



## TOKYO UNIVERSITY OF SCIENCE

1-3 KAGURAZAKA, SHINJUKU-KU, TOKYO 162-8601, JAPAN

Phone: +81-3-3260-4271

### PRESS RELEASE

## **New giant virus may help scientists better understand the emergence of complex life**

*A group of researchers from Japan have discovered a new large DNA virus that may help scientists better understand the origins of DNA replication and the evolution of complex life.*

*Tokyo, 26, April, 2019*

The discovery of the Medusavirus holds clues to the evolution of more complex life. The paper published in the *Journal of Virology* earlier this year has been creating waves because of the ability of the Medusavirus to turn amoeba into “stone.” However, the bigger discovery is the possible relationship between the Medusavirus and the evolution of complex life. Tokyo University of Science has released a video, and an infographic, to explain this phenomenon.

A team of scientists led by virologist Masaharu Takemura at Tokyo University of Science and Hiroyuki Ogata at Kyoto University in Japan have discovered a giant virus that, much like the mythical monster Medusa, can turn almost amoeba to a stone-like cyst. Isolated from a hot spring in Japan and eponymously dubbed Medusavirus, this virus infects a species of amoeba known as *Acanthamoeba castellanii* and causes it to develop a hard, stony shell. With the Medusavirus, scientists discovered that DNA replication occurred in the nucleus of the host amoeba and observed evidence of exchange of genetic information between the host and the virus as they coevolved. They also found that the giant virus harbors in its ancient genome some of the complex proteins that make up the building blocks of eukaryotic organisms such as animals, plants, and humans. Understanding the presence of these proteins in the virus’ genome may help scientists tackle some of the hardest questions about our origins. In fact, “genomics research of the giant virus indicates that there is likely a relationship between the Medusavirus and the origin of eukaryotic life,” says Professor Takemura from Tokyo University of Science.

A virus does not have the necessary “machinery” to replicate. It does this inside its host cell, by releasing its genome and “hijacking” the cell’s machinery. When a virus invades an organism, it uses some of the host genes in order to replicate itself. This can leave a mark, like a fingerprint, on the host’s DNA, which is then passed on for generations. The host also interacts with the virus, and the virus adopts new sequences that are preserved through



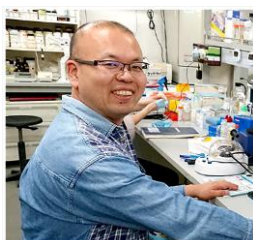
## Reference

Title of original paper: Medusavirus: a Novel Large DNA Virus Discovered in Hot Spring Water  
Journal: *Journal of Virology*  
DOI: <https://doi.org/10.1128/JVI.02130-18>

## About The Tokyo University of Science

Tokyo University of Science (TUS) is a well-known and respected university, and the largest science-specialized private research university in Japan, with four campuses in central Tokyo and its suburbs and in Hokkaido. Established in 1881, the university has continually contributed to Japan's development in science through inculcating the love for science in researchers, technicians, and educators.

With a mission of "Creating science and technology for the harmonious development of nature, human beings, and society", TUS has undertaken a wide range of research from basic to applied science. TUS has embraced a multidisciplinary approach to research and undertaken intensive study in some of today's most vital fields. TUS is a meritocracy where the best in science is recognized and nurtured. It is the only private university in Japan that has produced a Nobel Prize winner and the only private university in Asia to produce Nobel Prize winners within the natural sciences field. Website: <https://www.tus.ac.jp/en/>



## About the author

### About Professor Masaharu Takemura from Tokyo University of Science

Professor Masaharu Takemura is a Professor of molecular biology & virology at the Faculty of Science, Tokyo University of Science. He is one of the corresponding authors of the paper and is engaged in the study of giant virus biology, evolutionary cell biology, and the origin of the eukaryotic nucleus.

Link: <https://www.tus.ac.jp/en/fac/p/index.php?4d94>

Media contact

Tsutomu Shimizu

Email: [mediaoffice@admin.tus.ac.jp](mailto:mediaoffice@admin.tus.ac.jp)