

Ministry education and Science of Republic of Kazakhstan
Karaganda State University named after academician Ye.A.
Buketov

Biological and geographical faculty

Botany Department

Course – Botany

Specialty - 5B011300 – «Biology»

Lecture № 2

Meristem and cover tissues. Constant tissues: transport, mechanic

(1 hour)

Lecturer: candidate of biological science, associated professor
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Podophyllum peltatum L.
Image processed by Thomas Schoepke
www.plant-pictures.de

Plan of lecture:

- 1 Meristem tissue **ткани**, classification, location and function.
- 2 Basic tissues, their function.
- 3 Covering tissues. Primary, secondary and tertiary covering tissues.
- 4 Excretory tissues.
- 5 Mechanic tissues. Collenchymas, sclerenchymas and sclereids.
- 6 Transport tissues: xylem and phloem. Type of transport bundles.

Basic literatures:

- 1 Бавтуто Г.А. Практикум по анатомии и морфологии растений. – Минск: Новое знание, 2002. – 185 с.
- 2 Родман А.С. Ботаника. – М.: Колос, 2001. - 328 с.

Additional literatures:

- 1 Ишмуратова М.Ю. Ботаника. Учебно-методическое пособие. - Караганда: РИО Болашак-Баспа, 2015. - 331 с.
- 2 Тусупбекова Г.Т. Основы естествознания. Ч. 1. Ботаника. – Астана: Фолиант, 2013. – 321 с.

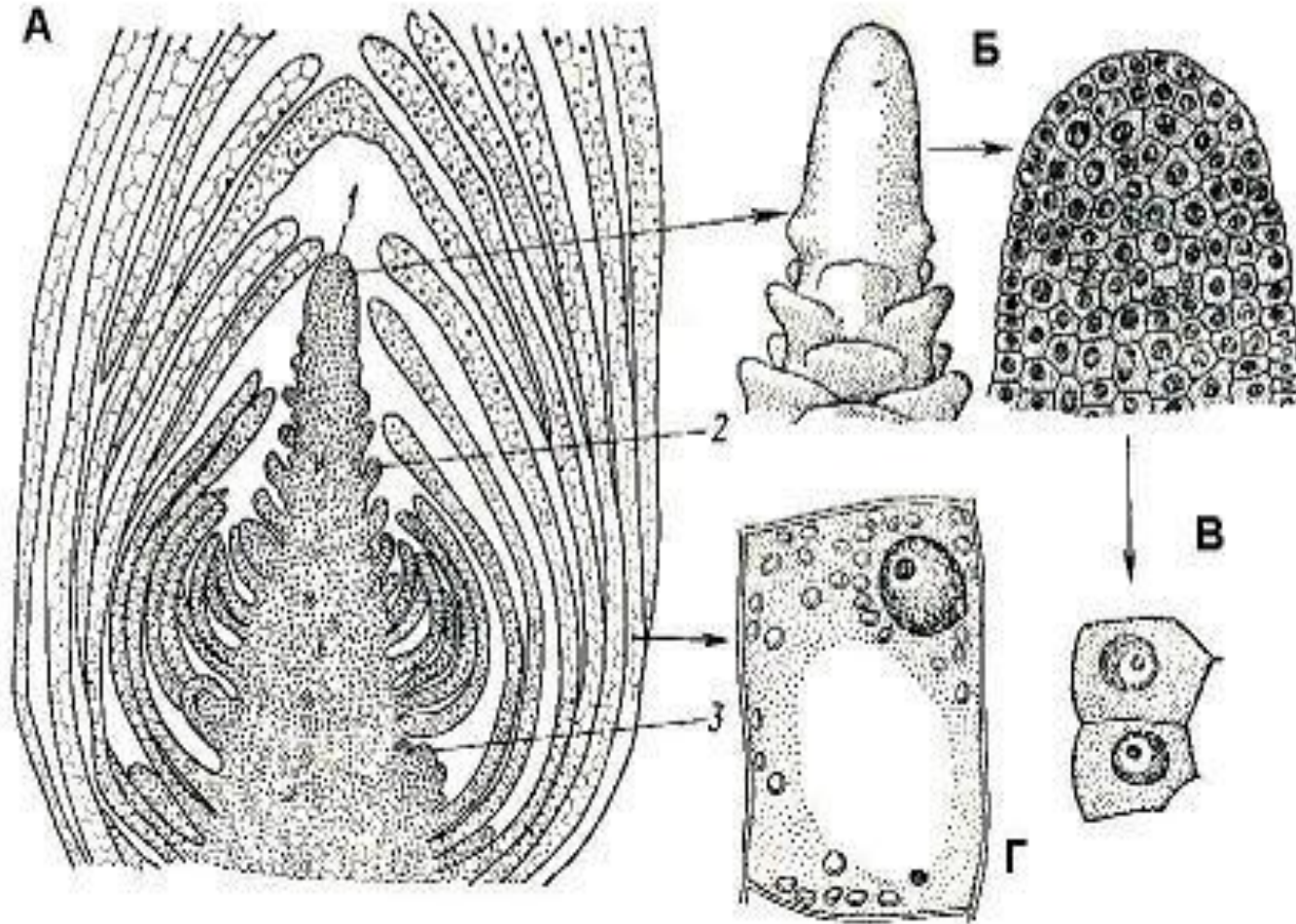
Classification of meristem tissues

By origin: 1) *primary meristems*, which are origin from meristems of embryo;

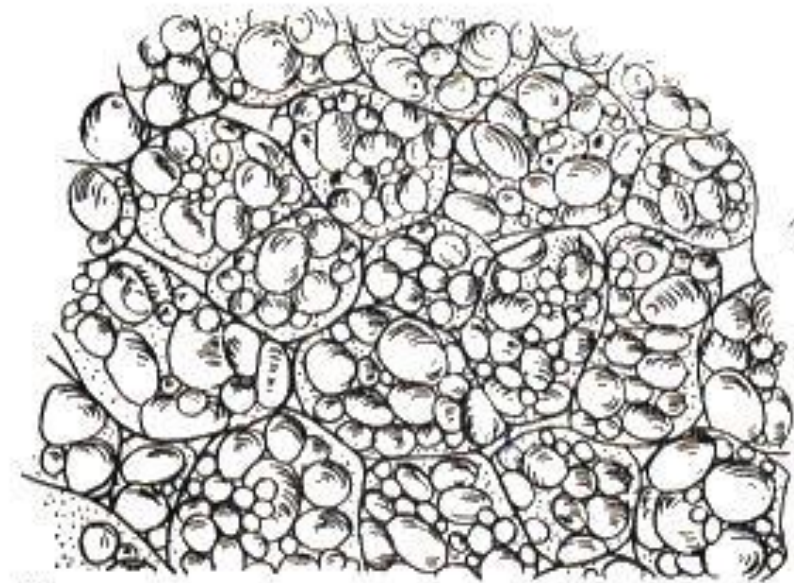
2) *Secondary meristems*, which are created from - or primary meristems, or de-differentiating of basic tissues.

By place of location are separated four types of meristems: 1) *apical*; 2) *lateral*; 3) *intercalary*; 4) *wound*.

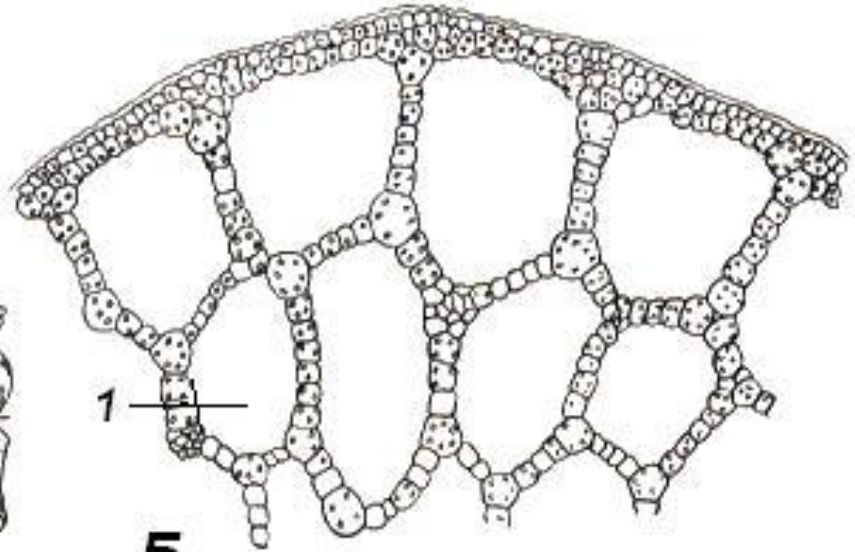
Apex meristem of shrank of Elodea



A – lateral cut; Б – lateral cut of cones of growing; B – cells of primary meristem; Г – parenchyma cell of leaf, finished differentiating; 1 – cone of growing; 2 – primordium of leaf; 3 – primordium of shrank



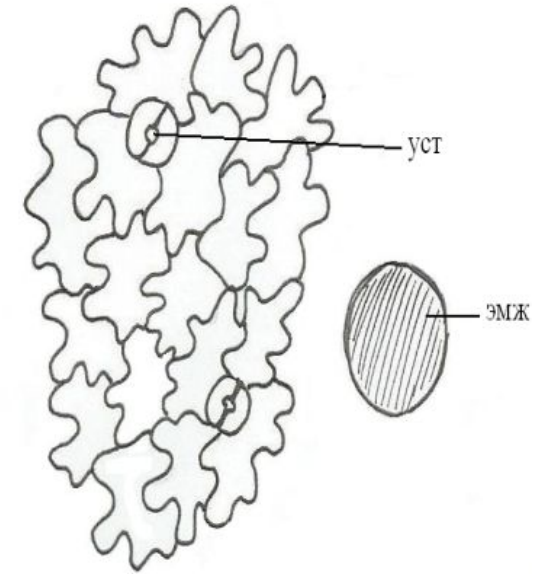
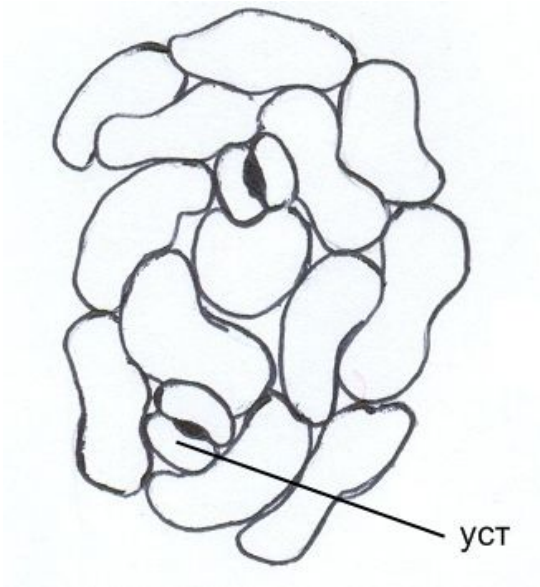
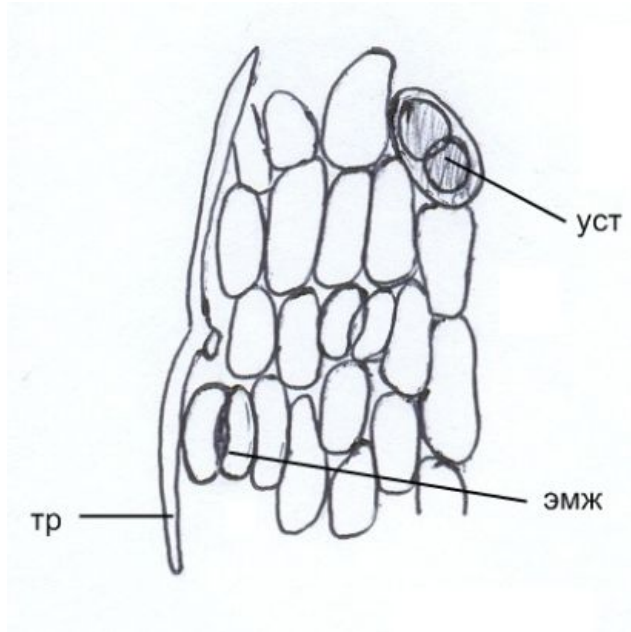
A



Б

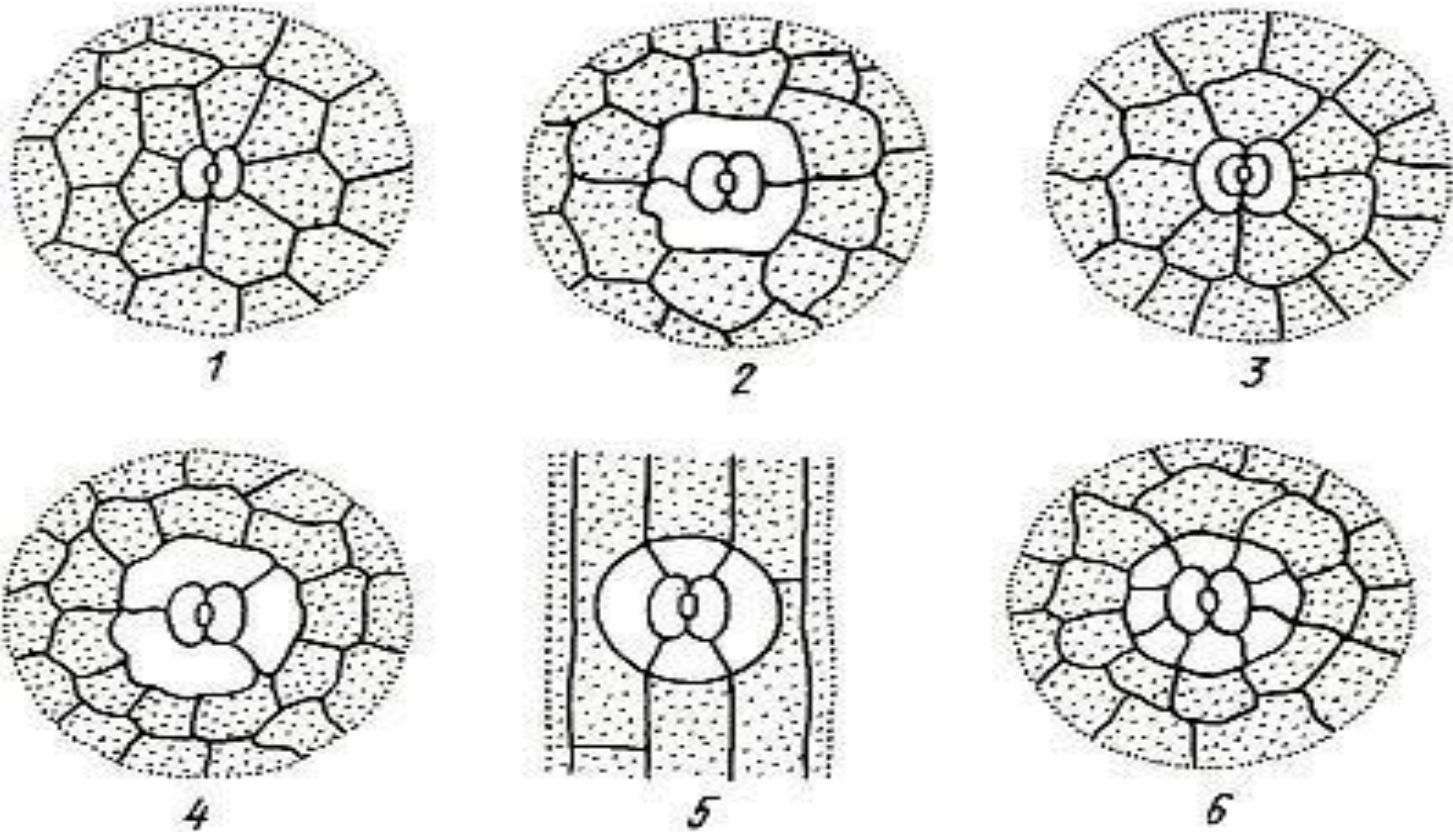
Storage parenchyma of potato (A) and airenchyma of stalk of pondweed (Б); 1- exo-cellular stretch

Structure of epidermis of different plants



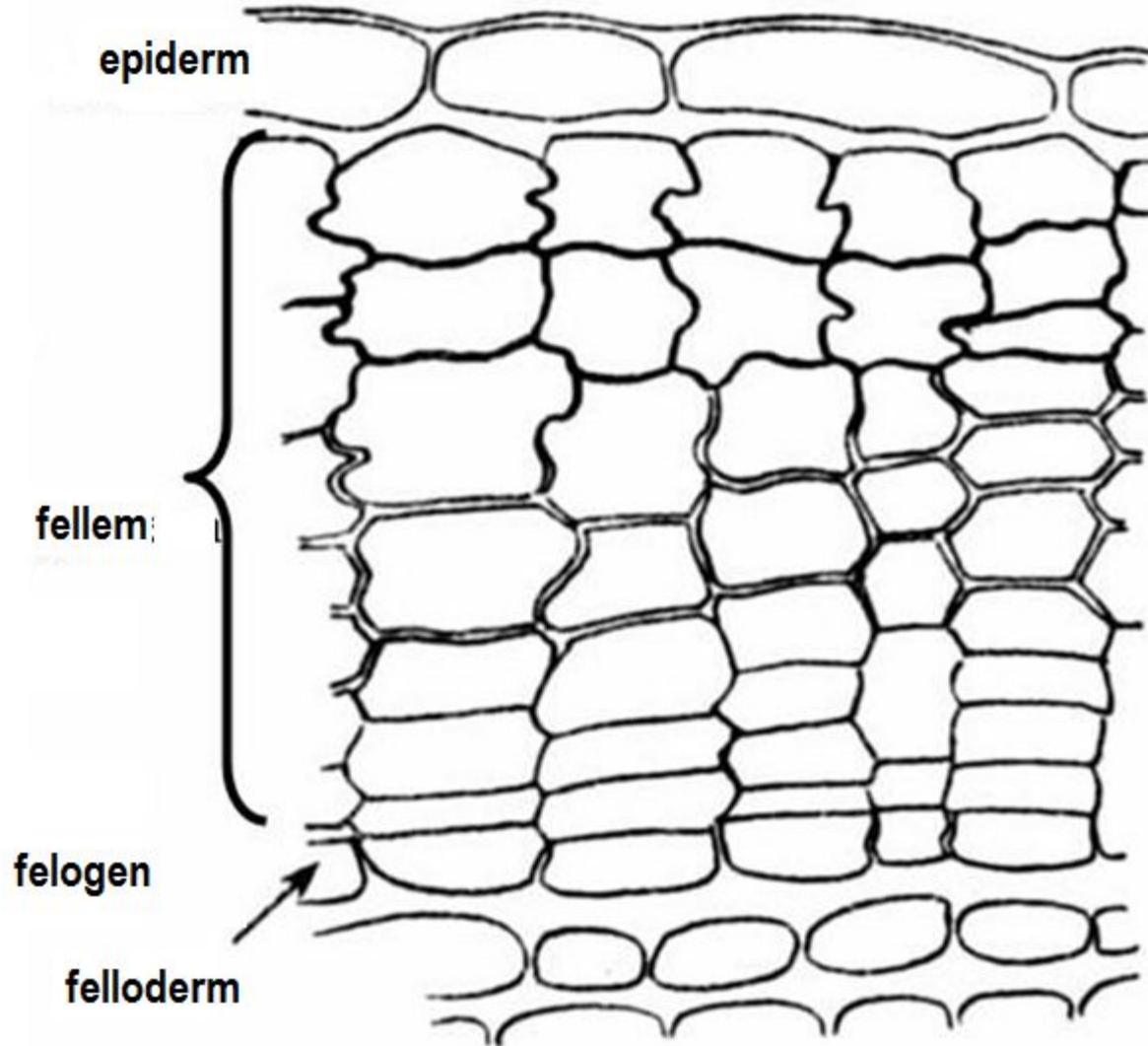
Тр – trichomes, уст – stoma, эмж – essential oil glandular

Types of stoma apparatus of plants

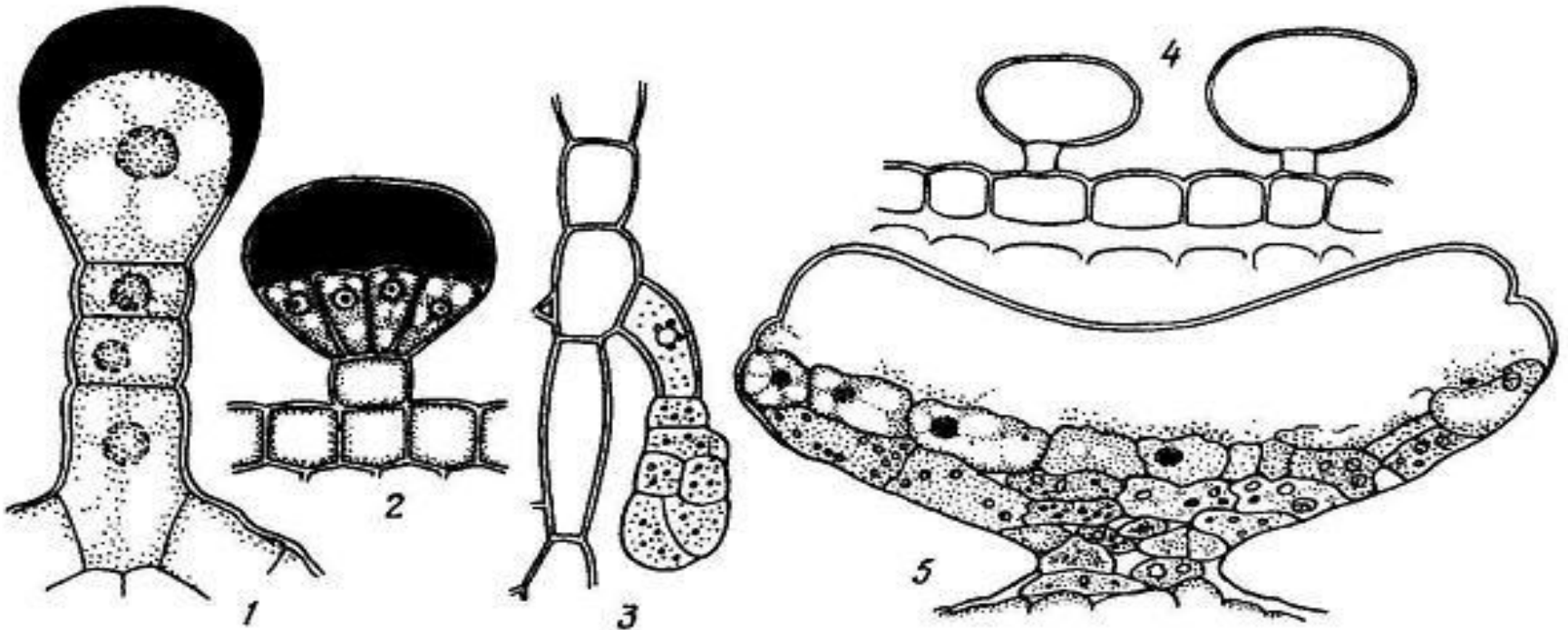


1 – anomocytous; 2 – diacytic; 3 – paracytic; 4 – anisocytous;
5 – tetracytic; 6 – encyclocytous

Structure of periderm of stalk of elder

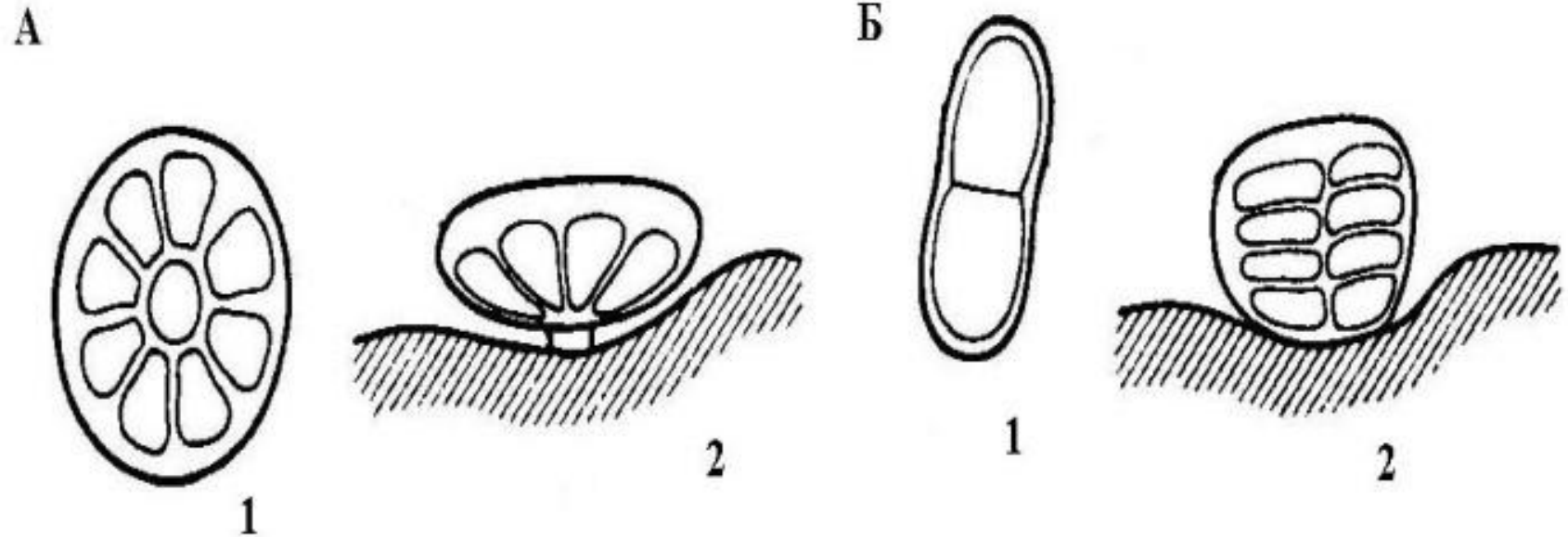


Glandular trichomes and glandulars



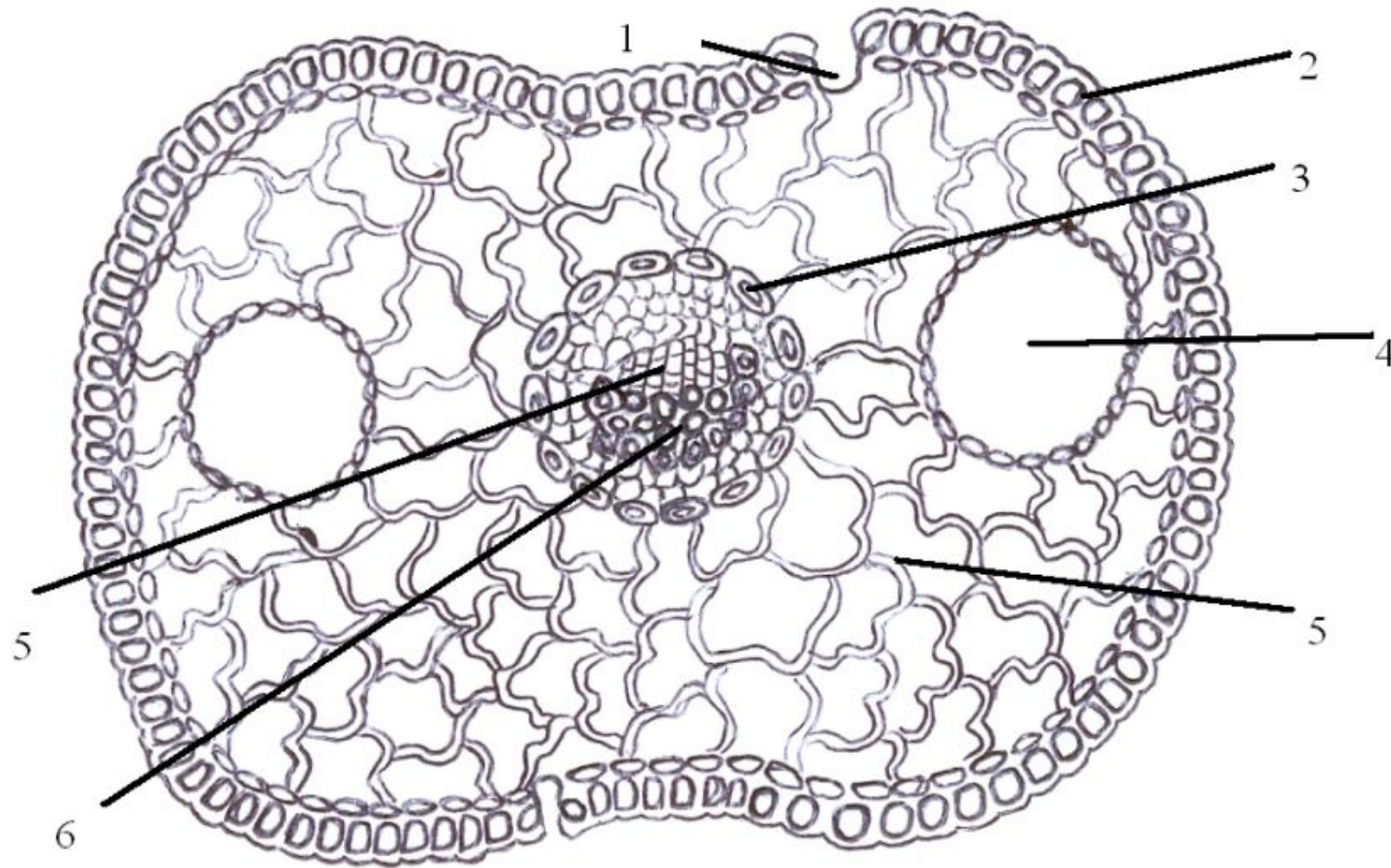
1- trichome of *Pelargonium* with essential oil, extracted under cuticula; 2 – glandular of *Rosmarinum*; 3 – trichome of potato; 4 – bubble trichomes of *Atriplex* with water and salt inside vacoules; 5 – glandular of leaf of *Ribes nigrum*

Structure of essential oil glandular of plants



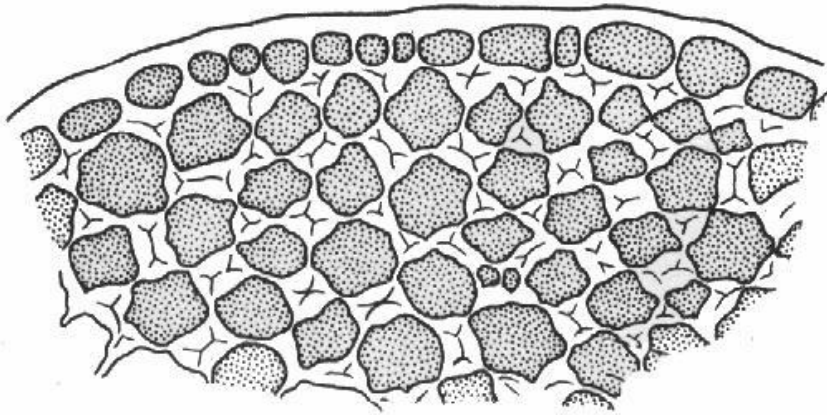
1 - view with cover; 2 – lateral view, A – Lamiaceae,
B - Asteraceae

Cross-cut of leaf of *Juniperus sabina*

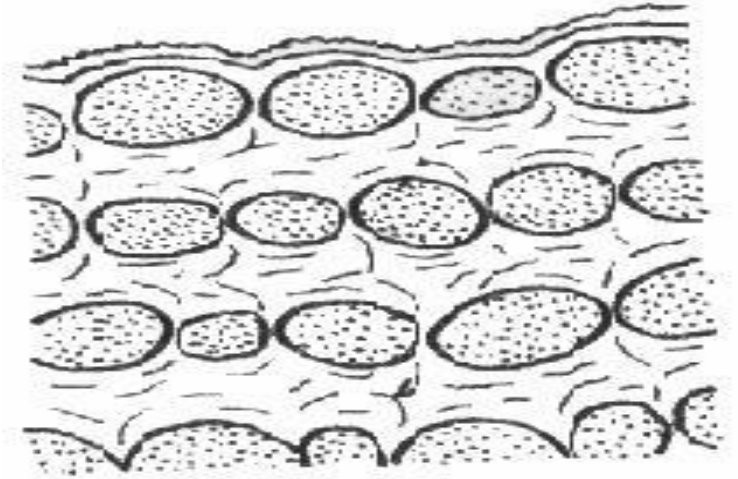


1 – epidermis, 2 – stoma, 3 – endoderm, 4 – pitch reservoir, 5 – mesophyll, 5 – phloem, 6 – xylem

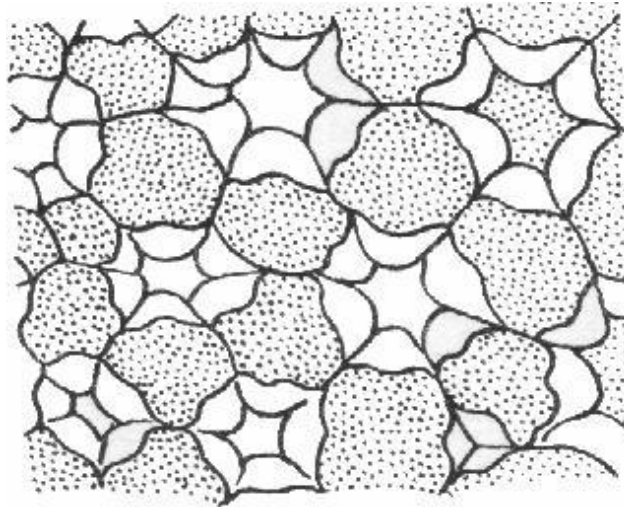
Structure of collenchymas



Angular

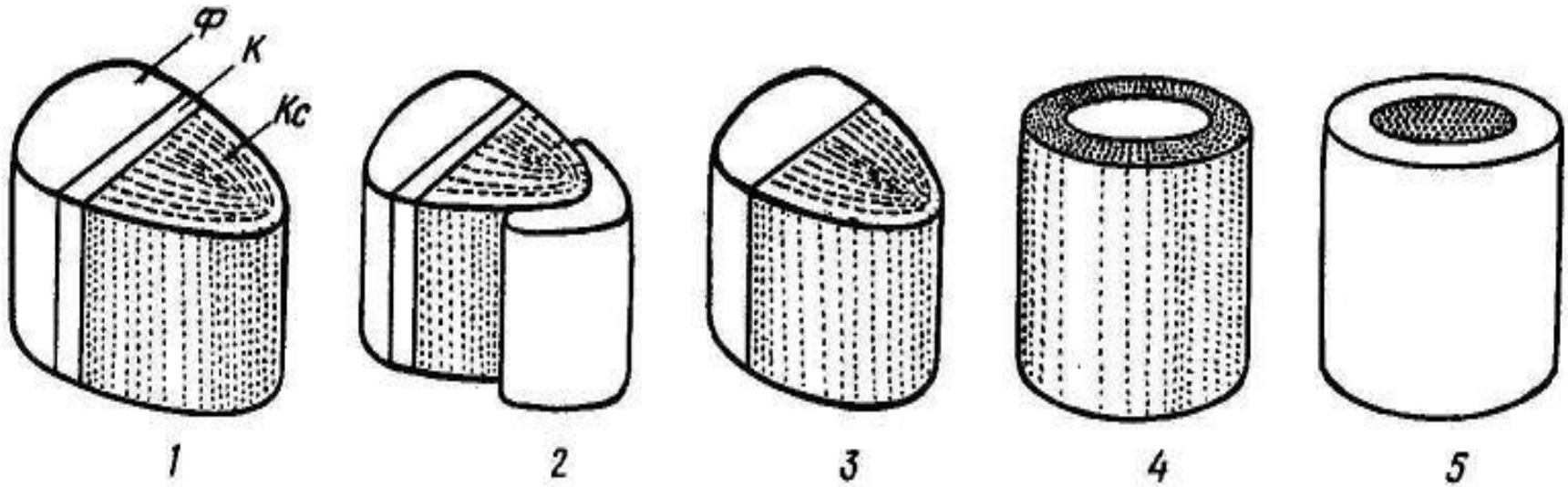


Lammellar



Lacunar

Type of transport bundles



1 – open collateral; 2 – open collateral; 3 – closed collateral; 4 – concentrated closed center phloem; 5 – concentrated closed center xylem; K – cambium; Kc – xylem; Φ – phloem

Control questions:

- 1 Show simple and compound tissues, primary and secondary tissues. Give the examples.
- 2 Why covering tissues belongs to compound tissues? Describe their functions.
- 3 Which role do conduct transport and mechanic tissues in plant organism?
- 4 Which type of mechanic tissue is characterized for growing plants? Which type – for adult plants?
- 5 What kind of tissue does form year ring?
- 6 What are differences between exoetic and endoetic secretor tissues?
- 7 Which structure have amphycasal and amphycrabal bundles?

Test question:

From lateral meristem cambium is formed:

- A) proto phloem and proto xylem
- B) endoderm
- C) essential oils
- Д) libriform
- E) parenchyma cells
- F) Trichomes
- G) Stoma
- H) Lenticel

From fellogen is created:

- A) cork
- B) collenchymas
- C) sclerenchyma
- Д) sclereids
- E) felloderm
- F) endoderm
- G) Pericycle
- H) procambium