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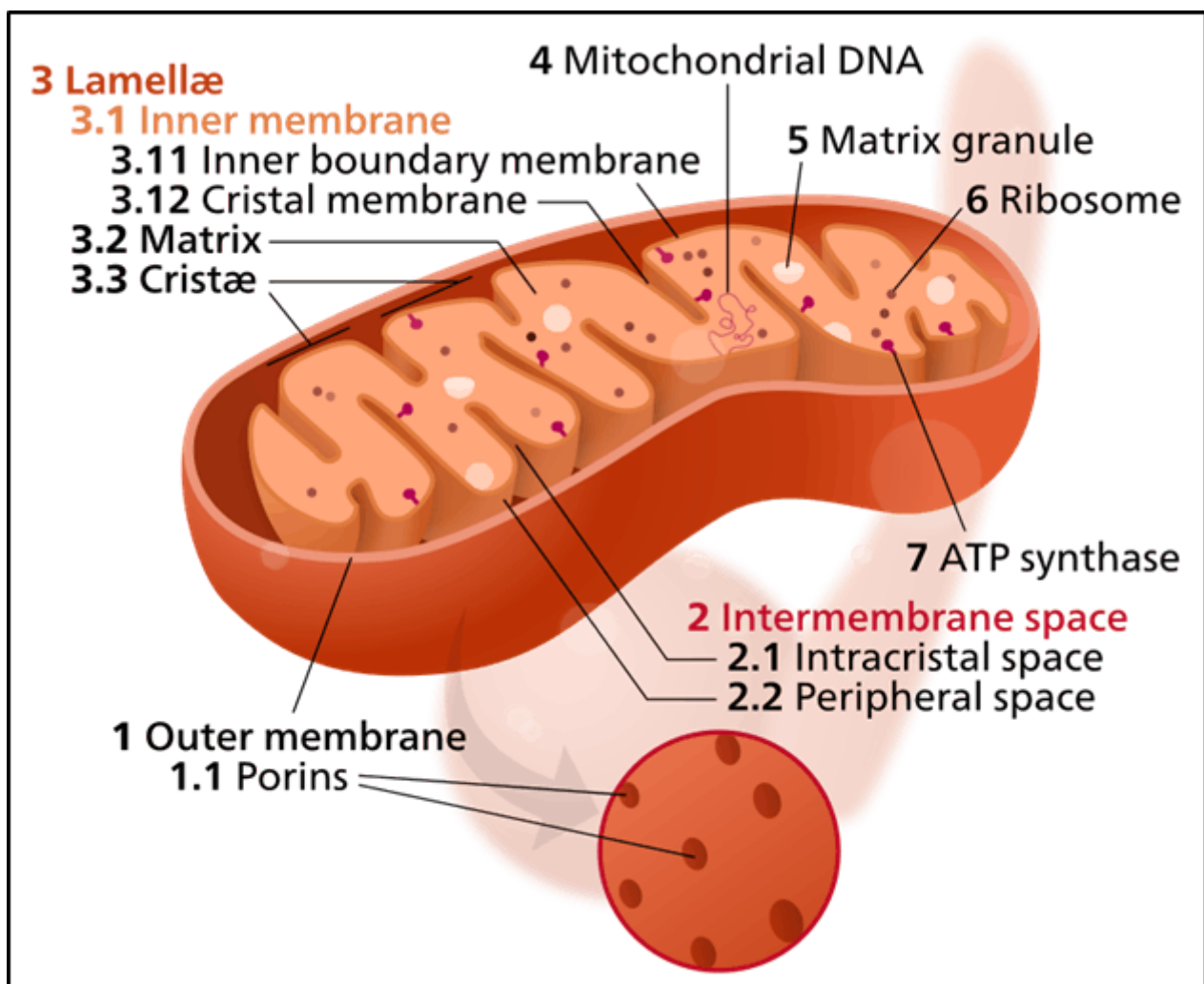
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## Mitochondria: Definition and Meaning and Mitochondria Diagram (For CBSE, ICSE, IAS, NET, NRA 2022)

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### Definition and Meaning of Mitochondrion

- It is a membrane bound organelle found in most eukaryotic cells.
- The term 'mitochondrion' is derived from the Greek words "mitos" and "chondrion" which means "thread" and "granules-like" respectively.
- A German pathologist named Richard Altmann in the year 1890 was the first to describe it.
- Eukaryotic cells are the cells that make up plants, animals, fungi, and many other forms of life.
- Mitochondria are commonly between 0.75 and 3  $\mu\text{m}$  in diameter and vary in size and structure.
- It is popularly known as the Powerhouse of the cell.
- These are found inside the cytoplasm and function as the cell's digestive system.
- Thus, Mitochondria can be defined as membrane-bound organelles present in the cytoplasm of all eukaryotic cells that produce adenosine triphosphate (ATP), the main energy molecule used by the cell. "
- Mitochondria play a vital role in breaking down nutrients and generating energy-rich molecules for the cell.
- Within the mitochondria, many of the biochemical reactions involved in cellular respiration take place.



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## Functions of Mitochondria

- To produce energy through the process of oxidative phosphorylation.
- It also promotes the growth of new cells and cell multiplication.
- It regulates the metabolic activity of the cell.

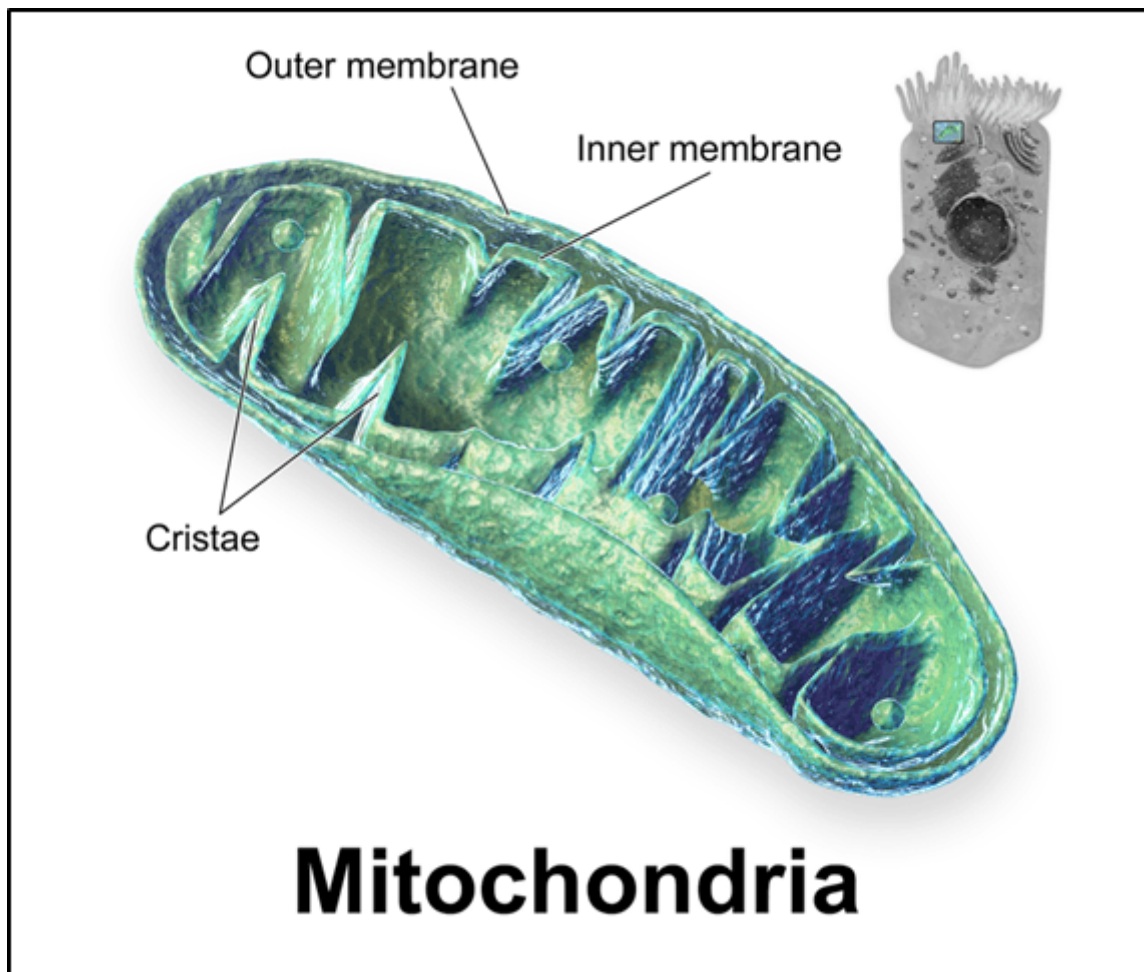
- It also plays a vital role building certain parts of the blood and various hormones like testosterone and Oestrogen.
- It further helps in maintaining an adequate concentration of calcium ions.
- Some of the cellular activities in which it is involved are cellular differentiation, cell signaling, cell senescence, controlling the cell cycle and in cell growth.
- It also helps in detoxifying ammonia in the liver cells.

## Structure of Mitochondria

- In both plant and animal cell, mitochondria are found as a double-membraned, rod-shaped structure.
- The size of the mitochondria ranges from 0.5 to 1.0 micrometer in diameter.
- The structure consists of:
  - Outer membrane
  - An inner membrane
  - A gel-like material called the matrix
- The outer membrane and the inner membrane are made of proteins and phospholipid layers.
- The surface of the mitochondrion is covered by the outer membrane. The large number of special proteins are known as porins.
- As far as ions, nutrient molecules, energy molecules like the ADP and ATP molecules are concerned mitochondria is freely permeable.

## Cristae

- A crista is a fold in the inner membrane of a mitochondrion.
- This helps in increasing the surface area inside the organelle.
- The inner membrane is permeable only to oxygen and to ATP molecules.
- Within the inner membrane of mitochondria, a few chemical reactions take place.

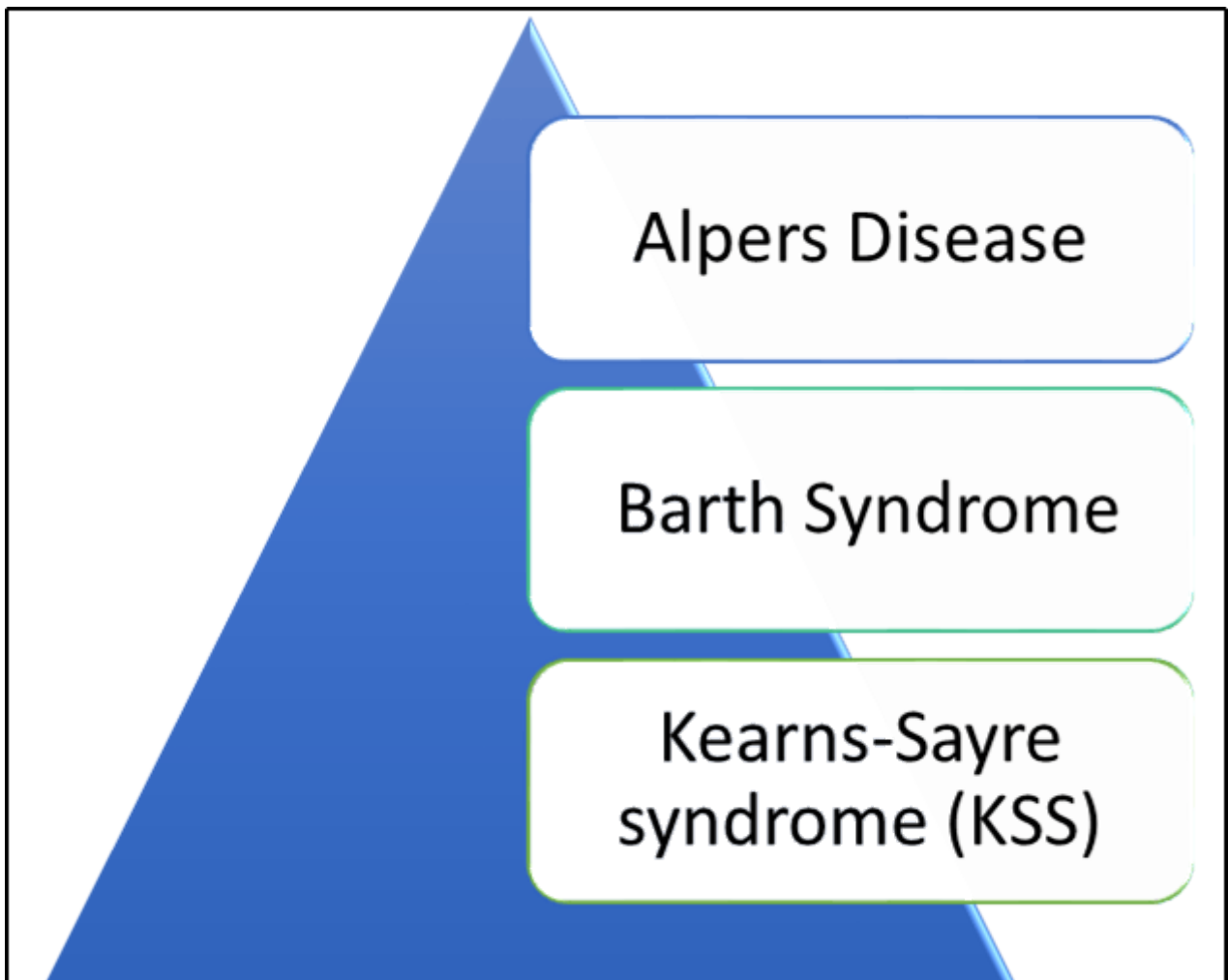


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## Mitochondrial Matrix

- In the mitochondrion, the matrix is the space within the inner membrane.
- This matrix contains a viscous fluid that contains a mixture of enzymes and proteins.
- Ribosomes, inorganic ions, mitochondrial DNA, nucleotide cofactors, and organic molecules are also present.
- The enzymes present in the matrix play an important role in the synthesis of ATP molecules.

# Mitochondrial Diseases



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## FAQs

Q 1. What are cristae?

Answer: The inner membrane of mitochondria with many folds forming a layered structure is known as cristae.

Q 2. What are the three Mitochondrial diseases?

Answer:

Three mitochondrial diseases are:

- i) Alpers Disease
- ii) Barth Syndrome
- iii) Kearns-Sayre syndrome (KSS)

Q 3. List out some of the important functions of Mitochondria.

Answer:

Some of the important functions of Mitochondria are:

- i) To produce energy through the process of oxidative phosphorylation.
- ii) It also promotes the growth of new cells and cell multiplication.
- iii) It regulates the metabolic activity of the cell.
- iv) It also plays a vital role building certain parts of the blood and various hormones like testosterone and Oestrogen.

Q 4. what's the structure of mitochondria?

Answer:

- Mitochondria is a rod-shaped, double membraned organelle.
- It can be found both in plant and animal cells.

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