTRACT. The mRNA expression levels of key genes (Smads, MSTN, and MyoG) in the TGF-β/Smad signaling pathway in Hu sheep at different growth stages (2 days, 2 months, and 6 months of age) and in different skeletal muscles (longissimus dorsi muscle and soleus muscle) and different genders were detected; and correlation of the Smad family (Smad2, Smad3, Smad4, and Smad7), MSTN, MyoG expressions was analyzed in Hu sheep. The results showed that the expression of Smads was higher in the soleus muscle than in the longissimus dorsi muscle; the expressions of Smad2, Smad3, and Smad4 were significantly higher in 2-day-old sheep than in sheep belonging to the other age groups (P < 0.05); the expressions of Smad2, Smad4, and Smad7 were higher in rams than in 2-day-old ewes, but lower in rams than in 2-month-old and 6-month-old ewes; and the expression of Smad3 was higher in rams than
in 2-day-old and 2-month-old ewes, but lower in rams than in 6-month-old ewes. In the 2 different muscle tissues, expression of Smad2 was significantly positively correlated (P < 0.01) with that of Smad3. The expression of Smad3 was significantly positively correlated (P < 0.01) with that of Smad4, which showed that the Smad family genes could have an inhibitory effect on the TGF-β/Smad signaling pathway.

Key words: Hu sheep; Smads; MSTN; MyoG; Gene expression