



**Cell &  
Molecular  
Biology  
Notes**

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# CHAPTER 9

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lec 6 part 2

\* Oxygen provides energy through biochemical pathway and used to power the activities (cellular metabolism) (cellular respiration inside the mitochondria)

The shape of mitochondria depends on the cell

Brain cells - muscles cells have a lot of mitochondria because they need a lot of energy.

Often cells have more than one cell, especially the cells with a high level of energy requirements.

Mitochondria are produced independently.

It can fuse with one another or split in two

There is DNA in mitochondria, it is possible to find mutation inside the mitochondria.

Fusion between 2 mitochondria to decrease the influence of mutation on the cell (Dilution of the mutation).

$Ca^{+2}$  is important in signal transduction

Cell death = apoptosis pathway.

الخلايا التي تموت ← موت الخلية المبرمج

Mitochondrial membrane 2 layer

Inner membrane - invagination

Mitochondrial proteins are produced in the cytosol (their DNA is located in the nucleus)  
Mitochondrial DNA is extremely small that produces just 13 proteins  $\Rightarrow$  they are incorporated in the cellular respiration

Matrix contains; DNA, ribosomes  
(transcription, translation)

Inner membrane involved in the cellular respiration  
it contains (electron transport chain) (ATP synthase)

Cardiolipin a type of phospholipid in animals and bacteria

The inner membrane is impermeable to create the  $H^+$  gradient with is electrochemical gradient  $\Rightarrow$   $\Delta \psi$

nuclear DNA is linear while mitochondrial DNA is circular.

Glucose enters the cell  $\xrightarrow{\text{Glycolysis}}$  Pyruvate  
produces NADH + ATP

Cellular respiration \*  $\text{جهاز التنفس الخلوي}$

## 9.9 Peroxisomes

Oxidative enzymes

oxidase

ROS  $\rightarrow$  relative oxygen species ( $\text{H}_2\text{O}_2$ )

$\text{O} + \text{H}_2\text{O} \xrightarrow{\text{peroxidase}}$   $\text{H}_2\text{O}_2$   $\xrightarrow{\text{Catalase}}$   $\text{H}_2\text{O} + \text{O}_2$   
بالبيروكسيداز  $\rightarrow$  بيروكسيد الهيدروجين  $\xrightarrow{\text{كاتالاز}}$  ماء و أكسجين

\* لذا هناك خلل في الميتوكوندريا  $\rightarrow$   $\text{أكثر}$   $\text{الأنسجة}$   $\text{تتأثر}$   
energy requirements  $\leftarrow$  muscles & Brain

Sperm needs energy, if the mitochondria becomes disordered, this will result in a non motile sperm.

Mitochondrial DNA is inherited from the mother

Mitochondrial mutation  $\rightarrow$  Mitochondrial diseases

13 polypeptide  $\rightarrow$  وظائف الميتوكوندريا

Homozygous  $\rightarrow$

التي يكون فيها نسختان متطابقتان