

Introduction to Botany. Lecture 16

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1 Questions and answers

2 Tissues

- Origin of tissues
- Tissues basics
- First tissues: parenchyma and epidermis



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2 Tissues

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Previous final question: the answer

Describe the difference between diplont and sporophyte

- All sporophytes are diplonts but not all diplonts are sporophytes
- Sporophyte is a diplont of plants₂ (Vegetabilia)



Tissues

Origin of tissues



Origin of tissues and organs of plants: first steps



Origin of tissues and organs of plants: first steps

Why did plants go to the land? Which problems did they meet and how did they resolve them? What was the plant way of acquiring tissues comparing with animals?



Tissues

Tissues basics



Definition of tissues and organs

- **Tissue** is a union of cells which have common origin, function, and similar morphology
- **Organ** is a union of different tissues which have common function(s) and origin



Simple and complex tissues

- **Simple tissues** have only one kind of cells
- **Complex tissues** have more than one cell type. This tissue type is unique for plants



Tissues

First tissues: parenchyma and epidermis

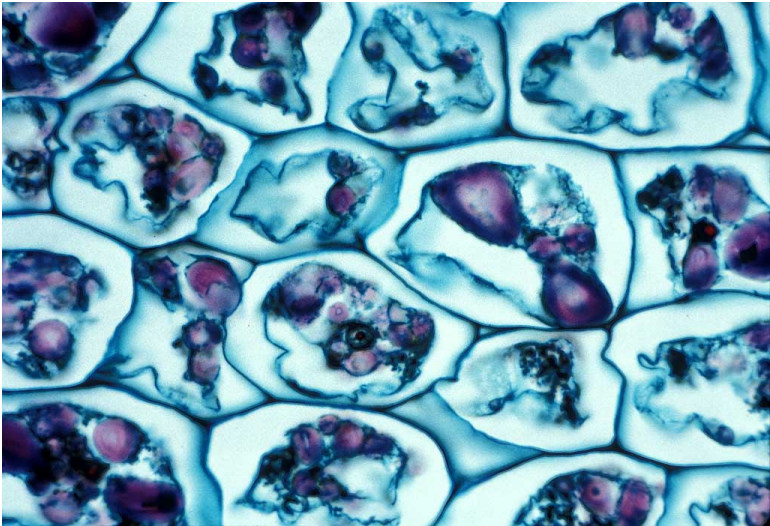


Parenchyma (ground, main tissue)

- Spherical or elongated cells
- Thin primary cell wall
- Sometimes, crystal inclusion bodies
- Main functions: photosynthesis and storage



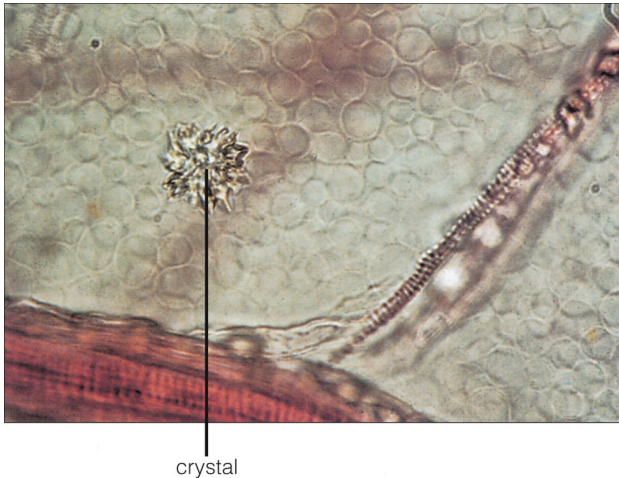
Parenchyma cells of a potato



Parenchyma cells of a potato; the central cell shows obvious nucleus with starch stained purple (LM $\times 83$)



Parenchyma with crystals

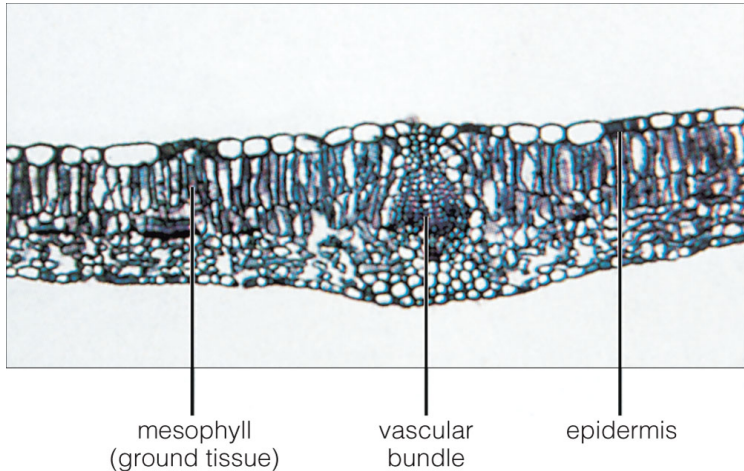


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Parenchyma cells often include crystals (e.g., of calcium oxalate)



Photosynthetic parenchyma



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Photosynthetic parenchyma in lilac (*Syringa vulgaris*) leaf

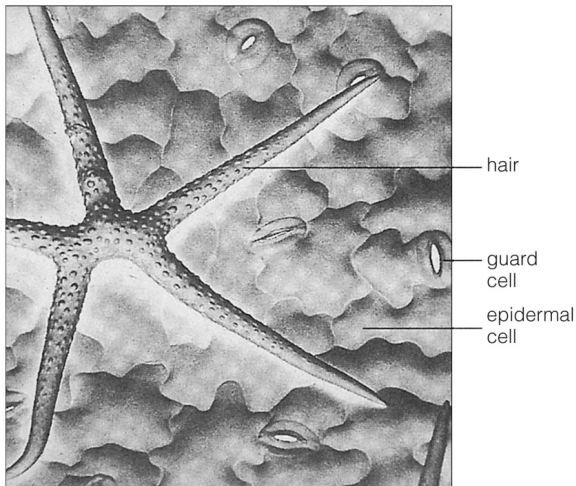


Epidermis: the complex tissue

- Complex tissue of different cell types:
 - 1 Epidermal cells
 - 2 Stomata cells:
 - Guard cells
 - Subsidiary cells
 - 3 Trichomes
- Shapes and chemical compounds vary
- Main functions: gas exchange, transpiration, defense



Epidermal cells

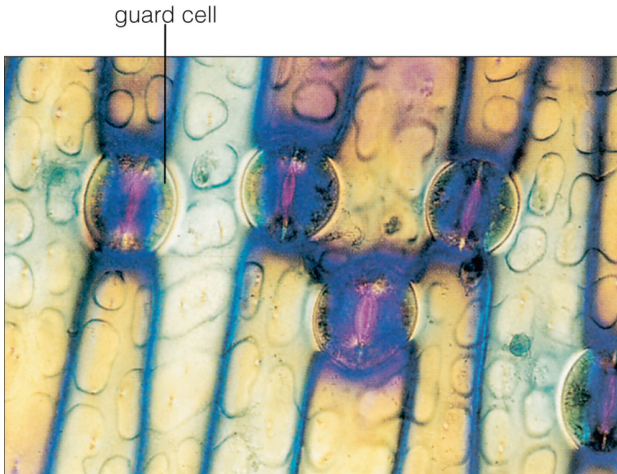


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Three kinds of Shepard's purse (*Capsella bursa-pastoris*) epidermal cells



Stomata



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Stomata with guard cells and pores (*Iris* sp.)



Summary

- **Zygotic** life cycle has no *diplont*, **gametic** life cycle has no *haplont*, **sporic** life cycle has both *haplont* and *diplont*
- The structure of plant body, its organs and tissues is a result of land colonization
- **Complex tissues** have different cell types, **secondary tissues** originate from lateral meristems (i.e., cambium)
- **Parenchyma**, or ground tissue, is a main component of young plant organs
- **Epidermis** is a complex tissue which includes stomata



For Further Reading



A. Shipunov.

Introduction to Botany [Electronic resource].

2015.

Mode of access:

http://ashipunov.info/shipunov/school/biol_154

