

Secondary plastids can be found in many unrelated groups of organisms among three supergroups – Excavata, Rhizaria and Chromista. Primary plastids in contrast are unique and defining feature of the Archaeplastida supergroup. Secondary plastids have arisen through several independent endosymbiotic events, in which engulfment of an eukaryotic cell containing primary plastid occurred and its reduction and integration by transferring bulk of their genome into host nucleus occurred. Crucial difference between primary and secondary plastids is number of surrounding membranes which need to be crossed by nucleus-encoded proteins which is higher in secondary plastids. Mechanisms of protein transport into secondary plastids are therefore more complicated and more molecules and signals partake in these mechanisms. Diversity of secondary plastid-bearing organisms notably contrasts with the fact that the transport pathways and molecules they use often share mechanism of function and origin. These similarities probably reflect general principles of cell biology and not phylogeny.