Should Giant Viruses Be Included on the Tree of Life?

Curious Cat Science and Engineering Blog

A new study of giant viruses supports the idea that viruses are ancient living organisms and not inanimate molecular remnants. The study may reshape the universal family tree, adding a fourth major branch to the three that most scientists agree represent the fundamental domains of life. But I am not sure that makes sense. The reason given for viruses not being “life” is that they cannot reproduce themselves – they hijack living cells to reproduce [1]. The research in the past history of viruses as they evolved into current viruses is interesting but I don’t see the reason to classify current viruses as life.

The researchers used a relatively new method to peer into the distant past. Rather than comparing genetic sequences, which are unstable and change rapidly over time, they looked for evidence of past events in the three-dimensional, structural domains of proteins. These structural motifs, called folds, are relatively stable molecular fossils that â□□ like the fossils of human or animal bones â□□ offer clues to ancient evolutionary events, said University of Illinois crop sciences and Institute for Genomic Biology professor Gustavo Caetano-AnollÃ©s, who led the analysis.

â□□Just like paleontologists, we look at the parts of the system and how they change over time,â□□ Caetano-AnollÃ©s said. Some protein folds appear only in one group or in a subset of organisms, he said, while others are common to all organisms studied so far.

â□□We make a very basic assumption that structures that appear more often and in more groups are the most ancient structures,â□□ he said.

Most efforts to document the relatedness of all living things have left viruses out of the equation, Caetano-AnollÃ©s said.

â□□Weâ□□ve always been looking at the Last Universal Common Ancestor by comparing cells,â□□ he said. â□□We never added viruses. So we put viruses in the mix to see where these viruses came from.â□□

The researchers conducted a census of all the protein folds occurring in more than 1,000 organisms representing bacteria, viruses, the microbes known as archaea, and all other living things. The researchers included giant viruses because these viruses are large and complex, with genomes that rival â□□ and in some cases exceed â□□ the genetic endowments of the simplest bacteria, Caetano-AnollÃ©s said.

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