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PROSPECTS OF HYPOMETABOLIC RESEARCH FOR LONG-TERM INTERSTELLAR FLIGHT

Abstract

Making and keeping the astronauts into hibernation hypometabolism for most of the time during the long-term manned interstellar flight will greatly alleviate the flight loads, mitigate the psychological pressure and interpersonal contradictions, ameliorate some space medicine problem and ensure more safety of interstellar flight. This boldest envisage was presented in most space scientific fiction films. The spaceflight hibernation hypometabolic regulation relevant technology and research model are the hot area of long-term deep space exploration manned space and the foundation for transforming scientific fantasies into reality. Hypometabolic state is characterized by a decrease in basic metabolic rate and energy consumption. Currently several hypometabolic regulating techniques were on the way to investigate the physiological effects, mechanism and spaceflight application such as therapeutic hypothermia, fasting/hunger therapy, biochemical reagent induction, hibernation induction trigger, Chinese traditional health preservation technology etc. In present, we try to review and present the progress of space hibernation hypometabolic investigation and the problems to be solved before these techniques application to the long-term manned interstellar flight, especially on screening hibernation hypometabolic induction methods suitable to manned spaceflight, application model of these inducing methods, the energy consumption and health assessment during hibernation hypometabolic state. Hypometabolic regulation technology is expected to become an effective means to solve the long-term interstellar navigation process of human survival support technology, and developed into a new type of health protection technology. Lowering body's core temperature and restricting diet coupled with psychological adjustment are the effective methods to alleviate metabolism. The physiological mechanism and actively induction models of dormant animals are the primary biomimetic objects for deep spaceflight. Chinese traditional Bigu can also provide reference for manned spaceflight hypometabolism regulation technology. We are preparing to construct the human and animal experiment model to develop the hypometabolic simulated technology by inducing non-hibernation animal into torpor-hypometabolic states.