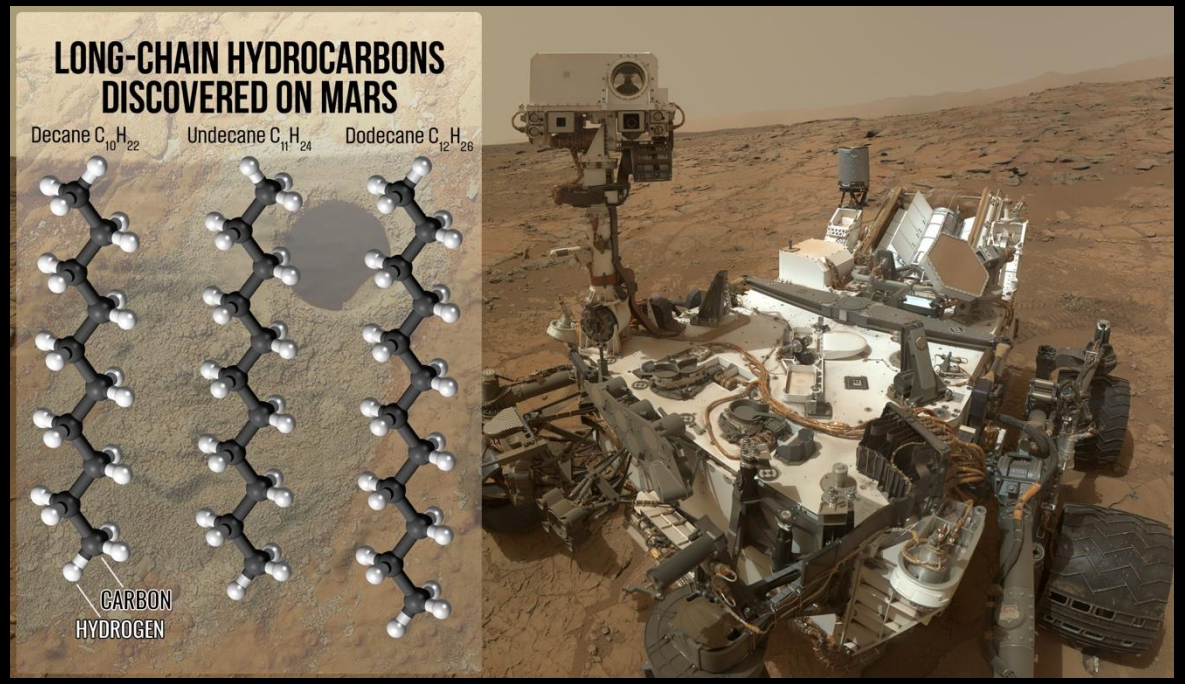
NASA's Curiosity Rover Detects Largest Organic Molecules Found on Mars

Researchers analyzing pulverized rock onboard NASA's Curiosity rover have found the largest organic compounds on the Red Planet to date. The finding suggests that prebiotic chemistry may have advanced further on Mars than previously thought.

Scientists examined a drill sample collected from an ancient lake mudstone in Gale crater using Curiosity's Sample Analysis at Mars (SAM) mini-lab and found the molecules decane, undecane, and dodecane. These compounds, essentially chains of 10, 11, and 12 carbon atoms, are thought to be the fragments of fatty acids – some of the chemical building blocks of life on Earth that form cell membranes and perform various other biological functions. Fatty acids also can be made non-biologically by geological processes, including the interaction of water with minerals in hydrothermal vents.

While there's no way to confirm that these long-chain alkanes resulted from biology, finding them provides hope that other large organic molecules, and specifically those created only by life (so-called "biosignatures"), could be preserved in ancient rocks on Mars.

This new finding bodes well for NASA and ESA's plans to bring back similar rocks collected in Jezero Crater by the Perseverance rover and analyze them with the most sophisticated instruments available to look for biosignatures settle the debate about life on Mars.



This graphic shows the long-chain organic molecules decane, undecane, and dodecane. These are the largest organic molecules discovered on Mars to date. They were detected in a drilled rock sample called "Cumberland" that was analyzed by the Sample Analysis at Mars lab inside the belly of NASA's Curiosity rover. The rover, whose selfie is on the right side of the image, has been exploring Gale Crater since 2012. *Credit: NASA//Dan Gallagher*

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