

Mitochondria

Introduction

The first criterion for this assignment was to select a relatively complex term used within my particular discipline. The second criterion was to choose a situation and an audience of “non-technical readers” in order to have the opportunity to write for a specific audience that does not have technical knowledge of the term that is being defined. The third criterion was to compose a parenthetical definition and a sentence definition. The last criterion was to compose an expanded definition of the term including: at least four expansion strategies, at least one visual, and at least three outside references with a proper MLA or APA style work cited list.

There were four objectives for this assignment. The first objective was to appreciate the important role definitions play in technical writing. The second objective was to better understand how audience and purpose indicate the need for definition. The third objective was to differentiate between the levels of detail in definitions. The last objective was to select the right level of detail according to the situation and target audience.

Parenthetical Definition

Mitochondria (organelles involved in energy production) are often considered to be the powerhouses of the cell.

Sentence definition

Mitochondria are important organelles found in large numbers in most cells as they take in nutrients and break them down to create energy rich molecules for the cell to use.

Expanded Definition

What are Mitochondria?

Mitochondria are specialized organelles present in the cells of animals, plants and fungi. The various functions of the cell and the organism as a whole are powered by these specialized structures. Nearly all our cells contain these structures. The number of mitochondria per cell can range from one mitochondrion to 10, 000 mitochondria in some highly specialized types of cells (Shratt, 1990). Consequently, the type of cell governs the quantity of mitochondria it contains.

How did they evolve over time?

In order to fully understand the mitochondria, one must be familiar with the endosymbiotic theory. This theory describes how the mitochondria in cells originated from primitive bacteria cells (Green & Reed, 1998). Essentially, large host cells ingested bacteria and both these cells became dependent on one another, resulting in a permanent relationship (Zimorski et al., 2014). The highly specialized mitochondria we are familiar with today evolved over millions of years. For this reason, they can no longer live outside of the cell. The endosymbiotic theory confirms why mitochondria resemble free-living bacteria (Zimorski et al., 2014).

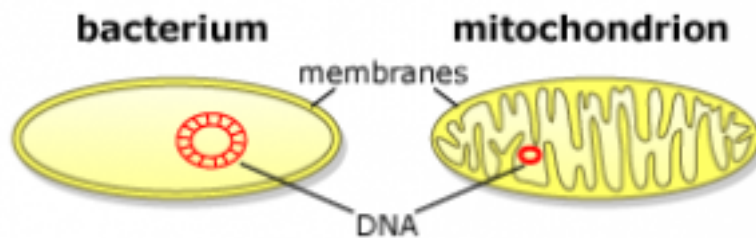


Figure 1. Structural similarities between bacteria and Mitochondrion are demonstrated (Understanding Evolution, 2016).

What are their structural components?

Mitochondria are composed of two membranes: inner membrane, and outer membrane. The inner membrane of the mitochondria folds over many times, creating layered structures called cristae (Shratt, 1990). The cristae are very important structures as they help increase the surface area inside the mitochondria. This increased surface area provides more space for the required chemical reactions to take place (Shratt, 1990). This essentially parallels the significance of microvilli (membrane protrusions) in the intestine, which help increase nutrient absorption by increasing surface area. The fluid contained in the mitochondria is called the matrix. The reason why mitochondria are so specialized is due to their matrix containing ribosomes (tiny organelles involved in protein synthesis), proteins, and DNA (Tedeschi, 2012).

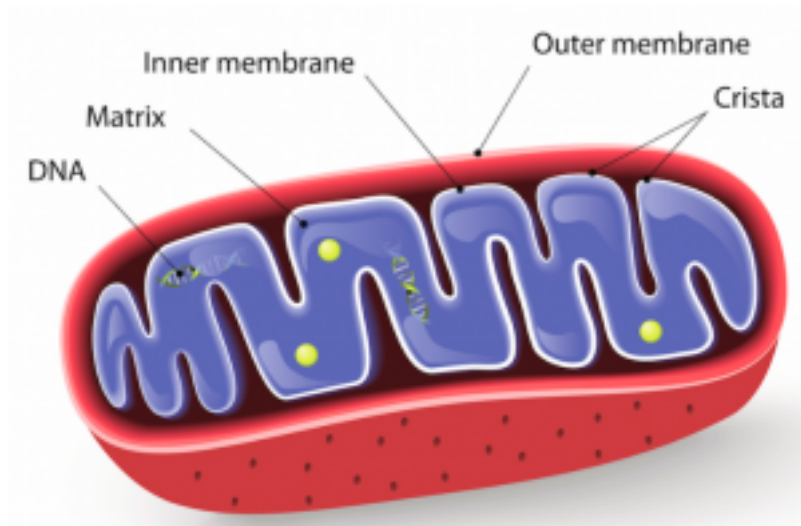


Figure 2. Structural components of the mitochondrion (Pilny, 2015)

How do they work?

Being the powerhouses that they are, mitochondria must use oxygen to release energy. As explained below, the major process of cellular respiration (using oxygen to break down food molecules for energy) takes place in the mitochondria. Using oxygen, the proteins in the matrix of the mitochondria convert carbohydrates (sugars), fats and proteins to organic molecules (Shratt, 1990). These organic molecules are then chemically digested in what is known as the citric acid cycle, releasing water and carbon dioxide. Essentially, the mitochondria are the major reason why we breathe in oxygen and breathe out carbon dioxide (Shratt, 1990).

Work Cited

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