

ADVANCED BIOLOGY

Cell Organelle Presentation

This assignment asks you and a partner to present the important features of one eukaryotic cell organelle. An excellent diagram illustrating these organelles is found in our text on pages 100-101. See [Cell Structure & Function Introductory Video](#)

Although Chapter 6 discusses the structure and function(s) of organelles, realize that many of the cell structures also appear in chapters that focus on the processes performed by the organelle. You will find a seemingly endless supply of useful information online, including video of relevant cell processes. In addition, Mr. Weiss' text cabinet houses an impressive array of biology and molecular biology books, which can supplement the information obtained in Campbell & Reece.

Your presentation should last approximately 15 minutes in length.

The information shared should address the following questions:

Note the small number of additional questions, specific to the structure/function of each cell organelle.

- ***What is the structure of this organelle?***
- ***How does the structure of this organelle contribute to the performance of its functions(s)? Make clear how the execution of function aids the cells and / or organisms in which the organelle is found.***
- ***Is this organelle found in large quantities in specific tissues or within specific groups of organisms?***
- ***How can the organelle be compared either structurally or functionally with a "real world" example? The connection between your example and the organelle studied should be clear to your audience.***

A small amount of in-class research time will be provided to allow your work to "get off the ground" under your teacher's guidance.

The first presentations will begin during the week of October 21.

Regarding presentation slides:

- Each slide should include overview points being made, as well as at least one visual aid.
- Links to videos should state the topic (or video title), and not exceed a few minutes.
- Sources need to be cited for both oral & visual information on the slide immediately when used;

Creativity is encouraged in your presentation, but not at the expense of your classmates' understanding of the material. Participation in your classmates' presentations is expected.

Additional expectations regarding your work include:

- A handout of summary notes in order to allow the class to be more engaged in your presentation;
- A depth of content in line with the expectations of an Advanced Biology course;
- References to your notes, *without continuous reading to the class*, showing a reasonable comfort level with the material you have learned.

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Cell Organelle Presentation Project: Supplemental Topics

Each organelle has associated topics that should be addressed during your presentation. See your assigned cell part listed below. Incorporate the listed points in your discussion.

Nucleus:

- Note the structure of nuclear membrane, pore complexes, and nuclear lamina
- Highlight chromosome structure
- Note the events of *transcription* – utilize online activity 17.2
- Note that the nucleolus will be discussed by ribosome presenters

Ribosomes:

- Address the synthesis of ribosomes by nucleoli
- Note the functional importance, noting the presence of ribosomes in both prokaryotes and eukaryotes
- Note the relationship between ribosomes and other organelles in cells
- Note the events of *translation* – utilize online activity 17.4

Rough Endoplasmic Reticulum:

- Note the prominence within eukaryotic cells
- Note the functional connections with other organelles – nucleus, ribosomes, Golgi complexes
- Note how proteins are tagged to move ribosomes to the RER surface

Golgi Apparatus:

- Note the *cis* face of the Golgi vs. *trans* face of the Golgi
- Note the orientation within the cell cytoplasm, relative to the RER and the interior cell membrane
- Highlight *the endomembrane system*, where the Golgi is the culminating step leading to exocytosis

Smooth Endoplasmic Reticulum

- Note the structural and functional distinction from the RER
- Highlight the functional specializations in specific cells within the body

Vacuoles:

- Highlight the importance of the large central vacuole seen in plant cells
- Note the diversity of vacuolar types: food vacuoles, contractile vacuoles' role in *osmoregulation*, peroxisomes
- Contractile vacuole video: <https://www.youtube.com/watch?v=9Ynm5ZOW59Q> (paramecium)

Lysosomes:

- Involvement with vacuoles during intracellular phagocytosis and pinocytosis
- Role of lysosomes during *autophagy* – skin between fingers of human embryos
- Lysosomal storage diseases: examples, consequences

Mitochondria: (You are *not* responsible for detailing the biochemical steps of cell respiration!)

- Note the role of the mitochondria during two of the three phases of cell respiration
- Structural importance of the highly folded cristae
- Summarize the **endosymbiotic** origin of mitochondria within eukaryotic cells:
<https://learn.genetics.utah.edu/content/cells/organelles/>
- The unique inheritance pattern of mitochondrial DNA

Chloroplasts: (You are *not* responsible for detailing the biochemical steps of photosynthesis!)

- Note the role of the chloroplasts during the two phases of photosynthesis
- Note the role of the thylakoids and the stroma during the reactions of photosynthesis
<https://www.youtube.com/watch?v=pwymX2LxnQs> (structural appreciation)
- Acknowledge the **endosymbiotic** origin of chloroplasts, just shared by mitochondria presenters:
<https://learn.genetics.utah.edu/content/cells/organelles/>
<http://www.sumanasinc.com/webcontent/animations/content/organelles.mp4>

Cytoskeleton:

- Note Table 6.1 of our text for an excellent overview of cytoskeletal components
- Note the diversity of cytoskeletal protein structure and function
- Note the functional connections between centrosomes and centrioles

Cilia and Flagella:

- Note the structural and functional distinctions between these two organelles
- Note the evolutionary “uniformity” of internal ciliary and flagellar structure (*9 + 2 arrangement*)
- Cilia video: <https://www.youtube.com/watch?v=9Ynm5ZOW59Q> (paramecium)

Intercellular Junctions:

- Structural and functional distinctions between tight Junctions, desmosomes, and gap junctions
- Note the role of plasmodesmata in plant cells
- Utilize online activity 6.7 – *Cell Junctions*
- Note plant cell wall formation and structure

ADVANCED BIOLOGY: Organelle Presentations

Class:

Cell Organelle	Student Presenters	Expected Date
Nucleus		
Ribosomes		
Rough endoplasmic reticulum		
Smooth endoplasmic reticulum		
Golgi apparatus		
Vacuoles		
Lysosomes		
Chloroplasts		
Mitochondria		
Cytoskeleton		
Cilia & Flagella		
Intercellular junctions		

Recall that your presentations are not merely to display your expertise at understanding the structure and function of your assigned organelle. You have a responsibility to teach your classmates this information as well. *The two major pitfalls of students past are speaking too quickly and reading too much.* Please do your best to avoid these barriers to successful teaching and learning. Refer to your original assignment sheet for the requirements on which you will be graded.