Huge viruses may open 'Pandora's' box: French study

July 18 2013, by Kerry Sheridan

The logo of the French National Centre for Scientific Research (CNRS) in Paris on December 7, 2012. Two newly discovered viruses are twice as large as the previous record-holders and may represent a completely new life form, French scientists reported in the US journal *Science*.

These viruses are so big they might just be your ancestors.

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reported in the US journal *Science*.

Researchers say they were "extremely surprised" by the discovery of what they are calling "Pandoraviruses," which are not believed to be the type that make people sick.

Instead, what is most interesting about them is their giant-sized genome—from 1,900 to 2,500 genes—way more than viruses like influenza, which has 10. Humans, by comparison, have about 24,000.

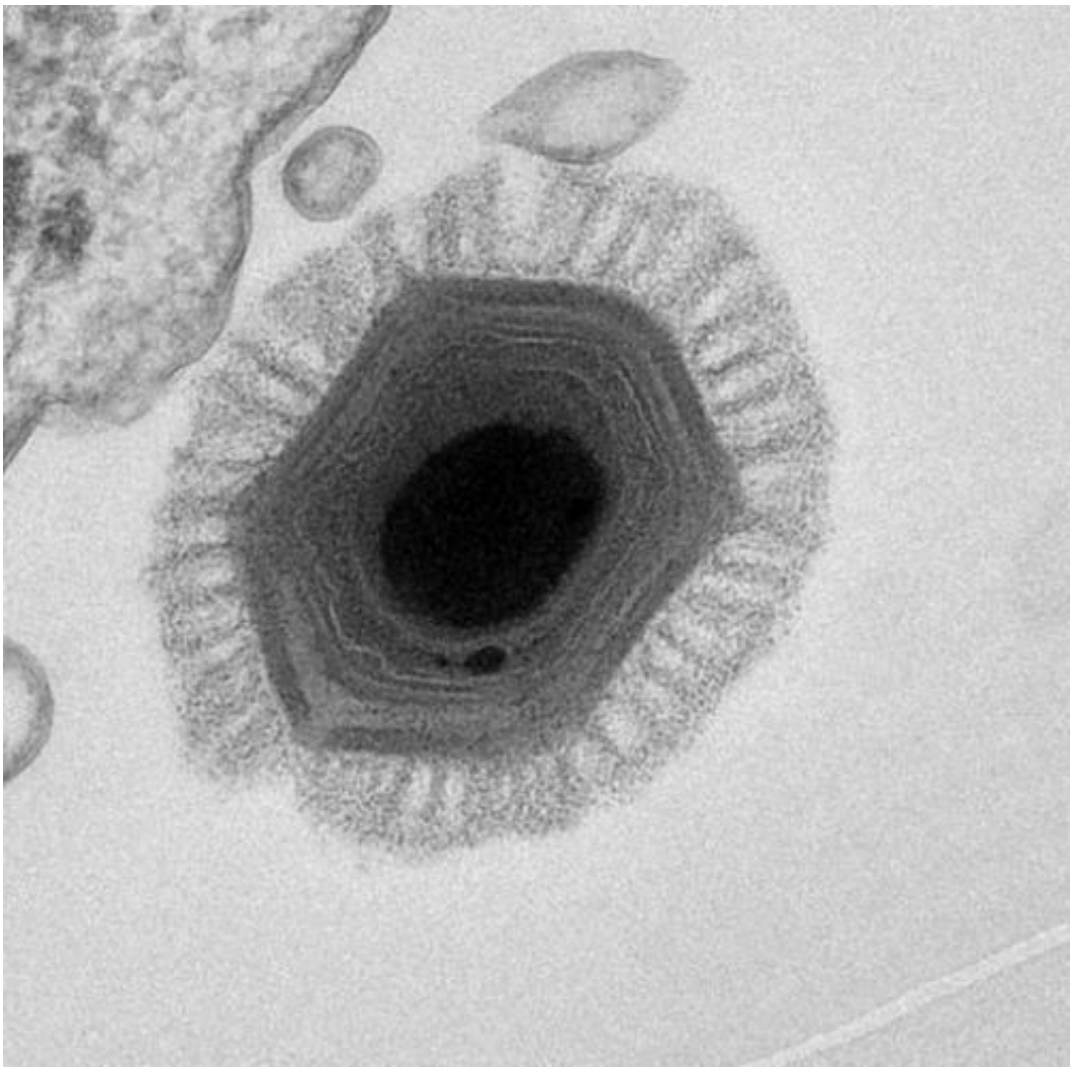
The previous record for a virus was 1,200 genes, in the discovery of the Megavirus chilensis. Before that was the Mimivirus with around 1,000 genes, discovered by the same team of scientists a decade ago.

Viruses are typically not deemed to qualify as a form of life, but some scientists say these giant viruses merit consideration as a new kind of living object.

One, Pandoravirus salinus, was found on sediment off the coast of Las Cruces, Chile.

The other, Pandoravirus dulcis, was found in the muck of a pond in Melbourne, Australia.

They are visible under a light microscope and look to have more in common with cells than other known viruses.



This picture shows the genome of Megavirus chilensisa, the previous record holder for largest virus, with 1,200 genes. Two newly discovered viruses are twice as big and may represent a completely new life form, French scientists reported in the US journal *Science*.

Pandoraviruses come from a different family than previously known giant viruses, said researchers Jean-Michel Claverie, a professor at the school of medicine at Aix-Marseille University and Chantal Abergel, director of research at France's National Center for Scientific Research (CNRS).

Their container-like shape and unique set of genes "made us associate them to the Pandora box. The opening of the box will definitively break the foundations of what we thought viruses were," the researchers said in an email to AFP.

Most of their genes appear unfamiliar to scientists, and they contain code for proteins and enzymes that "do unknown things," the authors said.

"The lack of similarity of most of their genes with other life forms might be an indication that they originated from a totally different primitive cellular lineage."

That means, according to the researchers, that Pandoraviruses may come from a "different tree of life altogether," than the three domains of life known to science as bacteria, single-celled micro-organisms known as archaea, and eukarya which includes fungi, plants and animals.

According to Gustavo Caetano-Anolles, a professor of bioinformatics at the University of Illinois who was not involved with the research but studies giant viruses, his theory is that they descended from a cell.

If true, "then we will have two kinds of ancestors—an ancestor that is shared between viruses and cells and an ancestor shared by all the cellular super kingdoms," he told AFP.

"The problem here is more from an evolutionary point of view. Where do these viruses come from?

"They are definitely part of something that we do not understand very well and that has the same complexity as cells."

It may be that viruses that make people sick are "part of a lineage that go

rogue," he added.

Meanwhile, the majority of viruses may be good guys that sow genetic diversity among Earth's life forms.

"Perhaps viruses are spreading the wealth. It is a way that nature has devised to spread the wealth of genetic information," he said.

The French scientists said they are hopeful that the discovery will lead to funding more research into how these Pandoraviruses operate, which could inform future biotech and biomedical innovations.

"Our knowledge of biology as a whole and of the origin of life is still very incomplete," they said.