

## Health risks of human space exploration

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For almost 60 years, human beings have been flying to the outer space, successfully completing missions in order to expand our knowledge about the universe. Over those years, we also have gained a lot of experience about the risks of human space flight. In the forthcoming perspective of the end of the International Space Station (ISS) service, international space agencies urge to plan the next step of human space exploration beyond LEO. They are aware of additional health risks of exploration class missions to the Moon and beyond. Far away from Earth, astronauts will be exposed to hostile environment, changed gravity fields, confinement, and ionizing radiation, which has been recognized as no. 1 risk of human spaceflight in exploration class missions. As in the future human beings will travel to deep space, extraordinary means will have to be taken to safeguard astronauts on the way to the Moon. During long duration deep space missions humans will experience different doses and spectra of ionizing radiation than on the International Space Station, posing new, detrimental-level risks to living organisms during and after exposure to space radiation environment. International Space Agencies have already recognized the necessity to better understand the effects of space radiation to the human body, in order to estimate the health risk and predict the consequences of long-duration space flight, including European Space Agency, where the Space Medicine Team at the European Astronaut Centre has been working towards understanding, predicting and reducing potential hazards for astronauts during deep space missions. Here, a summary on health risks of human spaceflight is presented, with emphasis on biological effects to the human body, that may occur due to ionizing radiation in the deep space environment. Current strategies for health risk assessment are shown, as well as the challenges for risk predictions of long-duration deep space missions.

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