

# Scientists are urged to look for extraterrestrial lifeforms

BY ALDEMARO ROMERO  
AND DAVID GILMORE  
SPECIAL FOR THE SUN

In a recent report published by the National Research Council of the U.S. National Academies of Sciences, scientists are urged to open up their minds to the possibility that there may be forms of life that are not based on DNA, the essential chemical molecule that controls most of life's heredity.

In a report titled "The Limits of Organic Life in Planetary Systems" and posted on the Academy's Web site at [www.nationalacademies.org](http://www.nationalacademies.org), the prime scientific organization of the country is urging scientists to consider the probability that there might be forms of life out there that not only lack DNA (as some viruses do) but many other of the chemical components that make up life on earth.

This is opening up a debate again about what is life. Some scientists have even argued that viruses are not true life forms because they lack many of the elements that constitute a cell, while others wonder if prions, the molecules that cause diseases such as mad cow disease, should not be considered life despite the fact that they lack not only DNA but RNA as well. RNA or ribonucleic acid is a molecule similar to DNA that carries out many functions that are essential for life.

Some viruses lack DNA but have RNA as a genetic substitute.

In the past scientists

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Some scientists believe a Martian meteorite found in Antarctica may contain the remains of fossilized bacteria, thus opening the door to the possibility that extraterrestrial life exists and has already arrived on Earth. However, others disagree with this notion, arguing that the fossils found in that meteorite were too small to have been made by bacteria.

have tried to find extraterrestrial life by either trying to communicate with intelligent aliens via electronic signals or by looking at meteorites from other planets that have fallen on earth.

Both procedures have been criticized on the basis that either it is unlikely that extraterrestrial civilizations have developed the very same instruments that humans have or that the alleged cells reported in meteorites are the product of purely chemical reactions, not living organisms.

Some scientists have been arguing that instead of carbon, a major element in life, silicon may be a good substitute. And instead of phosphorus as a main component of DNA, arsenic could be a substitute. Some even have advanced the idea that ammonia or methane could be good substitutes for water, eliminating, thus, the premise that without water life is impossible.

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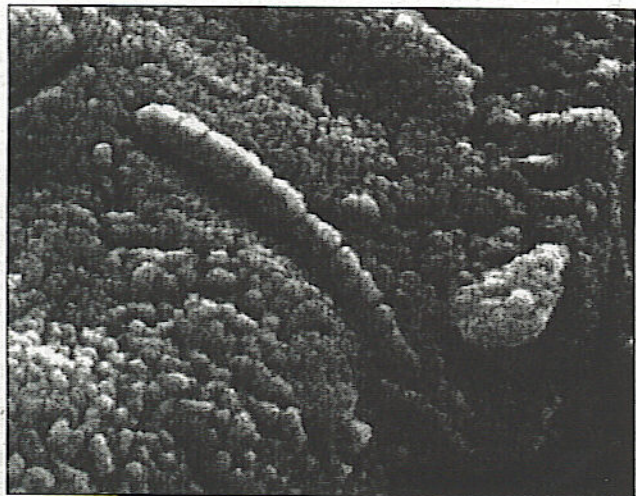


Photo courtesy of NASA

This scanning electron microscope image of Martian meteorite ALH84001 shows possible fossilized bacteria (center).

# ALIENS: Debate over other life somewhere in space controversial

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In order to explore these possibilities, scientists will have to develop new approaches to detect life.

"Nothing would be more tragic in the American exploration of space than to encounter alien life and fail to recognize it," the report concluded.

There is a possibility that extraterrestrial life exists and has already arrived on Earth. In 1996 it was announced that a Martian meteorite found in Antarctica may contain the remains of fossilized bacteria. This possibility was immediately criticized on the grounds that the fossils were too small to be bacteria. Because of the need for enough DNA to run a cell, it is thought that a living thing can only be so small. However, that same year, tiny, self-replicating structures now called nanobes were discovered below the Earth's surface. These nanobes seem to have DNA and the essential elements of life yet are a small fraction of the size of a bacterium. Whether nanobes are truly alive remains highly controversial. However, it is fascinating to consider the pos-

sibility that nanobes are alive and that they originated somewhere other than our planet. Perhaps the extraterrestrial life we have been searching for has been with us all along.

Although life may exist in some form that is barely recognizable to us, scientists are concentrating first on detection of living things that have fundamentally the same chemistry. Because the environments on other planets in our neighborhood are somewhat hostile to what we consider life, studies are focusing on extremophiles, bacteria that live in environments on earth that resemble the inhospitable environments found on our neighboring planets.

By better understanding these terrestrial microbes, we stand a better chance of recognizing them if we find them in extraterrestrial places.

For more information contact the Arkansas State University Department of Biological Sciences at [biology@astate.edu](mailto:biology@astate.edu).

Dr. Romero is chairman and professor of biology, and Dr. Gilmore is assistant professor of biology at Arkansas State University.