

Exploring the final frontier: Disease proposed as major barrier to Mars and beyond

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A new report appearing in *The Journal of Leukocyte Biology* argues that human missions to Mars, as well as all other long-term space flights might be compromised by microbial hitchhikers, such as bacteria.

That's because long-term space travel packs a one-two punch to astronauts: first it appears to weaken their immune systems; and second, it increases the virulence and growth of microbes. This combination of factors makes it vital for scientists to find tools that can help people cope with these microscopic hitchhikers before they lead to disease, especially since astronauts will not have the ability to return home to a hospital.

"When people think of space travel, often the vast distances are what come to mind first," said Jean-Pol Frippiat, one of the report's co-authors from Nancy-University in France, "but even after we figure out a way to cover these distances in a reasonable amount of time, we still need to figure out how astronauts are going to overcome disease and sickness."

Frippiat and colleagues based their conclusions on studies showing that immune systems of both people and animals in space flight conditions are significantly weaker than their grounded counterparts. They also reviewed studies that examined the effects of space flight conditions and altered gravity on virulence and growth of common pathogens such as Salmonella, E. coli and [Staphylococcus](#). These studies show that these

bacteria reproduce more rapidly in [space flight](#) conditions, leading to increased risk of contamination, colonization and serious infection.

"As clearly outlined by the researchers, we are unlikely to remain healthy when leaving earth for prolonged periods," said Luis Montaner, Editor-in-Chief of *The [Journal of Leukocyte Biology](#)*. "Unfortunately, because spacecraft technology is way ahead of our understanding of how to maintain human health, disease-free survival after reaching [Mars](#) or establishing a colony on the Moon may be problematic."

More information: Nathan Guéguinou, Cécile Huin-Schohn, Matthieu Bascove, Jean-Luc Bueb, Eric Tschirhart, Christine Legrand-Frossi, and Jean-Pol Frippiat. Could spaceflight-associated [immune system](#) weakening preclude the expansion of human presence beyond Earth's orbit? [doi:10.1189/jlb.0309167](https://doi.org/10.1189/jlb.0309167)

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