Lecture Series & Workshops 2019-2021

From Single Organisms to Systems Ecology and Evolution

The rapidly expanding universe of giant viruses

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- 4th of September 2019, 12 PM
- Campus Belval, Maison du Savoir; Amphi 3.510

PhD students and PostDocs are invited to join for a **meet, eat & greet** after the lecture for further discussions.

The first identified giant virus retained by the Chamberland filter, was called "Mimivirus" in 2003. With a particle of 0.7 micrometer in diameter packing a 1.2 Mb genome encoding 979 proteins, Mimivirus was the first virus overlapping the world of bacteria both in terms of particle size and genome complexity. As we thought we were finally reaching the limit of viral complexity and started to build a new paradigm about the evolution of DNA viruses, the discovery of the Pandoraviruses came ruining this newly built theoretical edifice. With 1.2 micron-long particles packing a genome of 2.5 Mb encoding more than 2,500 proteins, Pandoravirus salinus is now surpassing the complexity of the smallest eukaryotic cells, such as parasitic microsporidia species. As the family expanded with new members from all around the world and diverse environments, it clearly represents a class of giant viruses totally unrelated to the Megaviridae.

I will also present the discovery of Pithovirus sibericum, isolated from a >30,000-y-old radiocarbon-dated sample of Siberian permafrost that also share the amphora-shaped particles with the Pandoraviruses. This family is also rapidly increasing with now modern members dividing the family in 3 clades. Mollivirus sibericum, isolated from the same permafrost sample, is still the only member of this fourth family of giant viruses. Pandoravirus-like particles may thus be associated with a variety of virus families more diverse than previously envisioned. To conclude, I will briefly present the hypotheses that have been proposed about the origin and evolution of DNA viruses and their possible link with the emergence of eukaryotes.

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