Mitochondrial signaling - touch me, don't touch me, just be sweet

S-01.4-2

N. Raimundo[I]

[I]Penn State College of Medicine, Hershey, United States of America

Organelle communication is a key feature or eukaryotic cells. Physical contact sites
between organelles provide an excellent platform for cross-organelle molecule transfer.
The mitochondria-endoplasmic reticulum contact sites (MERCS) are conserved
structures from yeast to higher eukaryotes. Many tether proteins keeping MERCS have been identified in mammals. However, it remains unclear how MERCS integrate with the cellular signaling environment. AMP-dependent protein kinase (AMPK) is a key regulator of cellular metabolism, with anti-anabolic and pro-catabolic roles, including promotion of mitochondrial biogenesis and autophagy. Here, we use electron microscopy, confocal imaging and biochemical approaches to show that AMPK is also involved in the regulation of MERCS. Cells lacking AMPK activity have increased number of MERCS, and restoring AMPK activity or its downstream target mitochondrial fission factor also restores the
number of MERCS. Reciprocally, hyperactivation of AMPK reduces the number of MERCS.
This study shows that MERCS are regulated by a key cellular signaling hub, AMPK, and dynamically regulated in response to the signaling environment.