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IIT Madras and US researchers study viruses with potential to kill disease-causing bacteria

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Represents the longest DNA-based monitoring of a natural environment



Researchers at the Indian Institute of Technology Madras (IIT Madras) and US are studying viruses in Freshwater Lakes. Such research is critical to understanding viruses in nature as it has enormous applications that can benefit society and the environment.

An exciting example is ‘phage therapy’, which uses specific viruses called phages to target and kill disease-causing bacteria. This approach has the potential to combat antibiotic-resistant bacterial infections that are spreading in India and across the world and revolutionise medicine.

The findings of this research reveal the vital roles viruses play in ecosystems, not just by influencing the environment but also by supporting other organisms. This work highlights how viruses are beneficial to the health and stability of natural systems.

This International Team of researchers developed and applied cutting-edge Machine Learning-based tools to uncover the hidden world of viruses in microbiomes. Using these methods, they studied 465 freshwater lake samples from the same location in Madison, Wisconsin, US, collected over a period of more than 20 years. This research represents the longest DNA-based monitoring of a natural environment on Earth.

The research was led by Dr. Karthik Anantharaman, Visiting Professor, Wadhwani School of Data Science and AI, IIT Madras and an Associate Professor of Microbial and Viral Ecology at University of Wisconsin-Madison, USA.

In addition, studying viruses in freshwater systems can transform how we manage water resources, natural ecosystems, and public health. These findings also open doors to innovative strategies for ecosystem management, such as using viruses to restore balance in disrupted environments such as polluted lakes. For example, viruses could be used to prevent harmful algal blooms or bacterial outbreaks (like the green slime seen in polluted lakes), ensuring safer drinking water and healthier recreational lakes.