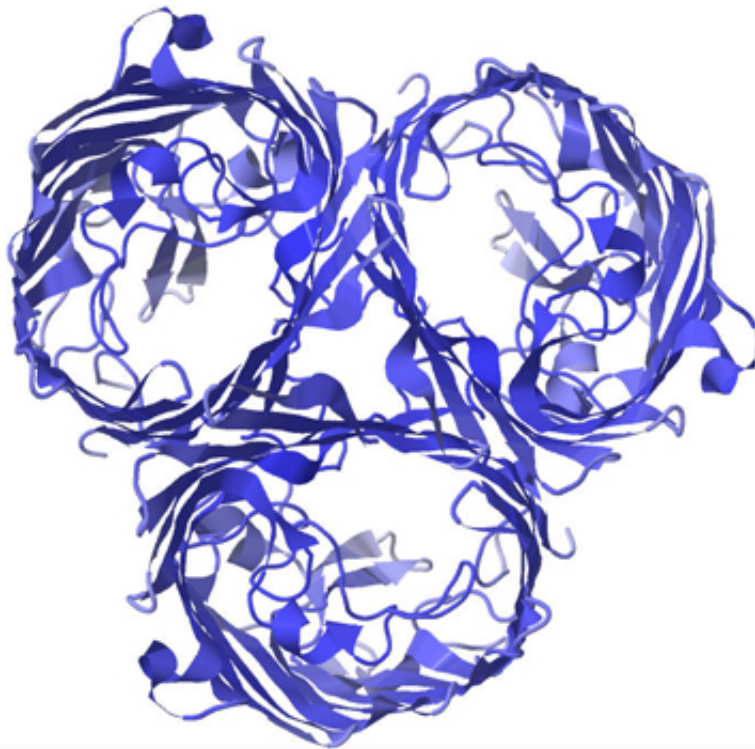


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After four mutations, new virus attacks



Researchers showed how a virus called “Lambda” evolved to find a new way to attack host cells, an innovation that it was able to accomplish in four mutations. (Credit Michigan State)

MICHIGAN STATE (US) — Scientists have shown for the first time how a new

virus evolves, clarifying how easy it is for diseases to quickly gain dangerous mutations.

8

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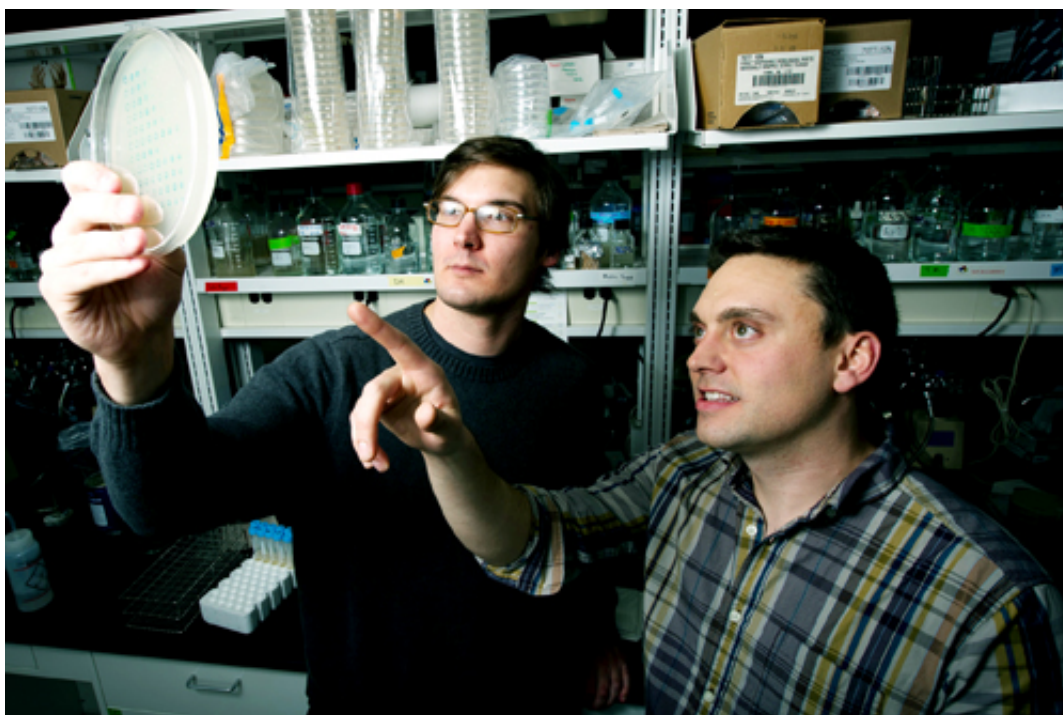
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Published in the journal [Science](#), the research shows how the virus Lambda evolved to find a new way to attack host cells, an innovation that took four mutations to accomplish. The virus, which isn't dangerous to humans, infects bacteria, in particular E. coli.

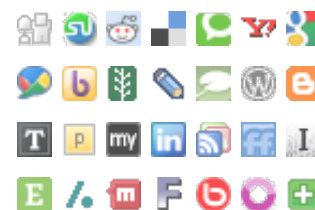
“We were surprised at first to see Lambda evolve this new function, this ability to attack and enter the cell through a new receptor—and it happened so fast,” says graduate student Justin Meyer, who co-authored the paper with Richard Lenski, professor of microbiology and molecular genetics at [Michigan State University](#).



“We were surprised at first to see Lambda evolve this ability

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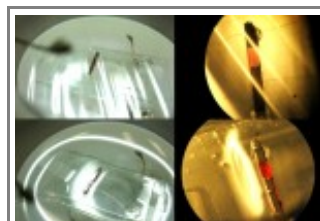
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to attack and enter the cell through a new receptor—and it happened so fast,” says Justin Meyer, right, with Devin Dobias. ““But when we re-ran the evolution experiment, we saw the same thing happen over and over.” (Credit: G. L. Kohuth)

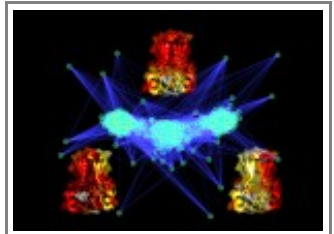
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“But when we re-ran the evolution experiment, we saw the same thing happen over and over.”

The paper follows recent news that scientists in the United States and the Netherlands produced a deadly version of bird flu. Even though bird flu is a mere five mutations away from becoming transmissible

between humans, it’s highly unlikely the virus could naturally obtain all the beneficial mutations all at once. But if conditions are favorable, it might evolve sequentially, gaining benefits one-by-one.

Through research conducted at [BEACON](#), the ability to duplicate the results implies that adaptation by natural selection, or survival of the fittest, had an important role in the virus’ evolution.

When the genomes of the adaptable virus were sequenced, they always had four mutations in common. The viruses that didn’t evolve the new way of entering cells had some of the four mutations but never all four together, Meyer says.

“In other words, natural selection promoted the virus’ evolution because the mutations helped them use both their old and new attacks,” Meyer says. “The finding raises questions of whether the five bird flu mutations may also have multiple functions, and could they evolve naturally?”

Researchers from Georgia Tech, the University of Texas, and Washington University in St. Louis contributed to the study, which was funded in part by the National Science Foundation and MSU AgBioResearch.

More news from Michigan State University: <http://news.msu.edu/>

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David Bump
Jan 31, 2012 22:29

Here’s what looks like the key to me: ““But when we re-ran the evolution experiment, we saw the same thing happen over and over.” ... When the genomes of the adaptable virus were sequenced, they always had four mutations in common.”

Sounds like the virus has been down this route before, and the “new” form just shows the innate, rapid-but-limited adaptability of the virus. Reminds me (distantly) of the VR-TR-RT ‘cassette’ discovered in another virus [“A is for adaptation” by Jef D. Boeke (Nature, v. 431, 23 Sept. 04, p. 408)], or the gene cassette approach used in the lamprey immune system [“Another manifestation of

GOD," review article by Martin F. Flajnik ([_Nature_ v. 430, 8 July 2004 p. 157](#))].

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