

IIT Madras Joins Hands With NASA

Why In News

- A new headache has mounted for **NASA's Indian-origin astronaut** Sunita Williams and the eight other crew members on board the International Space Station (ISS) including those who are currently inhabiting the orbiting station. A superbug lurks inside the city in space the International Space Station.



- Scientists have found a **multi-drug resistant bacteria** named '**Enterobacter bugandensis**' which has evolved and become more potent in the closed environment of the ISS. Since it is **multi-drug resistant**, it is often called a 'superbug'. This bacteria infects the **respiratory system**.
- Spacebugs are not extra-terrestrial life but bugs that have travelled as hidden as hidden co-passengers when they went to work at the ISS.

All You Need To Know

- Writing about the superbugs recently, **NASA said strains of the bacterial** species *E. bugandensis* isolated from the International Space Station (ISS) were studied. Thirteen strains of **E. bugandensis**, a **bacterium notorious** for being multi-drug resistant, were isolated from the ISS. Findings from the study indicate under stress, the ISS-isolated strains were mutated and became genetically and functionally distinct, compared to their Earth counterparts.



- The strains were able to viably persist in the ISS over time with a significant abundance. **E. bugandensis co-existed** with multiple other microorganisms, and in some cases could have helped those organisms survive. The work has been spearheaded by Dr Kasthuri Venkateswaran of NASA's Jet Propulsion Laboratory, Pasadena, California, USA.



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- Incidentally, he studied **Marine Microbiology, at the Annamalai University**, in Chennai before joining NASA. In 2023, he discovered a new multi-drug resistant bug called *Kalamiella Piersonii* which he named after his role model former President Dr APJ Abdul Kalam.
- Further research on *E. bugandensis* was undertaken jointly by JPL and Indian Institute of Technology-Madras

What Does Study Says

- The researchers point out that astronauts operating in altered immune conditions with limited access to **traditional medical facilities** face unique health challenges during space missions. Understanding the microbial landscape aboard the ISS is paramount for assessing the impact of these microorganisms on astronaut well-being.



- Emphasising the broader implications of the research, **Dr Kasthuri Venkateswaran**, Senior Research Scientist at JPL, NASA, said, "Our research uncovers how certain benign microorganisms help to adapt and survive opportunistic human pathogen, *E. bugandensis*, in the unfavourable conditions of the International Space Station.
- The **knowledge gained from this study** would shed light on microbial behaviour, adaptation, and evolution in extreme, isolated environments that allow in designing novel countermeasure strategies to eradicate opportunistic pathogens, thus protecting the health of astronauts."



Conclusion

- NASA says '**closed human-built environments**, such as the ISS, are unique areas that provide an extreme environment subject to microgravity, radiation, and elevated carbon dioxide levels. **Any microorganisms introduced** to these areas must adapt to thrive. By delving into microbial dynamics in extreme environments, this research opens doors to effective preventative measures for astronaut health.'
- Professor Karthik Raman said, "**Microbes continue** to puzzle us by growing in the most challenging conditions."

