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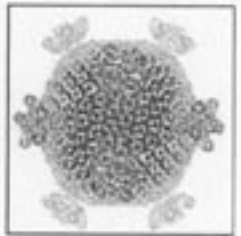
  
  

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## Wyoming

# Yellowstone virus tied to earliest life; Unique organism from geyser basin enthalls scientists



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Associated Press

A virus discovered in Yellowstone National Park may provide a link to ancient life on Earth before the primordial soup of life began dividing into more distinct forms over 3 billion years ago, Montana State University scientists say.

The virus may help scientists understand a common ancestor that scientists believe was present before life split into forms such as bacteria, heat-loving organisms and the building blocks that led to plants and animals.

"It's a clue that helps you say, 'Yeah, there probably was a common ancestor at some point or sets of ancestors,'" said George Rice, one of the MSU scientists who participated in the study. "It's food for thought."

Understanding the origin of life on Earth has been one of the basic goals of science. For many scientists, that means tracing back the branches in the "tree of life" to a point where the three "domains" or categories of life - known as bacteria, archaea and eukarya - come together in a single trunk.

While still far from painting a picture of that common ancestor, researchers are now able to ponder the implications for early life on Earth and may even apply it in looking for life forms on other planets.

"If we're going to go to non-Earth-based bodies to look for life, this discovery gives NASA an approach for looking for life in hot-temperature environments, which we know to exist off of Earth," said Mark Young, another MSU scientist involved in the study.

Many archaea, which are similar to bacteria, thrive in places like Yellowstone's hot, acidic geothermal basins. Like other living things, they can't escape viral infections.

Rice began hunting for thermophilic (heat-loving) viruses in Yellowstone five years ago. In 2001, he and others found several apparently unique viruses associated with an organism living near Midway Geyser Basin where temperatures ranged from 158 to 197 degrees Fahrenheit.

"It was basically something living in boiling acid," Rice said.

Although several new viruses were discovered, one in particular caught their eye.

After characterizing the structure and genome (the set of genetic information) of the virus, they found that its protein shell, shaped roughly like a soccer ball, was similar to a bacterial virus and to an animal virus. The similarity suggests to the scientists that the three viruses may share a common ancestor that predates the branching off of life forms more than 3 billion years ago.

"This is something that was predicted but hadn't been shown before," Rice said.

The discovery was published in the May 3 issue of the Proceedings of the National Academy of Sciences.

For a long time, scientists classified all life forms as plant or animal. That classification system expanded as more life forms were discovered. Eventually, biologists divided life into five kingdoms - plants, animals, bacteria, fungi and protists.

A more recent approach divides life into three domains: bacteria, eukarya (including plants, fungi, animals and others) and archaea (which means "ancient").

Archaea is likely the least understood of the domains, according to the paper's authors. Archaea may have been among the first forms of life on Earth. Able to thrive in the hot, gaseous and volcanic terrain of early Earth, they could also survive in the very inhospitable geothermal features of the Yellowstone of today.

Now that scientists know the Yellowstone virus's ancient structure seems to span all three domains of life, scientists plan additional studies on its genes to figure out what they tell the virus to do. Viruses can play a crucial evolutionary role in passing genes from one organism to another.

"Anywhere there's life, we expect viruses," Young said. "They are the major source of biological material on this planet."

The virus and others found at Yellowstone will give researchers a hand in the search for life on other planets, including Mars.

"These bugs are living and doing business in a harsh environment," Rice said. "This may be clues about what to look for."

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