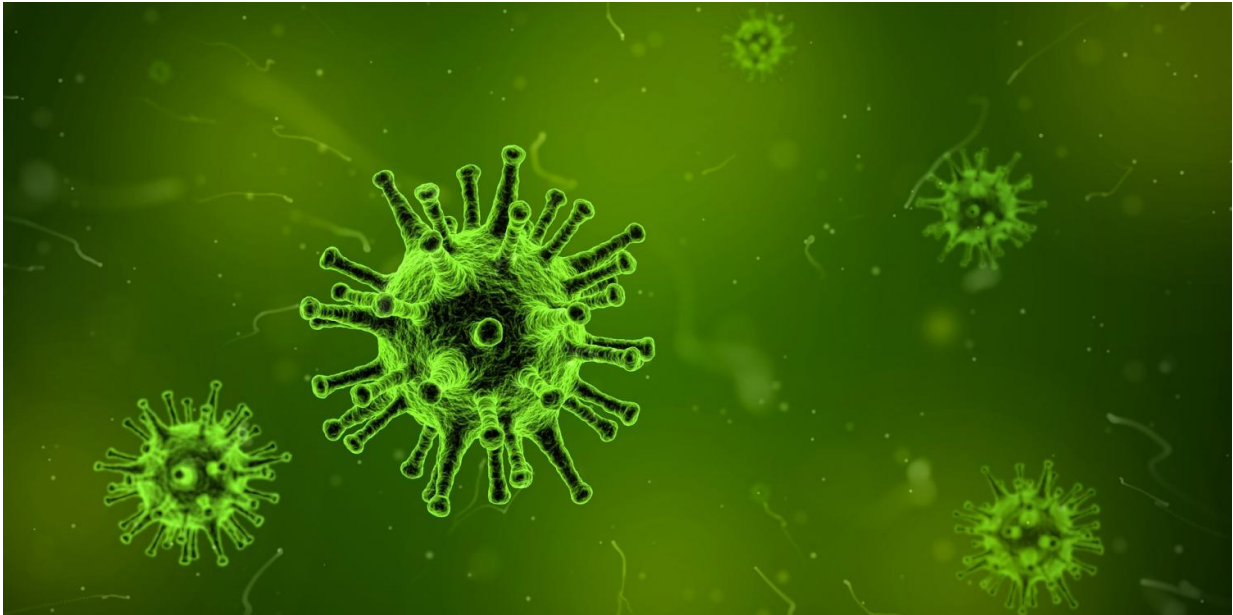


Virus reprograms ocean plankton

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A virus which infects ocean plankton can reprogramme cells and change the way they absorb nutrients - potentially changing how carbon is stored in the ocean, new research shows.

Scientists from the University of Exeter have examined the DNA of the OTV6 [virus](#), which infects [phytoplankton](#) (plant-like microbes which float in the upper part of the [ocean](#)).

The virus has stolen a gene from the phytoplankton, which has the

surprising effect of making the infected plankton better at absorbing certain nutrients for a period - before the virus kills them.

Much of the planet's carbon is stored in the sea by a process of algae dying and sinking to the ocean floor, and this research shows a new feature of that process.

"Availability of vitamins and nutrients determine how these phytoplankton function," said Professor Thomas Richards, of the University of Exeter.

"We have shown that this virus reprogrammes how the phytoplankton obtain nutrients, which affects how they grow and is likely to affect how they absorb carbon dioxide.

"Cells that have the virus are more competitive in the short-term.

"This is beneficial to the virus in terms of its own reproduction - and when the virus is ready, it kills the cell and releases more of the virus to infect others."

The scientists examined a phytoplankton species called *Ostreococcus tauri*.

Viruses often alter the function of infected cells, and in this case they change the way the phytoplankton takes in ammonium (which is an important nitrogen source for marine phytoplankton).

"This is important because the availability of nitrogen often limits phytoplankton growth," said Dr Adam Monier, also of the University of Exeter.

"Our findings show that a virus, using a gene stolen from a

phytoplankton, can control how nutrients are absorbed in infected phytoplankton.

"These results have implications for understanding how viruses manipulate the physiology and ecology of phytoplankton and influence marine [nutrient](#) cycles."

Viruses are very abundant in the oceans, but the researchers said relatively little work has been done to understand how they change their hosts and therefore the wider ecosystems which they inhabit.

The Exeter-led research, funded by the Gordon and Betty Moore Foundation and the Royal Society, involved collaborators from universities in France, Canada and the USA.

The paper, published in the journal *Proceedings of the National Academy of Sciences*, is entitled: "Host-derived viral transporter protein for nitrogen uptake in infected marine phytoplankton."

More information: Adam Monier et al., "Host-derived viral transporter protein for nitrogen uptake in infected marine phytoplankton," *PNAS* (2017).

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Provided by University of Exeter

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