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# GRAVISENSITIVITY OF DERMAL FIBROUS STRUCTURES IN MICE UNDER ZERO GRAVITY

**Abstract**

An increased duration of space flights poses challenges for the scientific community to improve measures to prevent the adverse physiological effects of microgravity. The connective tissue, forming an integrative-buffer metabolic environment with key parameters in the specific tissue microenvironment of each organ is of paramount significance for the quality of adaptation to the conditions of altered gravity. Mechanisms of adaptive rearrangements of the fibrous extracellular matrix of connective tissues under microgravity practically remain unexplored, despite the most essential functions of the stroma existing to ensure the physiological activity of internal organs. We analyzed the biomaterial (the skin dermis) of C57BL/6J mice from the Rodent Research-4 experiment after a long stay in space flight (21 to 24 days). The biomaterial was fixed onboard the International Space Station. It was found that weightlessness resulted in a relative increase in type III collagen-rich fibers compared to other fibrous collagens in the skin stained with picrosirius red. Stained with silver impregnation combination Giemsa's solution showed that the number of mast cells in the skin did not change, but their secretory activity increased. At the same time, co-localization of mast cells with fibroblasts, as well as impregnated fibers, was reduced. Potential molecular–cellular causes of changes in the activity of fibrillogenesis under zero-gravity conditions and the slowdown of the polymerization of tropocollagen molecules into supramolecular fibrous structures, as well as a relative decrease in the number of fibrous structures with a predominant content of type-I collagen, are discussed. The data obtained evidence of the different sensitivity levels of the fibrous and cellular components of a specific tissue microenvironment of the skin to zero-gravity conditions. The obtained data should be taken into account in the systematic planning of long-term space missions in order to improve the prevention of undesirable effects of weightlessness.