Eukaryotic cells have a distinct nucleus and posses membrane-bound organelles.

Eukaryotic Cells

The Nucleus:

- exit of mate data in and out of the nucleus and contains the reactions taking place within it.
- Nuclear Pores: allow the passage of large molecules out of the nucleus such as messenger RNA.
- Nucleoplasm: jelly like material that makes up the bulk of the nucleus.
- **Chromosomes:** consist of protein-bound, linear DNA.
- Nucleolus: manufactures ribosomal RNA and assembles the ribosomes.

Functions:

- act as a control centre of the cell through the 1. production of mRNA and tRNA and hence protein synthesis.
- 2. Retain the genetic material of the cell in he form of DNA and chromosomes.
- Manufacture ribosomal RNA and ribosomes. 3.

Mitochondria:

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- Rod shaped organelles. Double membrane around organelle to control the entry and exit of material.
- The inner of the two membranes is folded to form extensions called cristae. •
- Cristae provide a large surface area for the attachment of enzymes and other proteins involved in respiration.
- The matrix: contains proteins/liptor ibosomes and DNA that allow the mitochondria to control the produc- Controls the cells activities.
 The Nuclear Envelope: double membrane that surrounds the nucleus controls the tion of some of their over woteins. Many enzymes involved in respiration are found here.

 - esponeible for the production of the energy-carrier molecule ATP from respiratory substrates such as

The number and size of mitochondria and the number of their cristae, are high in cells that have a high level of metabolic activity and require a plentiful supply of ATP.

Example: Epithelial cells in the intestines require a lot of ATP in the process of absorbing substances from the intestines by active transport.

Chloroplasts:

- Organelles that carry out photosynthesis. They vary in shape and size but are typically disc-shaped.
 - Chloroplast Envelope: double plasma membrane that surrounds organelle. Highly selective over what enters and exits.
- The Grana: stacks of up to 100 disc-like structures called thylakoids that contain the photosynthesis pigment chlorophyll. The grana are where the first stage of photosynthesis occurs (light absorption).
- The Stroma: fluid-filled matrix where the second stage of photosynthesis (synthesis of sugars) occurs.
- They are adapted to their function of harvesting sunlight and carrying out photosynthesis by:
- Granal membranes provide a large surface area for the attachment of chlorophyll, electron carriers and enzymes that carry out the first stage of photosynthesis.
- Fluid of the stroma possesses all the enzymes needed to make sugars in the second stage.
- Chloroplasts contain both DNA and ribosomes so they can guickly and easily manufacture some of the proteins needed.