Impact of virus infection on eukaryotic evolution
"Did the NCLDV (Nucleocytoplasmic Large DNA Virus) produce the dinokaryon?"

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SUMMARY

Dinoflagellates are biflagellate protozoa belonging to the alveolates and are widely distributed in various aquatic environments. Most dinoflagellates have a special type of nucleus called the dinokaryon, which has a number of unique characteristics that are not observed in other typical eukaryotes. In our previous studies, we identified several genes encoding NP23, which is the only chromosomal protein found in dinoflagellates. Blast analysis identified many sequences encoding NP23-like proteins in expressed sequence tag (EST) databases of several dinoflagellates, so it was suggested that the NP23 protein is highly conserved among dinoflagellates. Interestingly, five open reading frames (ORFs) showing homology to NP23 were suggested based on the genomic data of nucleocytoplasmic large DNA virus (NCLDV). Two of five NCLDVs, both belonging to the genus Phaeovirus, have been studied in depth, and both were shown to possess a similar life cycle. The virus can only infect gametes, and new virus particles are generated only in gamete genesis cells (gamonts) of future generations. Based on the available information regarding the NCLDV, we will present a novel hypothesis regarding the evolutionary origin of the dinokaryon.