Genetics and Molecular Research

Effect of MSTN propeptide protein on the growth and development of Altay lamb muscle

W. Du[1], Y. Zhang[1], J.Z. Yang[2], H.B. Li[1], J. Xia[1], N. Li[1], J.S. Zhang[1], X.M. Yan[1] and Z.Y. Zhou[1]

[1]Xinjiang Academy of Animal Science, Urumqi, China
[2]Agriculture Lab, University of Hawaii at Manoa, Honolulu, HI, USA

Corresponding author: Y. Zhang
E-mail: zhanyang2015@126.com

Genet. Mol. Res. 15 (2): gmr.15027778
Received October 5, 2015
Accepted November 23, 2015
Published June 24, 2016
DOI http://dx.doi.org/10.4238/gmr.15027778

ABSTRACT. Prokaryotic expression technology was used to express maltose-binding protein binding myostatin (MSTN) propeptide fusion protein. Six disease-free Altay lambs were used in this study. The right leg gastrocnemii were injected with MSTN recombinant propeptide protein. The left leg gastrocnemii (the control group) were injected with the same dose of phosphate based saline. The lambs were fed during four months under the same conditions and then slaughtered. Gastrocnemius samples were hematoxylin-eosin stained and the size of the muscle fibers was measured. A real-time polymerase chain reaction (RT-PCR) showed that single gastrocnemius cells in the experimental group had an average area of 1163.01 μm^2, while it was 845.09 μm^2 in the control group ($P < 0.05$). This indicates that the MSTN propeptide biological agents had an inhibitory effect on MSTN. In order to reveal its mechanism, RT-PCR was conducted to detect the expression of the differentiation-associated genes *MyoD*, *Myf5*, *Myogenin*, *p21*, and *Smad3*. The results showed that, in the MSTN propeptide biological agent injected group, expression levels of *MSTN*, *Smad3*, and *p21* were lower than the control group, while *Myf5*, *MyoD*, and *Myogenin* were higher compared to the control group. This indicates that, when

 ©FUNPEC-RP www.funpecrp.com.br

expression of the *MSTN* gene was inhibited, muscle cell differentiation and growth can be promoted by *Smad3* up-regulated expression of *Myf5*, *MyoD*, and *Myogenin*.

Key words: MSTN; Propeptide; Real-time-PCR

 ©FUNPEC-RP www.funpecrp.com.br