

The Mitochondria's Role in Health and Aging

If there is one thing we all remember from high school biology, it's that the word *mitochondria* is synonymous with *powerhouse*. Mitochondria are literally the powerhouses of the cell, and the number of mitochondria in any given cell depends on the energy required by the cell, with each cell having hundreds to thousands of mitochondria.

Mitochondria create energy that is stored in a molecule called adenosine triphosphate (ATP). The energy is then used by the cell to do the work of the cell - a.k.a. carry out the processes which maintain life.

An Overview of Mitochondria

Mitochondria are organelles, and organelles are parts of a cell that help the cell do its job. As we mentioned, the mitochondria specifically create energy, so the cell can keep up the good work of making living things live.

There are other roles the mitochondria has or participates in:

- Calcium regulation inside the cell
- Thermogenesis (heat generation) in brown fat
- Immunity and inflammation contribution
- Key roles in cell survival and death

In one of her lectures on mitochondria and cell health, Dr. Elizabeth Yurth aptly stated, "Mitochondria are badasses." As we look at all the aspects of cell life that mitochondria have a role in, it is clear that they are not only the cell's powerhouse, but indeed...badasses.

Healthy mitochondria are integral to cellular health. Cellular health is integral to tissue health. Tissue health is integral to overall health and longevity.

If we start with unhealthy mitochondria, we have no path to overall health. Thus, maintaining or improving mitochondrial health may offer a road to lessening the impacts of aging and disease.

Quality Control and Health

The mitochondria are helpers. They help the cell with more than just energy production. Originally, it was believed that mitochondria were directed solely by the cell's nucleus - a one-way conversation.

Now, we understand that the mitochondria has a conversation with the nucleus and these “chats” are essential to fighting off disease and healthy aging.

The mitochondria has evolved a way to practice damage control over its environment. Our mitochondria can minimize or get rid of damage to the cell, as well as help the cell to heal and repair. These steps are all in an effort to protect itself, the cell, and up the chain - tissues and organs.

Mitochondrial dysfunction leads to a lack of quality control, which creates an environment where damage can go unchecked. This, in turn, can lead to detriments like rapid aging or disease.

Continue reading part two of this mitochondria series to better understand the conversation between nucleus and mitochondria, what the information sent back and forth does, and how it all impacts health and diseases like cancer.

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