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Human Physiology in Space (2)

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# HOW DO COSMONAUTS SLEEP IN MICROGRAVITY?

**Abstract**

Introduction. The ISS mission-16 began scientific experiment "Sonocard" the idea of which is to register physiological functions in sleeping cosmonauts with a lesscontact method. Methods. The recorder the size of a pack of cigarettes fits a T-shirt chest pocket. Inside the recorder there is an acceleration sensor, amplifier, converter, memory unit and power supply. Body vibrations due to cardiac beats are registered at night in the memory unit and transferred to the board computer in the morning for e-mailing to investigators. As of the date, eight Russian members of 6-mo. ISS missions have been investigated. Experimental sessions were scheduled twice a month during mission; the investigations were also performed before and after mission. Results. Vegetative balance before and after sleep was assessed using the heart rate variability analysis. The method showed that as on Earth, sound sleep in microgravity is favorable to active recovery of the body functional reserve. This is evidenced by reduction of sympathetic involvement in the vegetative nervous regulation and, on the contrary, growth in parasympathetic involvement as morning comes. Based on the experimental data, the sympathetic involvement reduction in the morning hours during the first month on flight is insufficient and, therefore, body fails to fully regain its functional reserve. Incomplete reserve recovery was also noted in the periods of hard work, for example, during dock of a transport vehicle or following EVA. Conclusion. Sleep quality in microgravity depends on progress of adaptation to the spaceflight conditions and workload intensity. It can be monitored using lesscontact technology Sonocard.