

Learning about Mitochondrial DNA

WebQuest

Directions:

There are three sections to this WebQuest, each associated with a different website. Read through the information on each of the following websites and use that information to answer the accompanying questions.

Part I: What is Mitochondrial DNA?

Go to the National Institute of Health's Genetics Home Reference Page on Mitochondrial DNA at: <https://ghr.nlm.nih.gov/mitochondrial-dna>

1. What are mitochondria?
2. Describe the structure of mitochondrial DNA (mtDNA).
3. What types of genes are located on mtDNA, and how do these genes allow mitochondria to function?

Part II: Why do Mitochondria have DNA?

Go to the Genetic Science Learning Center's Evolution of the Cell page at:

<http://learn.genetics.utah.edu/content/cells/organelles/>

4. How does the Endosymbiotic Theory explain the origin of mitochondria?
5. How did the Endosymbiotic Theory get its name?
6. Explain how the meaning of the word "theory" in science is different from that in every day language.
7. What scientific evidence is there to support the Endosymbiotic Theory?

Part III: Why Do We Inherit Mitochondrial DNA only from our Mothers?

Go to the New York Times article titled "Why Do We Inherit Mitochondrial DNA only from our Mothers?" at <http://www.nytimes.com/2016/06/24/science/mitochondrial-dna-mothers.html>

8. Both the unfertilized egg and sperm contain mitochondria, but the fertilized egg only contains the egg's mitochondria. What do scientists think happen to the sperm's mitochondria, based on their research in roundworms?
9. What is the role of the cps-6 gene in sperm cells?
10. Explain the hypothesis presented in the article for why mitochondria are consistently inherited from mothers, and not fathers, across so many organisms.