

Acute Inflammation is required for Muscle Regeneration

Ping Hu* and Xin Fu

Shanghai Institute of Biochemistry and Cell Biology, China

Skeletal muscle regeneration involves a series of physical responses after injury or disease, including activation of quiescent satellite cells (muscle stem cells), proliferation of satellite cells and myoblasts, differentiation of myoblasts, and formation of new myofibers. In recent years, more and more evidences suggested that inflammation plays important roles during muscle regeneration process. However, how inflammation affects muscle regeneration remains to be elusive. Here we focused on T cells mediated inflammation and found that it is a required positive regulator at early stage of skeletal muscle regeneration. Upon muscle injury, we observed large amount of T cell infiltrated at injury site. In immunodeficient mice, where the T cell infiltration is diminished while other lymphocytes such as macrophage infiltration remains normal, reparation of muscle injury was dramatically delayed. To further investigate the mechanism of T cell promoting muscle regeneration, we characterized the protein profile of activated T cells. A combination of four factors was identified to be able to promote satellite cell proliferation and long term expansion dramatically in culture. The cultured expanded satellite cells continue to express muscle stem cell marker, and were able to regenerate functional myofibers *in vivo*. Furthermore, muscular injection of the four factor cocktail could rescue the muscle regeneration defects caused by T cell deficiency. Our results demonstrate that T cell mediated inflammation is required for muscle stem cell proliferation at early stage of post-injury regeneration.

Biography:

Dr. Ping Hu, Ph.D. is a Principal Investigator in Shanghai Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences. She graduated from Peking University and obtained her Ph.D. degree from the joint graduate program of State University of New York, Stony Brook/Cold Spring Harbor Laboratory. She performed her postdoc research in University of California, Berkeley/Howard Hughes Medical Institute. Hu Lab is focused on the regulation of muscle stem cell functions and myogenesis, especially on the microenvironment of muscle stem cells and the epigenetic regulation of muscle stem cell functions.