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Plasticity of eukaryotic genomes: The proteomes of dinoflagellate plastids as a case study

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There is no doubt that the endosymbioses of alpha-proteobacterium and cyanobacterium, which gave rise to mitochondria and plastids, respectively, had great impacts on eukaryotic genome evolution. As the extent organelle genomes are extremely reduced comparing to their free-living relatives, the vast majority of endosymbiont genes became dispensable for the lifestyle in a eukaryotic cell and were eventually discarded. On the other hand, the genes, which are essential for functions and maintenance of endosymbionts/organelles, were transferred to the host (eukaryotic) genome. According to the ”gene flow” from the endosymbiot to host genomes (endosymbiotic gene transfer or EGT), bacterial genes – those with specific affinities to the bacterial homologs – encoded in eukaryotic genomes have been considered as the results of EGT. In this presentation, I discuss the origins of nucleus-encoded, plastid-targeted genes in dinoflagellates that experienced plastid exchange, and the putative plasticity of eukaryotic genomes: Eukaryotes most likely have the ability to integrate foreign genes not only from their endosymbionts, but also diverged organisms, which were involved in neither acquisition of mitochondrion nor plastid.

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