

Sorting and import of chloroplast and mitochondrial proteins in plant cells

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Plants have uniquely acquired the mechanisms for photosynthesis, through which light energy is converted into chemical energy. For this process, a subcellular organelle called chloroplast has been generated in plants through the endosymbiosis of ancestral photosynthetic cyanobacteria. However, the majority (more than 95%) of chloroplast proteins is encoded in the nuclear genome due to endosymbiotic gene transfer and posttranslationally targeted to chloroplasts. Moreover, given the resemblance between chloroplast and mitochondria in regard to the organellogenesis through endosymbiosis and protein targeting mechanisms, plants should have additionally established the mechanisms to discriminate between these two organellar proteins, unlike other eukaryotic species which possess only mitochondria, but not chloroplast. In this presentation, I will recapitulate the overall process for protein import into chloroplast and mitochondria, and discuss the recent findings regarding the sorting and import process of chloroplast and mitochondrial proteins in plant cells.