

# Introduction to Botany. Lecture 10

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# Outline

1 Questions and answers

2 Plant cell

- Cell boundaries



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# Previous final question: the answer

What is the symbiogenesis?



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What is the symbiogenesis?

- Making two organisms from one
- Engulfing purple bacteria which became mitochondria

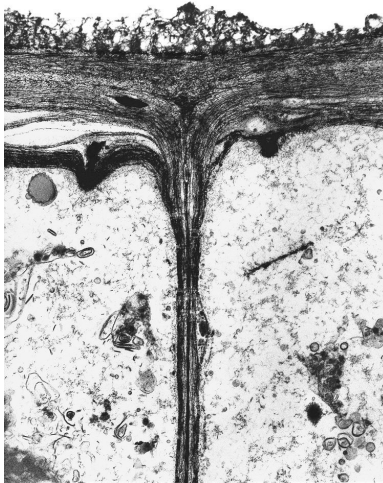


# Plant cell

## Cell boundaries



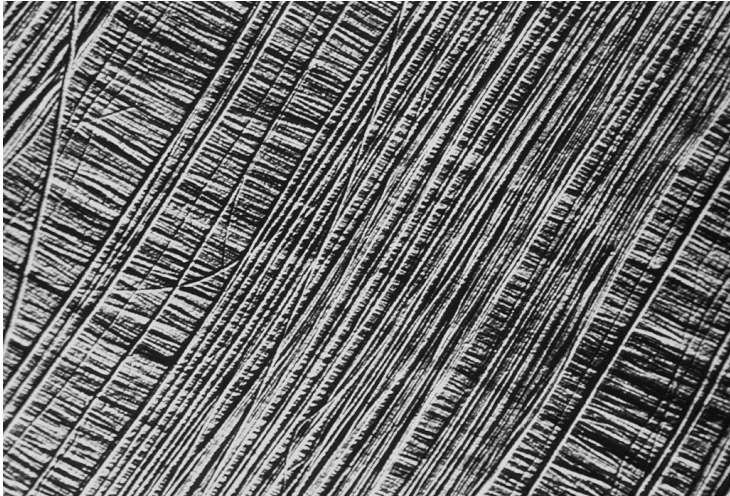
# Cell wall 1



Root cells of an onion showing the cell wall (TEM  $\times 47,000$ )



# Cell wall 2



Cellulose fibers in the plant cell wall (SEM)



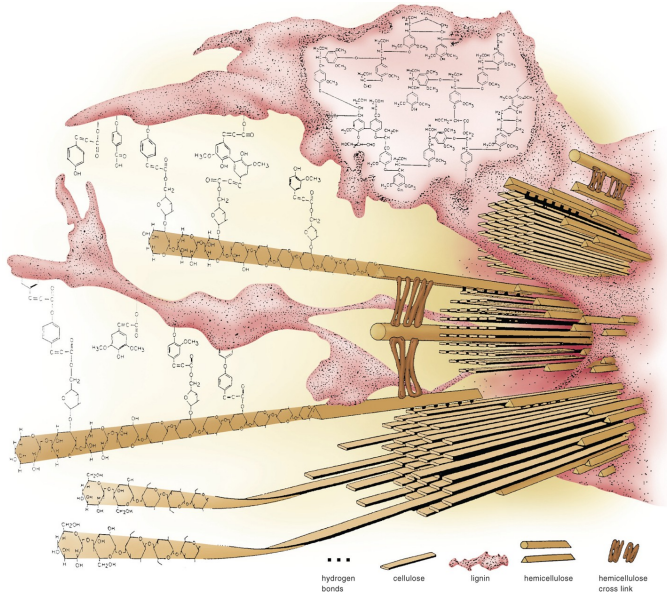


# Primary and secondary cell walls

- **Primary cell wall** consists mostly of cellulose and proteins, they are thin and flexible
- **Secondary cell wall** includes hydrophobic lignine and suberine; this inclusion leads to the death of cell. However, dead cells are very useful for plants



# Secondary cell wall: molecules



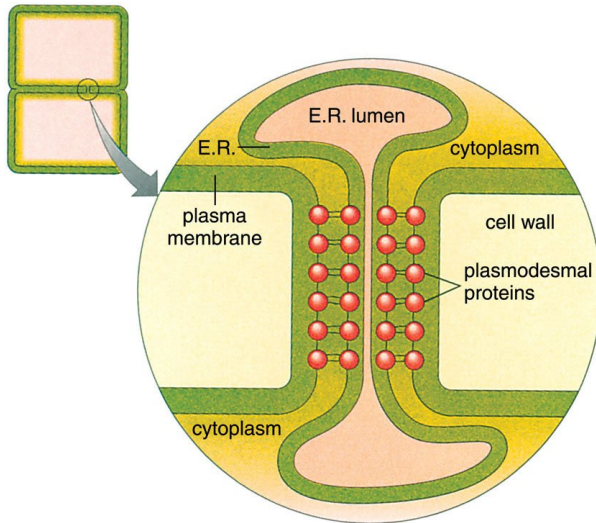
# Plasmodesmata 1



Plasmodesmata in a corn leaf between a mesophyll cell and a bundle sheath cell (TEM)



# Plasmodesmata 2



E.R. = endoplasmic reticulum (endoplasmic network)



# Vacuoles, osmosis and turgor pressure

- If cell vacuoles contain more concentrated solution of salts then water surrounding cell (i.e., water outside is *hypotonic*), water will flow inside a cell. It is called **osmosis**
- Cell wall prevents cell from explosion due to high **turgor pressure**
- When water flows outside a cell, cell content will shrink: this is **plasmolysis**



# Symplast and apoplast

- **Symplast** — name for continuous cytoplasm in set of cells
- **Apoplast** — space outside cell; area of considerable metabolic activity



# Final question (2 points)



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List at least two differences between plant and animal cells.





# Summary

- Vacuole, chloroplasts and cell wall are three most important cell parts specific to plants.
- There are **two ways** of moving things between plant cells: through symplast or through apoplast



# For Further Reading



A. Shipunov.

*Introduction to Botany* [Electronic resource].

2010—onwards.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_154](http://ashipunov.info/shipunov/school/biol_154)



Th. L. Rost, M. G. Barbour, C. R. Stocking, T. M. Murphy.

*Plant Biology*. 2nd edition.

Thomson Brooks/Cole, 2006.

*Chapter 3.*

