Abstract

Eukaryotic cells contain a variety of intracellular lipid membrane-bound compartments called organelles that mediate the important biochemical functions necessary for life. The field of studying organelle biology has recently grown fast owing to the advent of new microcopy that allowed the high-resolution imaging of organelles and organelle-specific probes. Consequently, unlike our classic textbook image of organelles usually depicted as static and isolated, emerging pictures show organelles undergo dynamic fusion, and fission, and actively communicate with each other by establishing close apposition between the membranes of two organelles, the so-called membrane contact sites. Rewiring such organelle dynamics is essential for cells to appropriately adapt to altering environments such as nutrient deprivation. Unlike other organelles that have multiple copies in cells, each cell contains only one ER. This ER extends throughout the cell and occupies a large fraction of the cytoplasmic volume via its elaborate, giant membrane architecture consisting of different morphological domains, namely tubule, sheets, and nuclear envelope. However, the underlying mechanism of ER morphological dynamics and the relationship between its form and function still remain elusive. In this talk, I will present how cells reshape ER during nutrient starvation and rewire their metabolic states by communicating with neighboring organelles.