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WHAT IF WE CAN'T—A REVIEW OF HUMAN PHYSIOLOGICAL LIMITATIONS TO LONG-TERM
SPACE FLIGHT AND LIVING IN SPACE

Abstract

Despite all our dreams and enthusiasm, the essential question of whether our species can ever live permanently in space remains unanswered. The 1975 NASA Ames Study on Space Colonization demonstrated how human physiology constrains and determines human habitat design in space. Our scientific understanding about the risks of and standards for microgravity (and rotation rate if centrifugally generated), ionizing radiation, and atmosphere pressure and composition, remains inadequate 47 years later. In addition, there are newly recognized physiological challenges to living safely in space, including Space Obstructive Syndrome and Hemolytic Anemia. A comprehensive review was conducted to establish what we have learned and what is still required to know about the pathophysiology of long-term space travel and settlement, since my first report in 1978. The results determine not only how, but if we can realistically plan on inhabiting the cosmos that surrounds us.