

What happens to a pathogenic fungus grown in space?

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A new study, published this week in *mSphere*, provides evidence that *Aspergillus fumigatus*, a significant opportunistic fungal threat to human health, grows and behaves similarly on the International Space Station compared with earth. The study provides important information that can help with space exploration. As the durations of manned space missions increase, it is vitally important to understand the long-term consequences of microbial exposure on human health in closed human habitats.

One mission of the Microbial Observatory Experiments on the International Space Station is to examine the traits and diversity of fungal isolates, to gain a better understanding of how fungi may adapt to microgravity environments and how this may affect interactions with humans in closed habitats. In the new study, led by Benjamin Knox, a microbiology graduate student at University of Wisconsin-Madison, scientists compared two isolates of *A. fumigatus* that were isolated from the International Space Station to reference isolates from earth.

Through in vitro, in vivo, and genetic analyses, the researchers discovered that the isolates recovered from the space station exhibited normal in vitro growth and chemical stress tolerance, and there were no unexpected genetic differences. The strains in space were slightly more lethal in a vertebrate model of invasive disease, but there was nothing to suggest that as a consequence of spending time in space, there were any significant changes to the fungus.

"While we observed virulence differences, we speculate that it is

completely within the variation that one would observe with terrestrial isolates," said Mr. Knox. "There is an emerging body of literature showing a terrific phenotypic variation in *A. fumigatus*."

Since *A. fumigatus* is the most significant airborne opportunistic mold pathogen of humans, it is likely to be an issue on space vessels. "For people wanting to draft policy, either sampling or cleaning regimes aboard these space vessels, the study shows that if a fungus is identified as *A. fumigatus*, any and all isolates represent potential pathogens and should be treated as such," said Mr. Knox.

Provided by American Society for Microbiology

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