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Organic Matter on Mars

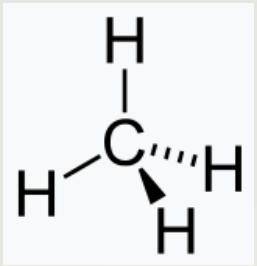
Why in News?

- The United States NASA (National Aeronautics and Space Administration's) Perseverance rover has uncovered evidence of organic compounds in a Martian crater.
- The rover's landing site in Jezero Crater shows a high possibility for past habitability.
- The presence of various minerals, including carbonates, clays, and sulphates, indicates its history as an ancient lake basin.

Perseverance rover

What are Organic Compounds?

- ***organic compound*** are chemical **compounds** that **contains carbon–hydrogen or carbon–carbon bond**



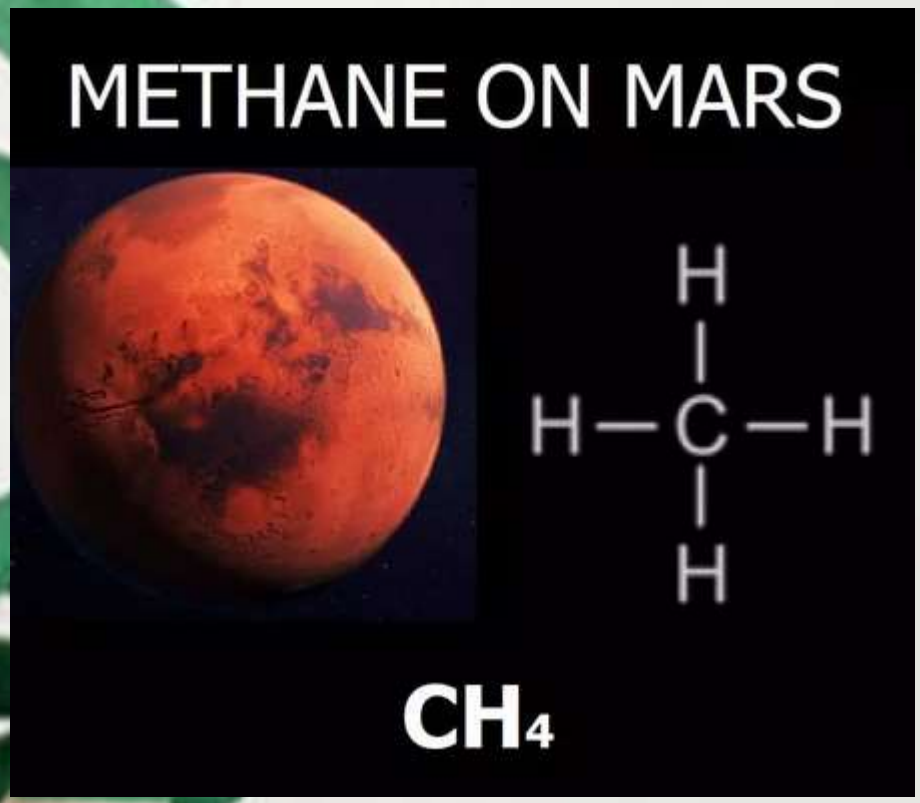
methane

- They are the **key building blocks of life** on Earth, as they **form the basis of proteins, nucleic acids, carbohydrates, lipids and other biomolecules**.

- They **can also be produced by non-biological processes,** such as **volcanic activity, meteorite impacts, lightning strikes** and **cosmic radiation**

- The latest research through Perseverance Rover helps locate basic chemical compounds on Mars.
- Multiple reservoirs of potential organic molecules are suggested to exist on the planet, expanding the possibilities for habitability.

- **Notably, the study found molecules associated with aqueous processes, suggesting that water may have been a significant factor in Mars's vast range of organic matter.**

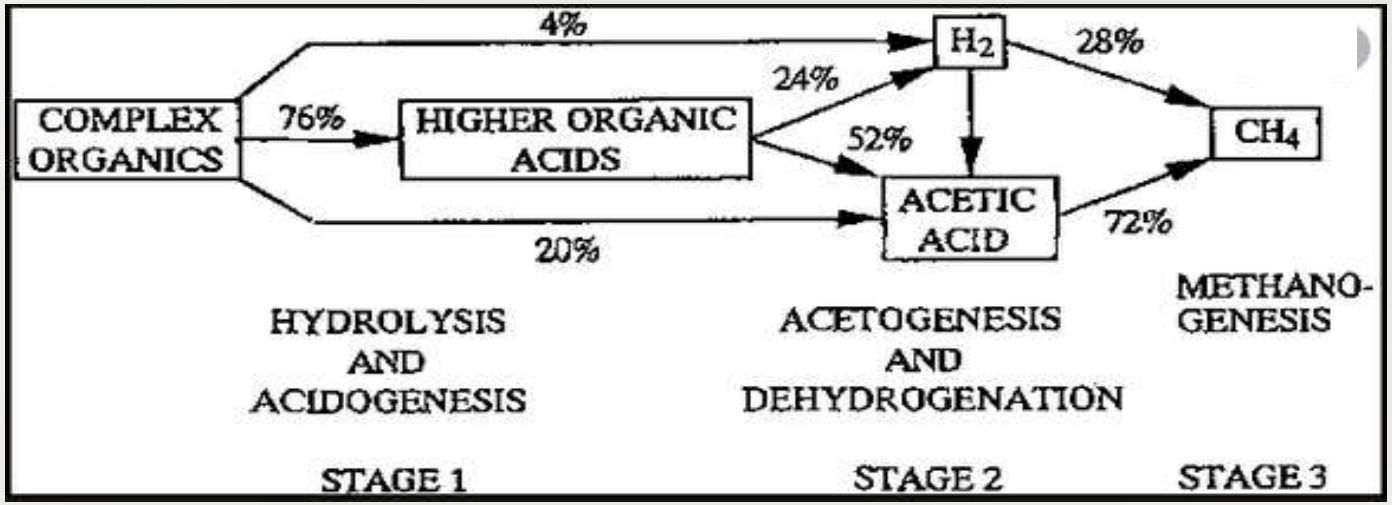


- Earlier NASA's Curiosity Rover had discovered high amounts of methane in the Mars air in 2019, a gas that on Earth is usually produced by living things.

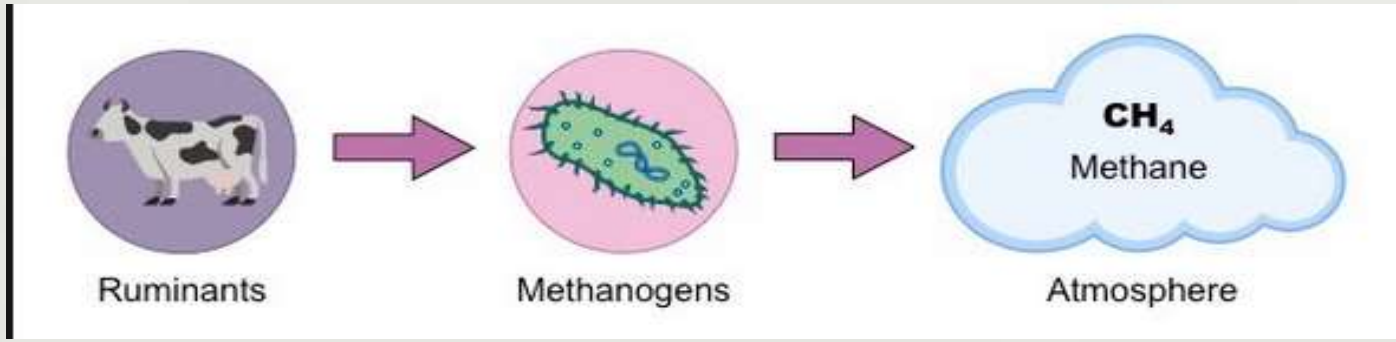
- The Curiosity rover has found 21ppb-parts per billion of methane

Methane on Earth

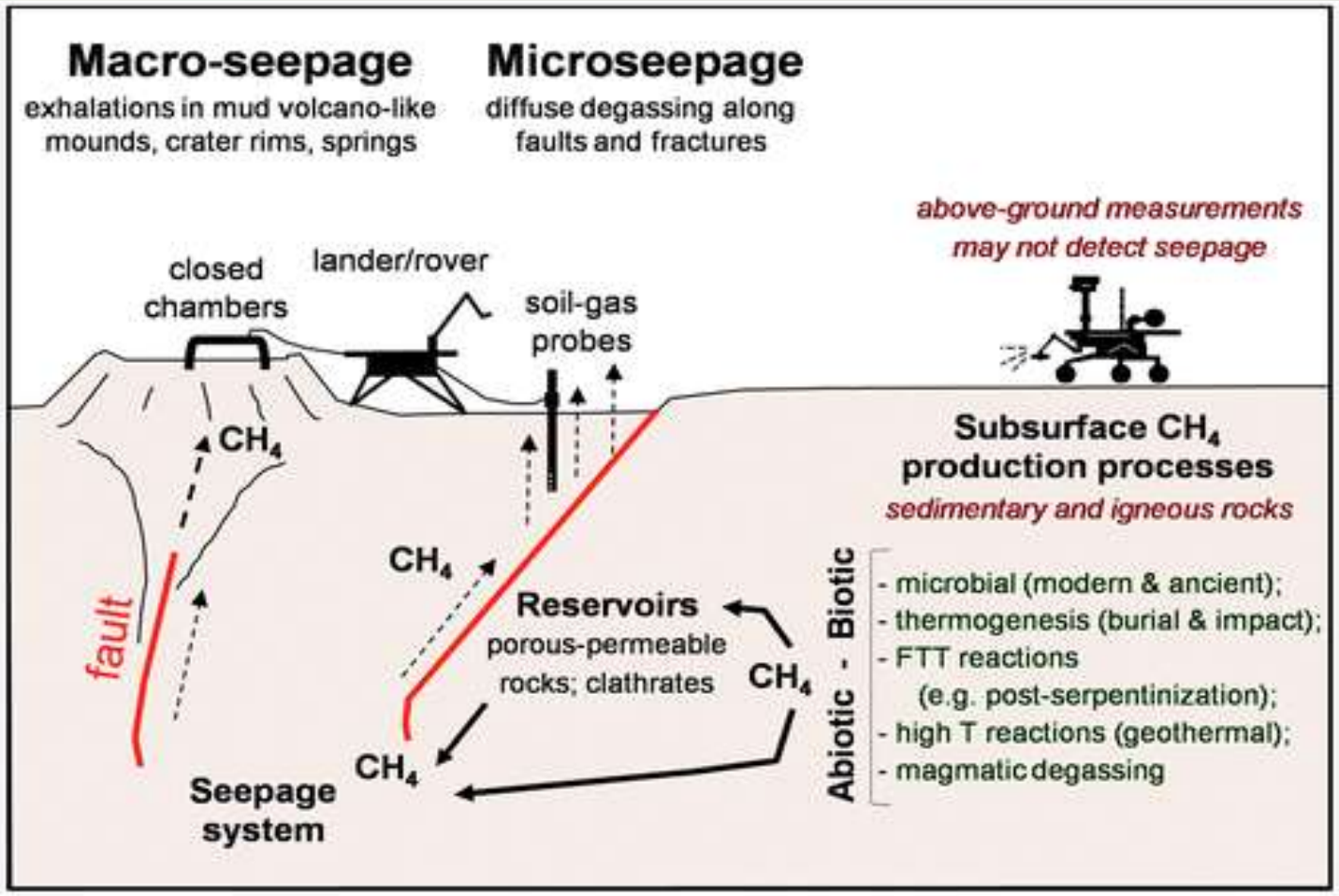
- On Earth, methane (CH4) is a naturally occurring gas.
- Most of the methane on Earth is produced in biological processes —by anaerobic microbes



- Many of these methane-producing microbes live in the digestive systems of animals, especially rumens.



- However, methane can also be produced by abiotic processes.
- It has been found to occur in formations such as rocks, springs and aquifers, and studies have concluded that it was formed there by chemical reactions between carbon and hydrogen atoms at low temperature.



Significance of this study

- Since the time the gas was first detected on Mars, it has been considered a potential biomarker.
- Scientists are hoping to detect the source of the gas, and in the process clues that might point to the existence of life on the Red Planet.

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