



Common Ancestry

EVO-2.C.1

Structural evidence indicates common ancestry of all eukaryotes—

- a. Membrane-bound organelles**
- b. Linear chromosomes**
- c. Genes that contain introns**



Eukaryotic DNA is...

- A. Circular & multiple DNA strands**
- B. Linear & multiple DNA strands**
- C. Circular & a single DNA strand**
- D. Linear & a single DNA strand**

Note: single means that it's one DOUBLE stranded DNA molecule

Eukaryotic DNA is...

B. Linear & multiple DNA strands

Note: single means that it's one DOUBLE stranded DNA molecule



Eukaryotes have multiple linear strands of DNA while prokaryotes have a single circular piece of DNA.

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All eukaryotic cells have...

- A. Mitochondria**
- B. Chloroplast**

All eukaryotic cells have...

A. Mitochondria



Eukaryotic cells have membrane bound organelles. Both mitochondria and chloroplasts are membrane bound organelles. Based on the endosymbiotic theory, the chemosynthetic bacteria was engulfed prior to the photosynthetic bacteria.

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Eukaryotic cells have...

A. Nucleoid

B. Nucleus

Eukaryotic cells have...

B. Nucleus



Eukaryotic cells have membrane bound organelles. The nucleus is a membrane bound organelle that surrounds the DNA while the nucleoid is the region of the cytosol in prokaryotes where the DNA is located.

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Why are eukaryotic cells able to be bigger than prokaryotic cells?

- A. Compartmentalization due to membrane bound organelles**
- B. Eukaryotes are more robust to scare the prokaryote away**
- C. Endosymbiotic theory required a larger cell**
- D. My teacher said so**

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Why are eukaryotic cells able to be bigger than prokaryotic cells?

A. Compartmentalization due to membrane bound organelles



Due to the membrane bound organelles, there are compartments that allow for specific reactions to take place in specific locations. This allows for the eukaryotes to be larger than prokaryotes without membrane bound organelles.

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Why can eukaryotic DNA store more information in same DNA amount?

- A. Eukaryotes have introns and no mRNA processing**
- B. Eukaryotes have introns and mRNA processing**
- C. Prokaryotes have introns and no mRNA processing**
- D. Prokaryotes have introns and mRNA processing**

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Why can eukaryotic DNA store more information in same DNA amount?

B. Eukaryotes have introns and mRNA processing



Eukaryotic DNA is linear and located in a nucleus, which is an organelle surrounded by membrane. The process of transcription takes place in the nucleus while the process of translation takes place in the cytosol. Due to this difference in location, the mRNA can undergo processing which cuts out introns and allows for multiple mRNA strands from same pre-mRNA.

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All eukaryotes came from a common ancestor.

- A. True**
- B. False**

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All eukaryotes came from a common ancestor.

A. True



Eukaryotes all diverged from a common ancestor. This explains why all eukaryotes have mitochondria.



**Which organelle is not
membrane bound?**

- A. Golgi Bodies**
- B. Lysosome**
- C. Ribosome**
- D. Rough ER**

Which organelle is not membrane bound?

C. Ribosome



The ribosome is made up of rRNA and protein. There are two parts: large subunit and the small subunit which work together to allow for protein synthesis.

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**Membrane bound organelles are
found in...**

- A. Eukaryotes**
- B. Prokaryotes**

**Membrane bound
organelles are found in...**

A. Eukaryotes



Eukaryotes have membrane bound organelles while prokaryotes do not. This is one of the reasons why the eukaryotic cells is larger than the prokaryotic cell. In addition, the nucleus is found in a eukaryote and not in a prokaryote.

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Which organelle would you find in a prokaryote?

- A. Golgi bodies**
- B. Lysosome**
- C. Ribosome**
- D. Rough ER**

Which organelle would you find in a prokaryote?

C. Ribosome



Prokaryotes do not have membrane bound organelles. The Golgi, lysosome, and rough ER are all membrane bound organelles. The ribosome is composed of mRNA and proteins.

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How does the DNA between prokaryotes and eukaryotes differ?

**How does the DNA
between prokaryotes and
eukaryotes differ?**



Prokaryotes:

Single circular DNA houses in the nucleoid, does not contain introns

Eukaryotes:

Multiple linear DNA strands housed in a nucleus, contains introns



What is an intron?

- A. Coding segment of DNA**
- B. Coding segment of mRNA**
- C. Noncoding segment of DNA**
- D. Noncoding segment of mRNA**

What is an intron?

D. Noncoding segment of mRNA



Introns are noncoding segments of mRNA that are cut out during mRNA processing/splicing.

The expressed information is in the exons.

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**Which are removed during
mRNA splicing?**

- A. Exons**
- B. Introns**

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Which are removed during mRNA splicing?

B. Introns

Exons are expressed information while the introns are noncoding information. Due to the introns having noncoding information, they are removed during mRNA processing called mRNA splicing.



Where in the cell are the introns removed?

- A. Cytosol**
- B. Lysosome**
- C. Nucleus**
- D. Peroxisome**

Where in the cell are the introns removed?

C. Nucleus



The mRNA is synthesized in the nucleus. After it is synthesized before it leaves the nucleus, the post-transcriptional modification takes place which include mRNA splicing.



Which cells have introns?

- A. Eukaryotes**
- B. Prokaryotes**
- C. Both Eukaryotes and Prokaryotes**

Which cells have introns?

A. Eukaryotes



Eukaryotes have introns. They are removed prior to the mRNA leaving the nucleus to be translated in the ribosome.