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Production of bioactive myostain propeptide of various animal species in *E. coli*

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Myostatin (MSTN) is a potent negative regulator of skeletal muscle growth in various animal species, thus there have been attempts to develop MSTN-inhibitory strategies to improve skeletal muscle growth in meat-producing animals as well as to treat muscle-wasting conditions in humans. MSTN propeptide (MSTNPro), the N-terminal part of unprocessed MSTN suppresses MSTN bioactivity by prevention of MSTN binding to its membrane receptor suggesting that MSTNPro is a potential candidate molecule to be used to suppress MSTN activity. To examine the potential of MSTNPro as an agent to improve skeletal muscle growth of meat producing animals *in vivo*, a large quantity of MSTNPro must be available. Since *E. coli* remains the most cost-effect system in high-yield production of recombinant proteins, we have attempted to produce bioactive MSTNPro in *E. coli*. Our first attempt demonstrated that rainbow trout MSTNPro was expressed in soluble forms using maltose binding protein as an N-terminal fusion partner. Affinity purified rainbow trout MSTNPro demonstrated MSTN-inhibitory activity in an *in vitro* assay system and the potency was not different from that of commercial mouse MSTN Pro produced in a eukaryotic system. In subsequent studies, bioactive MSTNPro of chicken, pig and mouse were produced using the same *E. coli* system. Interestingly, MSTN-inhibitory potencies were different among MSTNPros from different animal species. The ability to produce MSTNPro in a cost effective *E. coli* system is expected to make it easy to investigate the potentials of MSTNPro as a pharmaceutical agent to improve skeletal muscle growth of meat producing animals.

Biography

Yong Soo Kim has completed his PhD in the field of Animal Physiology from the University of California, Davis and Postdoctoral studies from Melbourne University. He is a Professor at the Department of Human Nutrition, Food and Animal Science, University of Hawaii, Manoa. His research area involved muscle growth and development and meat science and research activities in muscle biology area have focused on understanding the mechanisms involved in the regulation of muscle growth and development and improving animal growth rate and carcass composition.

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