New types of viruses discovered that infect plankton in the world's oceans

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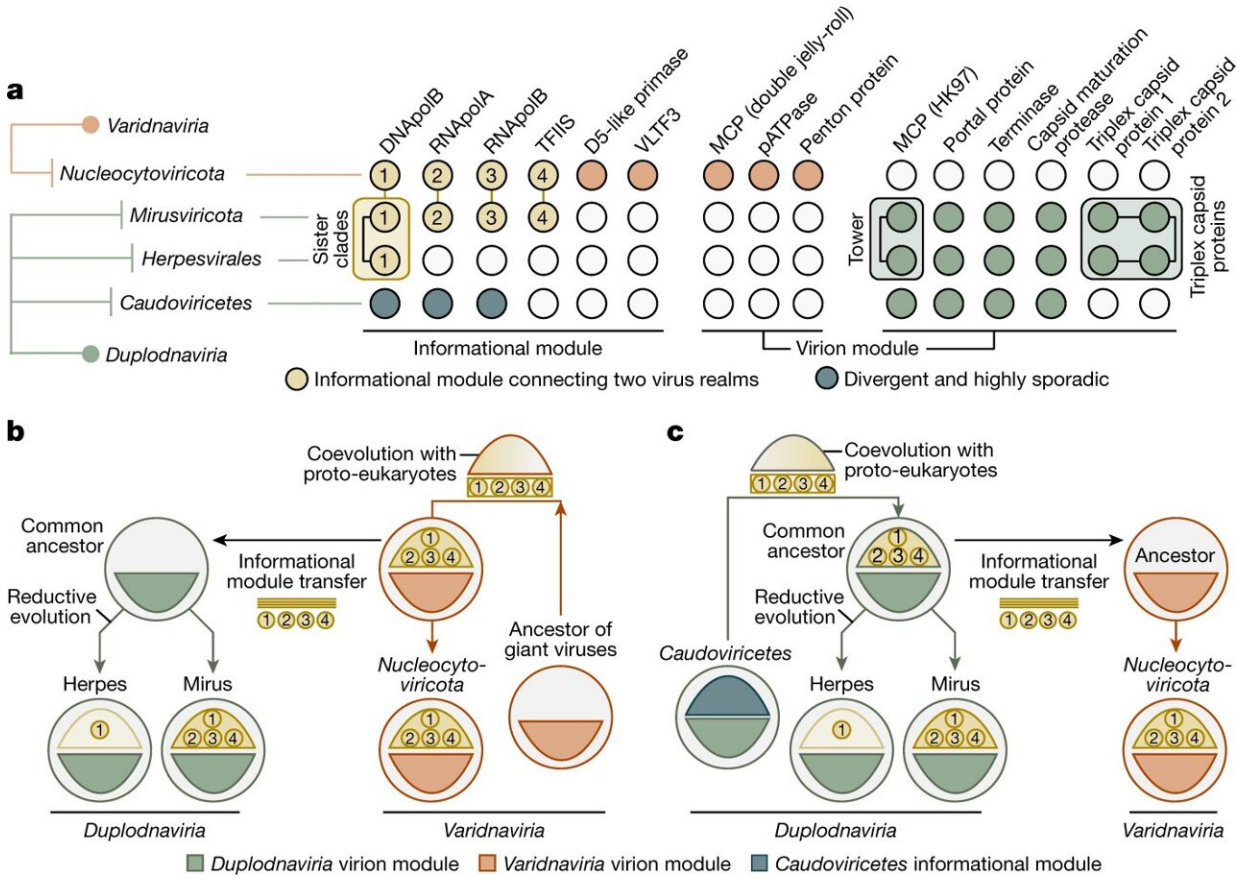

Evolutionary trajectories of the eukaryotic informational module. a, Summary of the occurrence of hallmark genes for the informational and virion modules in Nucleocytoviricota, mirusviruses, herpesviruses and Caudoviricetes. Informational module genes with a strong evolutionary relationship are connected with a line. Genes containing information pointing to a common eukaryotic viral ancestry between mirusviruses and herpesviruses are framed. VLTF3, viral late transcription factor 3. b,c, Descriptions of two

evolutionary scenarios in which the informational module of eukaryote-infecting viruses within the realms Duplodnaviria and Varidnaviria first emerged in the ancestor of either Nucleocytoviricota (giant virus hypothesis) or mirusviruses (mirusvirus hypothesis). Credit: *Nature* (2023). DOI: 10.1038/s41586-023-05962-4

An international team of oceanologists, chemists and microbiologists has announced the discovery of several new viruses that infect plankton in all of the world's oceans. In their paper published in the journal *Nature*, the group describes how they found evidence of the viruses from water samples collected during the Tara Ocean expedition and what they have learned about them thus far.

Viruses are defined as infectious agents that are made of a nucleic acid covered with a protein coat. They are only able to multiply when infecting a host. Viruses have been found in a wide range of environments ranging from the Antarctic to remote islands and large land masses to most water sources, including the world's oceans. In this new effort, the research team has found a whole new group of previously unknown viruses that live in all of the world's oceans by infecting plankton.

To learn more about viruses living in the ocean, members of the research team were analyzing data obtained by the Tara Ocean expedition—a large undertaking with the goal of better understanding the extent of invisible marine biodiversity. As part of that effort, expedition members collected almost 35,000 water samples from across the globe over the years 2009 to 2013. In addition to seawater, the samples also held algae, plankton and as it turns out, previously unknown viruses.

A close look at the viruses showed them to be double-stranded DNA

viruses that infect plankton cells, helping them to regulate the flow of carbon and other nutrients in the oceans. The team has named them mirusviruses. They suggest that the viruses are a vital part of the plankton and ocean surface environment, which in turn helps to feed the creatures that live below.

They research team was also able to see that the viruses belonged to the Duplodnaviria virus family of viruses, which means they are related to the viruses that cause herpes in humans. But they also found that they were related in other ways to the Varidnaviria virus group, which the researchers suggest, means that they are chimeric.

The researchers also suggest that the discovery not only adds to knowledge regarding biodiversity in the word's oceans and how plankton work, but may also help with better understanding the roots of the virus behind herpes infections.

More information: Morgan Gaïa et al, Mirusviruses link herpesviruses to giant viruses, *Nature* (2023). DOI: 10.1038/s41586-023-05962-4