IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Biology in Space (8)

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IN VITRO MUSCLE STEM CELL CULTURE AND DIFFERENTIATION SYSTEM IN SPACE

Abstract

Long term staying in space leads to severe muscle atrophy. Many works have been done to elucidate the mechanism of muscle atrophy in outer space. Most of these works are focused on the differentiated myotubes. Whether the microgravity and space radiation or other factors in the outer space affects the activity of muscle stem cells and the regeneration abilities of muscle stem cells is not clear yet. Due to the limitation of equipment and manpower in outer space, a robust long term muscle stem cell culturing system is needed. Here we established a long term in vitro culturing system for muscle stem cells by mimicking the endogenous microenvironment of muscle stem cell proliferation. A combination of four factors was identified to be able to promote muscle 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 differentiate in vitro and regenerate functional myofiers in vivo. This robust in vitro culturing system enables us to further culture muscle stem cells in outer space.