

Human adaptations for extreme environments during simulated space analog missions

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Living organisms possess natural ability to adapt in response to changing environmental conditions. Limitations in adaptation are critical in strategies of survival. Simulator of space base located in Rzepiennik in Poland is an isolated laboratory established in 2018 to run studies in bioastronautics and space medicine. During each year international crews of maximum six people enter the isolation for 7 days, where they undergo detailed monitoring and examination of physiological, psychological, and cognitive parameters using non-invasive measurement methods. Until now, the data base contains results from more than 250 participants, which is the largest such data base in the world.

Collected data can be processed in multiple ways to create predictive models of human behavior, for example to mitigate risks, to improve team work, to detect novel group dynamics phenomena, to optimize crew composition in realization of critical projects, to evaluate human performances and many others.

This presentation focuses on analysis of human adaptation in controlled extreme environment which is based on isolation from sunlight; altered time perception; confinement; limited access to food, water, electricity and internet; elevated levels of carbon dioxide; sleep deprivation; oversaturated workload and stressful emergency simulations.

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