

Clarifying Mitochondrial Network and Organelle Contacts in Eukaryotic Cells at Metabolic Remodeling Phase

Chang-Lin Chen (陳昶麟)¹, Jia-Chen Tsai (蔡佳臻)^{1,*},
Wei-Ling Huang (黃薇玲), and Chuang-Rung Chang (張壯榮)^{1,2,*}

¹Institute of Biotechnology, National Tsing Hua University, Hsinchu, Taiwan

²Department of Medical Science, National Tsing Hua University, Hsinchu, Taiwan
crchang@life.nthu.edu.tw

Abstract

Mitochondria are critical organelles in the cell. The unique feature of mitochondria is that they continuously fuse, divide and transport. These dynamic processes determine mitochondrial network morphology, as well as contacts with other organelles. Disrupted mitochondria dynamics was indicated in neurological disorders, cardiac dysfunctions, and metabolic diseases (including diabetes and cancers). Mitochondria dynamics changes can be attributed to either altered expression of dynamics-related proteins or disturbed signaling pathways. Our previous results have identified irregular mitochondrial network morphology in a variety of genetic backgrounds and stress conditions. However, the detail structural organization of mitochondria and their contacts with other organelles remain obscure. Soft X-ray tomography will aid us to address the issue, and to elucidate the underlying regulatory mechanisms of mitochondria dynamics. The information gained will benefit us to identify therapeutic targets in diseases related to distorted balance of mitochondrial dynamic processes.

Keywords – Mitochondria, Dynamics, Organelle contacts.