Bacteria species part of Curiosity baggage on Mars

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Credit: NASA

(Phys.org) —When the Curiosity rover landed on Mars in 2012, there may have been dozens of microbial species, having withstood pre-launch spacecraft cleaning. This is the finding of a study titled "Identification and Survival of Isolates Collected from the Mars Rover, Curiosity." The scientists who worked on the study, from the University of Idaho, Jet Propulsion Lab at CalTech in Pasadena, Idaho State University, South Dakota School of Mines and Technology, and Colby College, presented

their findings on Monday to the American Society for Microbiology meeting in Boston.

Reporting on this project, *Nature News* said their study is the first to examine the entire archive of microbes collected from Curiosity. The study is not only interesting for the number of strains identified but also for observations about their resistance. Results from the study can now provide details about the microbes that inhabit the surfaces of spacecraft after microbial reduction.

Nature News, commenting on the findings, referred to "a surprising number" resisting extreme temperatures and damage caused by ultraviolet-C radiation, the most potentially harmful type.

In their presentation abstract, the authors explained how organisms were collected during MSL's planetary protection implementation campaign. (MSL refers to the Mars Science Laboratory.). Isolates were identified and characterized using standard culturing and molecular techniques. Results showed 62% of the 377 organisms identified were related to members of the Bacillus genus while 31% belonged to non-spore-forming genera. Many isolates showed resistance to desiccation (78%), and UVC radiation and 94% of the isolates could grow in the presence of elevated salt conditions (≥10% NaCl) and 35% at low temperatures (4C), while 11% of isolates could survive under multiple extreme conditions.

The authors' comments reflect a concern among scientists over contamination, as they said that "this study will help gauge whether microorganisms from Earth pose a forward contamination risk that could impact future life detection and sample return missions. The overall outcome of this study will provide knowledge about the hardiest of organisms on the spacecraft and could benefit the development of cleaning and sterilization technologies to prevent forward

contamination."

A *Scientific American* article in 2011 also noted why scientists are concerned about cleanliness standards: "Adhering to cleanliness standards is a way to make sure the mission does not transport Earth life to Mars. Doing so preserves the ability to study that world in its natural state and also avoids contamination that would obscure an ability to find native life on that planet, if it exists."

More information: via Nature

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