

Challenges of Life Support/Medical Support for Human Missions (8)
Challenges of Life Support/Medical Support for Human Missions (1) (1)

Author: Mr. Kirill Gordienko

Institute of Biomedical Problems (IBMP), Russian Academy of Sciences (RAS), Russian Federation

Dr. Galina Vassilieva

Institute of Biomedical Problems (IBMP), Russian Academy of Sciences (RAS), Russian Federation

Dr. Valery Novikov

FSC RF-IMBP, Russian Federation

Mrs. Daria Sidorenko

Institute of Biomedical Problems, Russian Academy of Sciences, Russian Federation

Ms. Elena Batalova

Institute for Bio-Medical Problems of RAS, Russian Federation

Dr. Rinat Gimadiev

RUDN University, Russian Federation

STUDY OF METABOLISM MARKERS AND BODY COMPOSITION PARAMETERS IN A 120-DAY
ISOLATION IN A HERMETICALLY CLOSED CHAMBER (SIRIUS-19)

Abstract

In recent years, physiologists have become increasingly interested in proteins that exhibit hormone properties and are synthesized in various tissues and organs that are not related to endocrine glands. Research in this direction can change the traditional beliefs in the metabolism regulation. Such new hormones include leptin and adiponectin (adipose tissue), ghrelin (digestive tract), irisin (muscles). The participation of these hormones in the metabolism and body composition regulation under the extreme conditions of space flight and in ground-based model experiments has not been previously studied. The purpose of this work was a comparative study of the content of metabolic markers in blood and of the body composition under conditions of a 120-day isolation. The experiment involved six healthy volunteers aged 28 to 44 years (three male and three female subjects). Venous blood sampling and preparation of biomaterial was carried out according to the GCP standards, first in the background period, then 6 times inside the hermetically closed chamber and twice after leaving it. Such indicators as insulin, adiponectin, leptin, ghrelin, irisin, thyroid hormones were determined. Body composition, including bone, fat, and lean masses, were examined using dual x-ray absorptiometry (Lunar Prodigy). Data processing was performed using non-parametric methods of the STATISTICA 10 software. Most of the indices studied were characterized by high individual variability. The statistical relationship between the content of hormones in the blood and body composition, in particular, thyroid hormones and lean mass, were studied. The data obtained will be used for the planning and conduction of ground-based model experiments and for the analysis of clinical tests of space flight participants.