

Bacteria-hunting virus fished from Connecticut lake treats infected doctor

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Dodge Pond in East Lyme, Connecticut. Credit: Yale University

An anti-bacterial virus found in a Connecticut lake successfully treated an 80-year-old doctor with a life-threatening antibiotic-resistant infection in his heart, a Yale team of scientists and doctors reported March 8 in the journal *Evolution, Medicine, and Public Health*.

The case study suggests that the viruses, called bacteriophages, could be an effective treatment against many drug-resistant infections, said the researchers.

The Connecticut doctor suffered from an [infection](#) after he received an aortic arch replacement operation and required massive doses of antibiotics to keep him alive. But the bacteria infecting his heart, *Pseudomonas aeruginosa*, had developed a resistance to drug treatment. His physician, Dr. Deepak Narayan, was then contacted by research scientist Benjamin Chan who had been screening natural samples for bacteriophage to see if these viruses might be effective against drug-resistant infections. He told Narayan that a virus-hunting expedition at Dodge Pond in Connecticut netted a bacteriophage with affinity for *Pseudomonas aeruginosa* and suggested that experimental phage therapy might be used to combat the infection.

After Narayan surgically administered hundreds of thousands of tiny bacteriophages into the patient's chest, the viruses successfully killed the bacteria and the patient was found to be free of infection.

Co-author Paul Turner, Yale's Elihu Professor of Ecology and Evolutionary Biology and acting dean of science, explained that the [bacteriophage](#), known as OMKO1, attached to proteins on the surface of bacteria that allow them to pump-out antibiotics, and survive assault by these drugs. Once OMKO1 destroyed bacteria with these pumps, the only survivors were bacteria mutants without them, which are easy targets for antibiotics.

"The [bacteria](#) are backed into an evolutionary corner," Turner said.

Benjamin Chan, research scientist in Turner's lab and first author of the study, said he and his colleagues are busy screening a variety of bacteriophages against other drug-resistant pathogens such as *E. Coli* and

Klebsiella pneumoniae.

"This new approach to countering that threat grew out of basic research on the process of evolution and also shows the value of biodiversity," said Sam Scheiner, program director in the National Science Foundation's (NSF) Division of Environmental Biology. Dr. Deepak Narayan is senior author of the paper.

More information: Benjamin K Chan et al. Phage treatment of an aortic graft infected with *Pseudomonas aeruginosa*, *Evolution, Medicine, and Public Health* (2018). [DOI: 10.1093/emph/eoy005](https://doi.org/10.1093/emph/eoy005)

Provided by Yale University

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