

ADVANCED BIOLOGY

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