OPEN ACCESS Freely available online

ISSN: 2161-1009
Biochemistry & Analytical Biochemistry

Commentary

Role of Mitochondria Organelles in Eukaryotic Cell

Lisa Sun*

Department of Biology, University of Cambridge, Cambridge, UK

DESCRIPTION

Cellular organelles produce chemical energy through a process known as oxidative phosphorylation. They descended from bacteria and continue to express their own genome through specialized mitochondrial transcription and translation machinery that is distinct from that used for nuclear gene expression. Particularly, the machinery controlling eukaryotic, cytosolic translation differs significantly from that guiding mitochondrial protein synthesis in terms of both structure and functionality. Even though they contain their own genetic material, mitochondria are not entirely separate from the rest of the cell, and cellular fitness is intimately related to mitochondrial function. For gene expression and function, mitochondria heavily rely on the import of nuclear-encoded proteins; as a result, they engage in substantial inter-compartmental interaction to control their proteome.

This linkage not only mediates reactions to stress and mitochondrial malfunction, but also enables mitochondria to adapt the changes in cellular circumstances. Fundamental discoveries have been made in recent years regarding the biogenesis, structure, and mechanisms of the mitochondrial translation apparatus with a focus on mammals and yeast. These discoveries have been made possible by the emergence of numerous near-atomic structures and a significant amount of biochemical research. We also go over the regulation of cellular mitochondrial protein expression, including mRNA and tRNA maturation and stability, the functions of auxiliary factors like translation regulators that modify the rate of mitochondrial translation, and the significance of inter-compartmental crosstalk with nuclear gene expression and cytosolic translation and how it facilitates the integration of mitochondrial translation into the cellular context.

The majority of the proteins in mitochondria and chloroplasts are imported across two membranes, with translocases of the outer membrane serving as an entry gate. The incoming precursor protein and directing factors engage in interaction with these translocases. Precursor-protein receptors bind to a key element within the translocon that facilitates both transfer through a cation selective channel and initial sorting towards interior sub compartments. Despite these similarities, the two organelles modes of translocation are different. In chloroplasts, the receptors (Guanosine-5'-Triphosphate) GTP-binding and hydrolysis are necessary for transport, whereas in mitochondria, the pre protein transit is prompted by its rising affinity for the translocase subunits. A precise organelle inheritance process at cell division is necessary to maintain a functional set of cytoplasmic organelles in eukaryotic cells.

Translocases of the outer membrane serve as entry gates for mitochondria and chloroplasts, which import the majority of their proteins across two membranes. These translocases engage in interactions with the incoming precursor protein as well as the directing chaperone elements. Precursor-protein receptors in the translocon dock to a core element that mediates both transfer through a cation-selective channel and early sorting towards interior sub compartments. Despite these similarities, the two organelles modes of translocation are different in chloroplasts; transport is mediated by GTP-binding and hydrolysis by the receptors, whereas in mitochondria, pre protein transit is mediated by its rising affinity for the translocase subunits. In order to maintain a functional set of cytoplasmic organelles during cell division, eukaryotic cells must follow a precise organelle inheritance mechanism.

But lately, when scientists realized that mitochondria serve as crucial hubs for a wide range of cell signalling cascades, our understanding of the function of mitochondria in cell biology was enlarged. The constant reshaping of the cellular mitochondrial network, known as mitochondrial membrane dynamics, involves a number of processes, including organelle fusion and fission (division), as well as ultrastructural membrane remodeling, and it is intimately linked to the functional versatility of the cell. The regulation of complicated cell signalling events, such as those involved in controlling cell pluripotency, division, differentiation, senescence, and death, is thus affected by mitochondrial dynamics and frequently orchestrated by them.

Correspondence to: Lisa Sun, Department of Biology, University of Cambridge, Cambridge, UK, E-mail: lisasun123@cam.uk

Received: 04-Jul-2022, Manuscript No. BABCR-22-17830; **Editor assigned:** 07-Jul-2022, Pre QC No. BABCR-22-17830 (PQ); **Reviewed:** 22-Jul-2022, QC No. BABCR-22-17830; **Revised:** 29-Jul-2022, Manuscript No. BABCR-22-17830 (R); **Published:** 08-Aug-2022, DOI: 10.35248/2161-1009.22.11.443.

Citation: Sun L (2022) Role of Mitochondria Organelles in Eukaryotic Cell. Biochem Anal Biochem. 11:443.