

Mimivirus isolated, genome amputated

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In the absence of competition with other microorganisms, Mimivirus, the largest known DNA virus, loses 17% of its genome. This has recently been demonstrated by a French-American collaboration including researchers from CNRS, the Universite de la Mediterranee and the Universite de Provence. The results are published on-line this week in the journal *Proceedings of the National Academy of Sciences*.

With 900 genes of their own, Mimiviruses, discovered in 2003 by two teams headed by Professor Didier Raoult, represent the largest known group of DNA viruses. They have been discovered in amoebas, unicellular beings that can be found in the [water-cooling](#) circuits of air conditioning systems. The originality of this virus stems from its size and its vulnerability to infection by small viruses : virophages.

In a natural environment, in other words within amoebas, Mimiviruses live in a “community”. They share their amoebic space with other organisms such as viruses and bacteria. Constant exchanges of genes within these organisms with intra-amoebal life, not just between each other but also with their protozoan host, have allowed this evolution towards a “community” life.

The researchers cultivated the Mimivirus in the laboratory, alone in an amoeba and without contact with other organisms. Through accelerated evolution (only 150 passages, they observed a 17% reduction in the size of its genome. This genomic loss mainly occurs in the form of deletions of both ends of its genome. In the absence of other [microorganisms](#) and thus competition within the amoeba, the Mimivirus then eliminates part

of its genome by deleting in particular the genes involved in the formation of the long fibers that surround its capsid. The Mimivirus therefore becomes "bald". The researchers also observed that it becomes resistant to virophages.

This work shows that a change of ecosystem may be associated with a major and rapid modification of the genome of microorganisms.

More information: Mimivirus shows dramatic genome reduction after intra amoebal culture, Mickaël Boyer, et al., *Proceedings of the National Academy of Sciences USA*, June 2011.

Provided by CNRS

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