

Introduction to Botany. Lecture 17

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1 Questions and answers

2 Tissues

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



1 Questions and answers

2 Tissues

- Origin of tissues
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Results of Exam 2: statistic summary

Summary:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	NA's
27.00	51.75	64.50	62.69	77.50	109.00	3

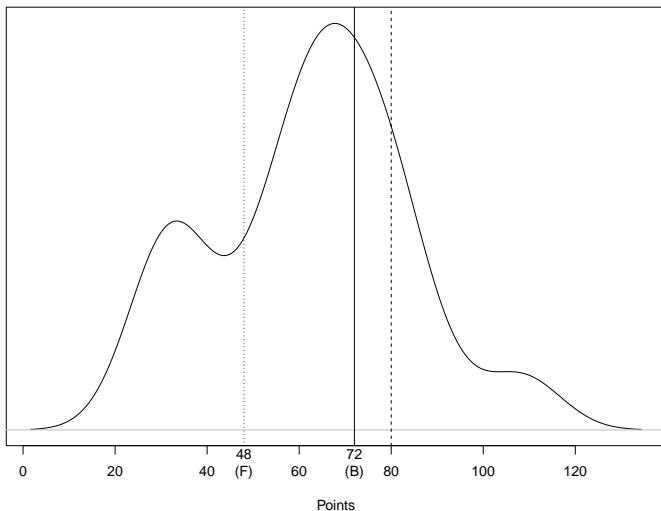
Grades:

F	D	C	B	max
48	56	64	72	80



Results of Exam 1: the curve

Density estimation for Exam 2 (Biol 154)



1. Two motile but unequal cells fused during syngamy. How to call these cells?
 - A. “+” and “-”
 - B. **Male and female**
 - C. Spermatozoon and oocyte
 - D. All of above
7. Which of the following is NOT associated with a chloroplast?
 - A. Double membrane system
 - B. DNA
 - C. Ribosomes
 - D. **Cell wall**
 - E. Chlorophyll
46. Multicellular organisms:
 - A. **Could function without specialized cells**
 - B. Always have specialized reproductive cells
 - C. Always have specialized tissues



Previous final question: the answer

Why is diplont better?



Previous final question: the answer

Why is diplont better?

- Delaying the effect of recessive lethal mutations
- Diverse alleles (variants of one gene) increase adaptability
- In theory, better adapted for the intensive protein production



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

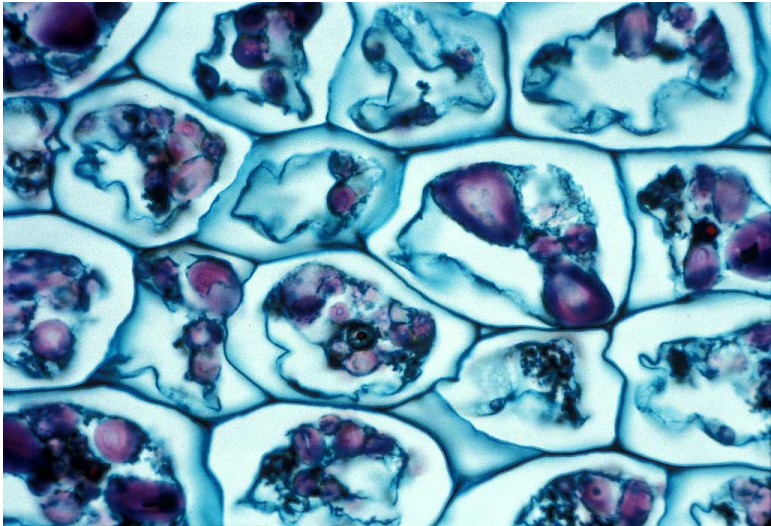


Parenchyma (ground, main tissue)

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



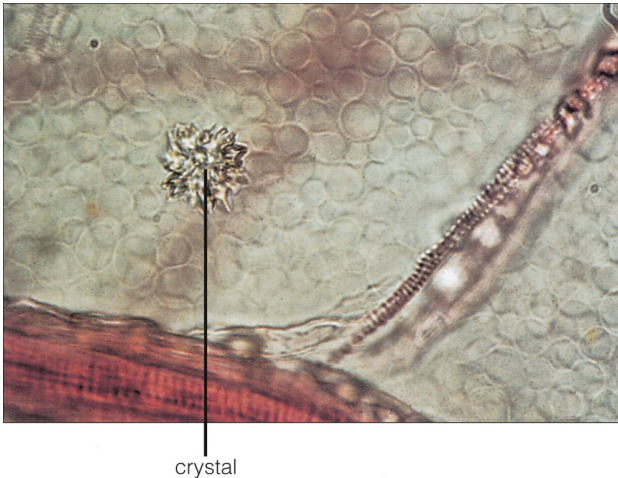
Parenchyma cells of a potato



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



Parenchyma with crystals

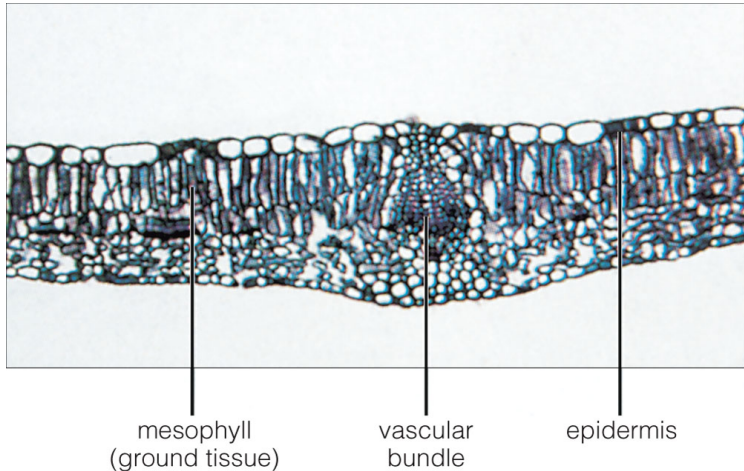


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Parenchyma cells often include crystals (e.g., of calcium oxalate)



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

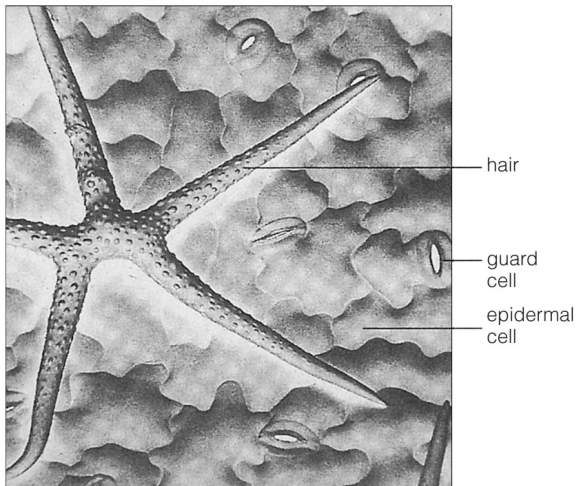
Subsidiary cells

Trichomes

- Shapes and chemical compounds vary
- Main functions: gas exchange, transpiration, defense



Epidermal cells

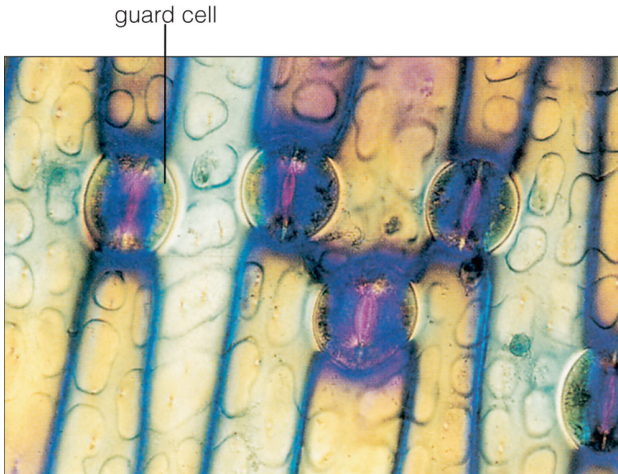


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Three kinds of Shepard's purse (*Capsella bursa-pastoris*) epidermal cells



Stomata



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



Final question (2 points)



Final question (2 points)

How are plant tissues different from animal tissues?



Summary

- 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].

2010—onwards.

Mode of access:

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 4.

