Introduction to Botany. Lecture 20

Alexey Shipunov

Minot State University

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Outline

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1. Questions and answers
2. Tissues
   - Secondary cover: periderm
   - Step five: pumps. Absorption tissues
   - In addition: secretory tissues
3. Leaf
   - Leaf morphology

Previous final question: the answer

What are more primitive states for xylem and phloem, respectively?

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What are more primitive states for xylem and phloem, respectively?

- Xylem: tracheids
- Phloem: sieve tubes with nuclei and no companion cells

Xylem vs. Phloem

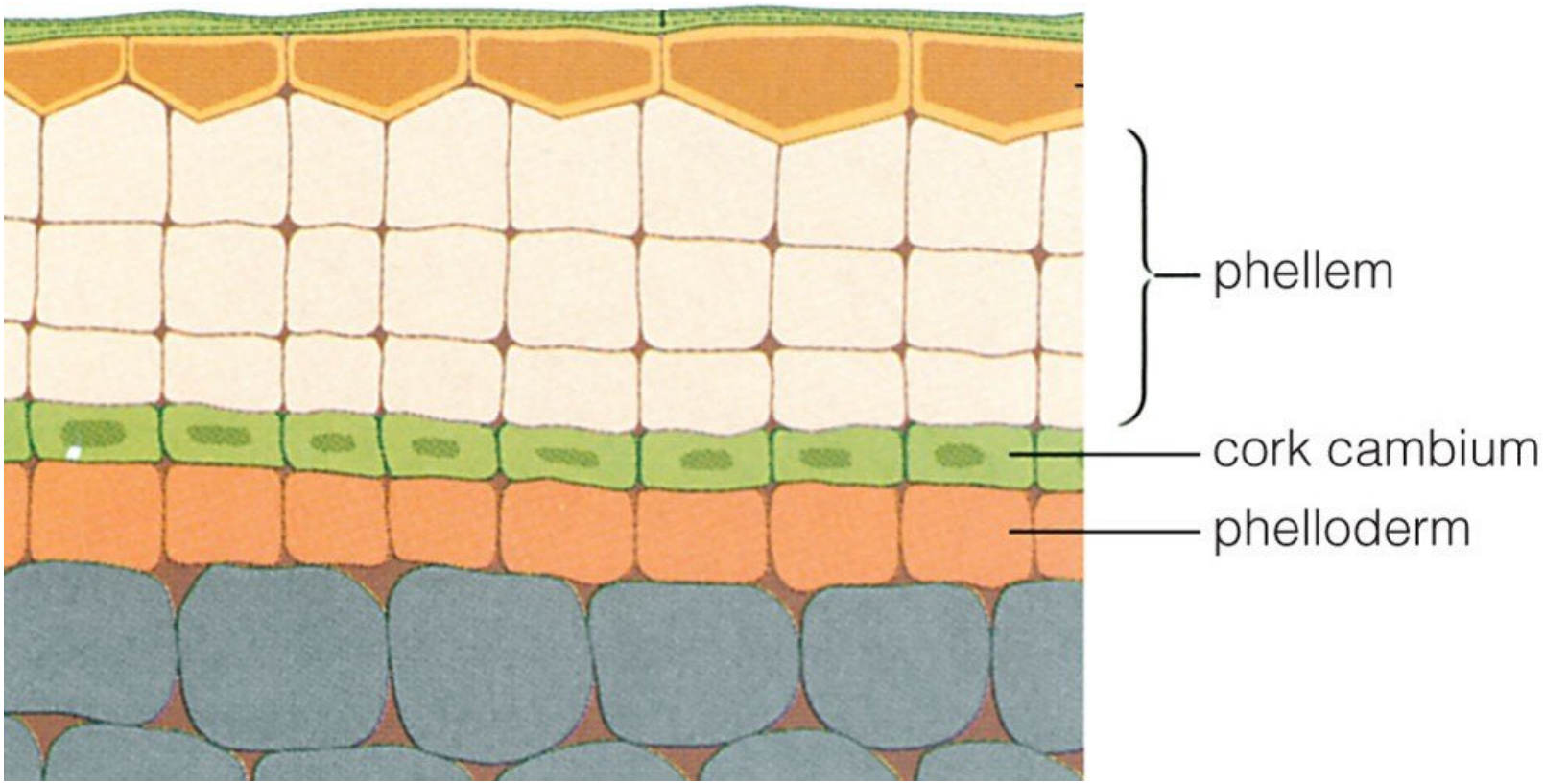
- **State**: dead vs. living cells
- **Transport**: water vs. sugar
- **Direction**: up vs. down
- **Biomass**: big vs. small

Tissues
Secondary cover: periderm

Secondary dermal tissue: Periderm

- Secondary dermal tissue
- Arises inside the stem ground tissue (cortex), closer to surface
- Complex tissue: includes phellem (cork in the strict sense), cork cambium (phellogen), and phelloderm
- Old periderm includes some other tissues and becomes a bark
- Cells of phellem are dead cells rich of suberin
- Main function is defense

Three cell types of periderm



Cork cambium is another lateral meristem; *phellem* and *phelloderm* are main components of periderm

Tissues

Step five: pumps. Absorption tissues

Poikilo- and homoiohydricity

- **Poikilohydric** plants do not save water, they survive even complete desiccation
- **Homoiohydric** plants save water, they always have similar water content and do not survive after desiccation
- Compare with poikilo- and homoiothermic animals (reptiles vs. mammals)

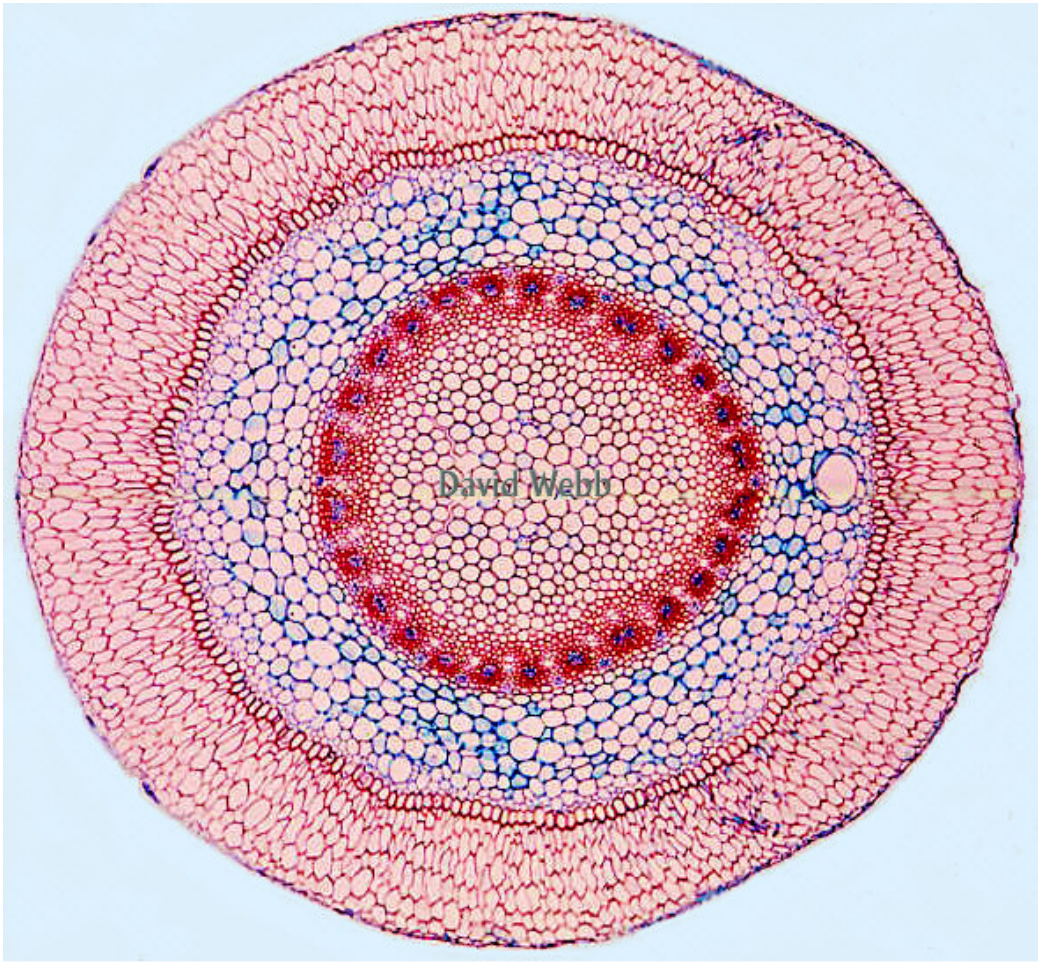
Absorption tissues

- Always primary, simple tissues
- **Rhizoderm**, or root hairs, originates from protoderm, but life span is much shorter than of epidermis
- **Velamen**, originates from root cortex

Rhizoderm

Root hairs of grass seedlings (LM)

Velamen



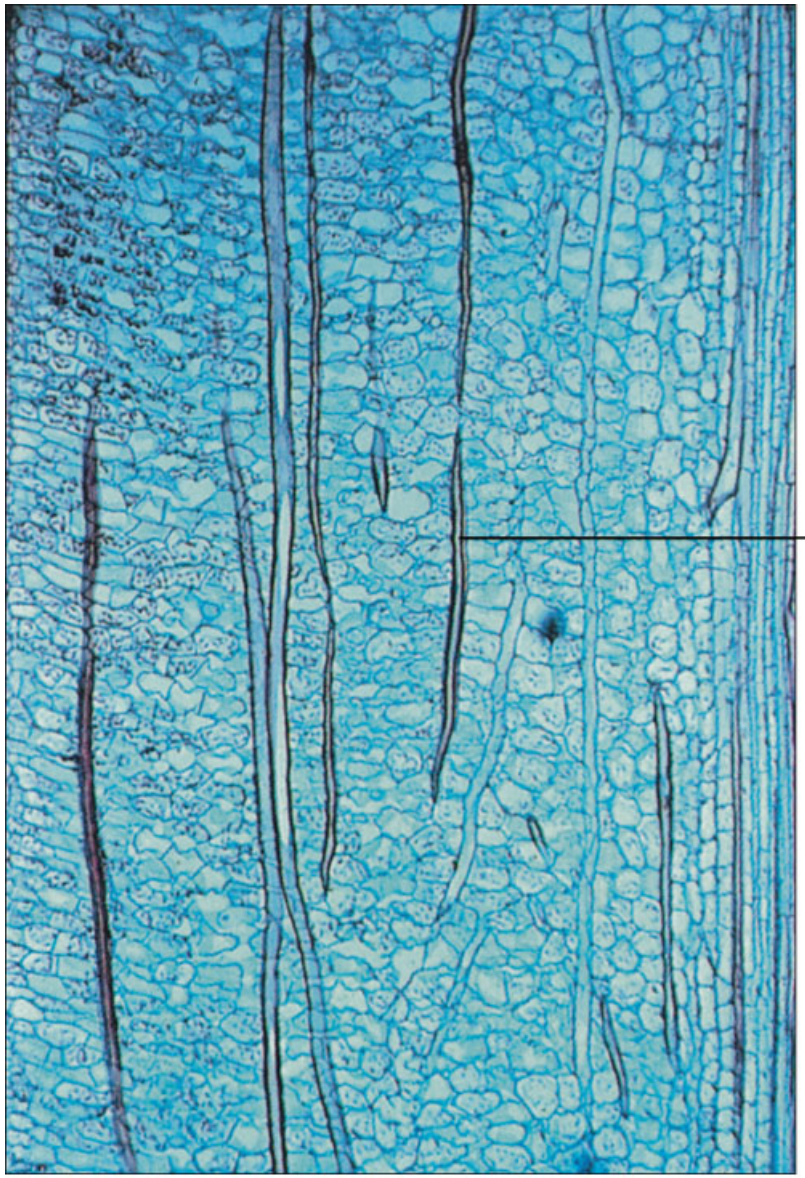
Outer cylinder is a velamen tissue of orchid root (LM, © D. Webb)

Tissues
In addition: secretory tissues

Secretory tissues

- Primary, simple or complex tissues
- Spreading across plant body, concentrating in leaves and young stems
- May secrete latex, volatile oils, mucus and other chemicals
- Functions vary: attraction or dis-attraction, communication, defense etc.

Laticifers



Leaf
Leaf morphology

Definition, functions and features

- Lateral flattened organ of shoot with restricted growth
- Functions:
  - Photosynthesis
  - Respiration
  - Transpiration
  - Synthesis of secondary chemicals
- Features:
  - Have bud in the axil (remember compound leaves)
  - Do not grow by apex
  - Do not produce new leaves
  - Have hierarchical morphology

Final question (2 points)

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Please give an example of a **secondary complex** tissue.

Summary

- Xylem and phloem transport water and organic compounds, respectively
- **Secondary tissues** originate from lateral meristems (i.e., cambium)
- **Homoiohydric** plants have (among others) **absorbtion** tissues which take water from soil

For Further Reading

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