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Establishment, evolution and fate of secondary plastids

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Abstract

The gain of plastids was a major evolutionary transition in the evolution of eukaryotes. Subsequent to the evolution of primary plastids, photosynthesis spread from red and green algae to unrelated eukaryotes by secondary and tertiary endosymbiosis. What are the prerequisites and mechanisms of secondary endosymbiosis? What are the consequences of endosymbiosis for the host and the endosymbiont? How does the organellar genome evolve after endosymbiont fixation? Although access to photosynthesis appears to be beneficial, in most photosynthetic lineages, the loss of photosynthetic function and even the entire plastid was observed. The major process that accompany the loss of photosynthetic functions is the erosion of the plastid genome. Are there any common patterns of the reductive evolution of plastid genomes? I will attempt to shed new light on those open questions on the origin, evolution, and loss of plastids using examples of secondary plastids from diverse evolutionary lineages.

