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Generation of cloned adult muscular pigs with myostatin gene mutation by genetic engineering

Xi-Jun Yin[1], Jin-Dan Kang[1], Seokjoong Kim[2], Long Jin[1], Qing Guo[1], Xiaoxu Xing[1], Meifu Xuan[1], Guanglei Zhang[1], Qirong Luo[1], Yong Soo Kim[3], Chengdu Cui[1], Wenxue Li[1], Zhengyun Cui[1] and **Jin-Soo Kim[4]**
[1]Yanbian University, China
[2]ToolGen, Inc., South Korea
[3]University of Hawaii, USA
[4]Institute for Basic Science, South Korea

Because skeletal muscle is the most economically valuable tissue in meat-producing animals, enhancing muscle growth in these species may enhance the efficiency of meat production. Skeletal muscle mass is negatively regulated by myostatin (MSTN), and non-functional mutations of the MSTN gene in various animal species have led to dramatic hypermuscularity. This study was designed to assess the characteristics of male MSTN-knockout (KO) pigs. A transcription activator-like effector nuclease (TALEN) pair targeting exon 1 of the swine MSTN gene was constructed and used to transfect porcine fetal fibroblasts (PFFs). We obtained a cell line that consisting of a 2-bp deletion in one allele and a 4-bp deletion in the other allele, was used as a donor to generate cloned pigs via SCNT, and delivered 18 live piglets. They developed and grown normally to sexual maturity. These MSTN-KO boars grew normally to adulthood and showed visually-clear hypermuscular characteristics, increased carcass dressing percentage and loin eye size, and decreased in backfat thickness. These pigs may show greater meat production, as well as being used in animal models of human diseases.

Speaker Biography

Xi-Jun Yin is working as the Director of Jilin Provincial Transgenic Animal and Embryo Engineering Laboratory at Yanbian University. His research goal is to increase reproductive efficiency of swine and to expand the genetic potential present in pig embryos. Recently, his research team successfully produced myostatin gene knockout double-muscled adult pigs.

e: yinxj33@msn.com

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