

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 № 1

## **Introduction into botany. Structure of plant cell. Plant tissues and their classification**

(1 hour)

Lecturer: candidate of biological science, associated professor  
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# **Plant of lecture:**

- 1 Introduction into botany. Branches of botany.
- 2 Structure and function of plant cell.
- 3 Cell theory.
- 4 Plant tissues and their classification.

## **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.

**Botany** (from greek word «*botanae*» – plant, grass) is a complex of biological disciplines about plants. Object of botany is species of kingdom Plant, also phototrophic organisms – seaweeds.

In our course of botany we will also considerate separate question of morphology and systematic of some prokaryotes (cyanobacteria) mushrooms.

**Department of botanical science**

Systematics

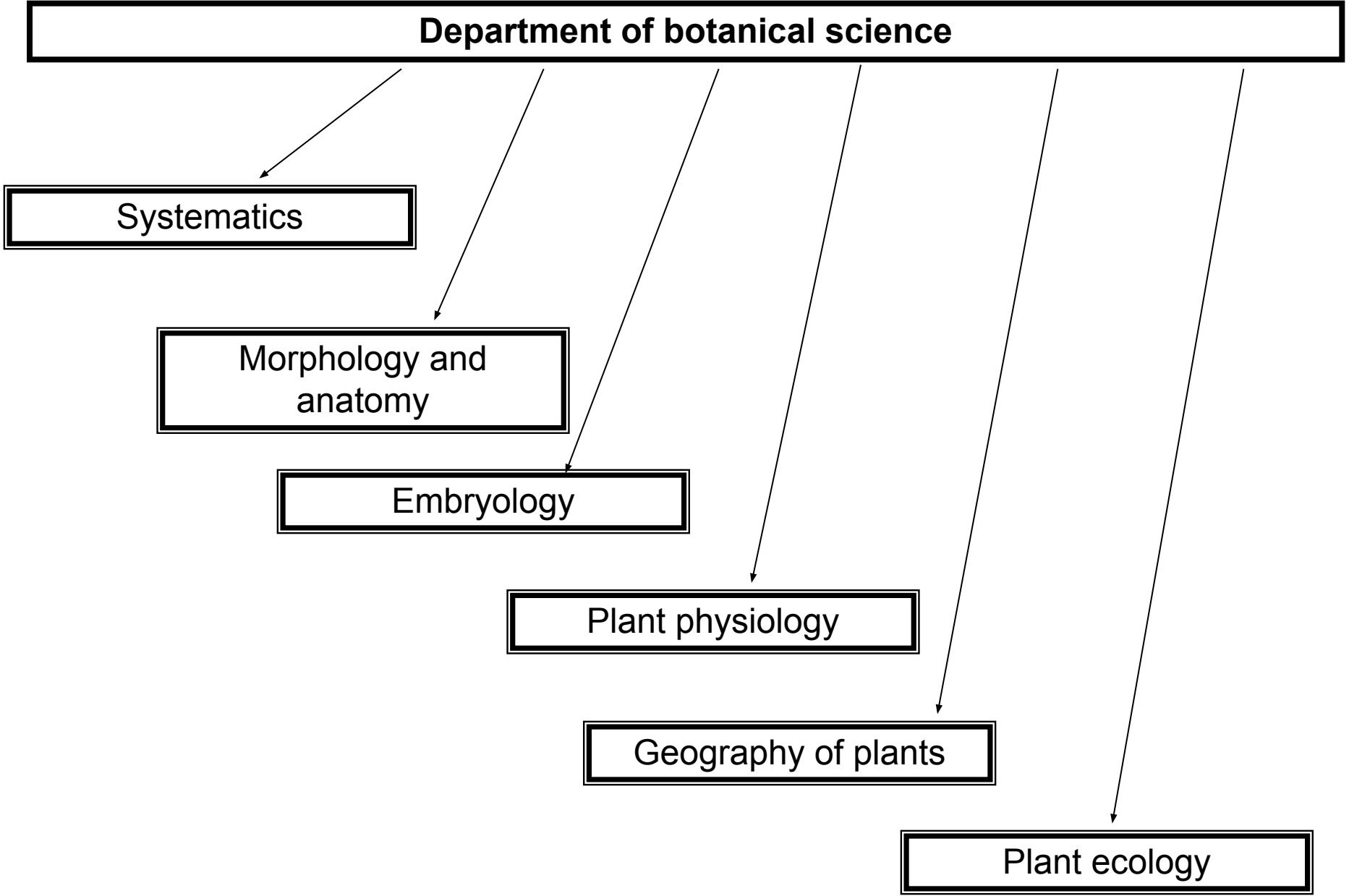
Morphology and  
anatomy

Embryology

Plant physiology

Geography of plants

Plant ecology



## **The basic spheres of using of plants**

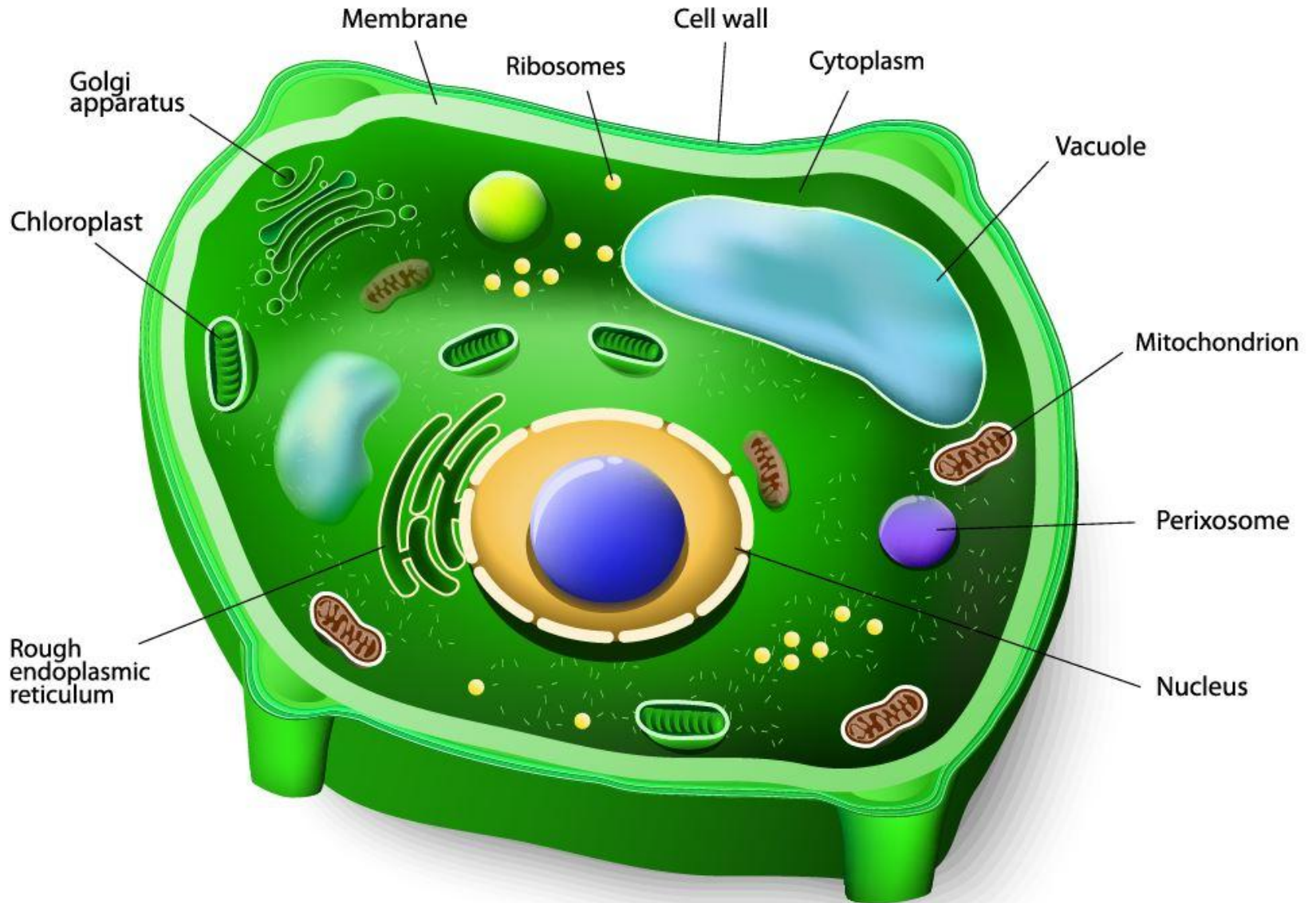
- 1) As food product for human population and fodder for stock,
- 2) As raw material for industry and practical activity,
- 3) As medical preparations and raw material for cosmetics and pharmaceutical industry,
- 4) In green building,
- 5) For environment and storage of ecology.

**Cell** is main form of the organization of live matter, elementary unit of an organism.

From cells of others eukaryotes (animals, mushrooms) they are distinguished by the following features:

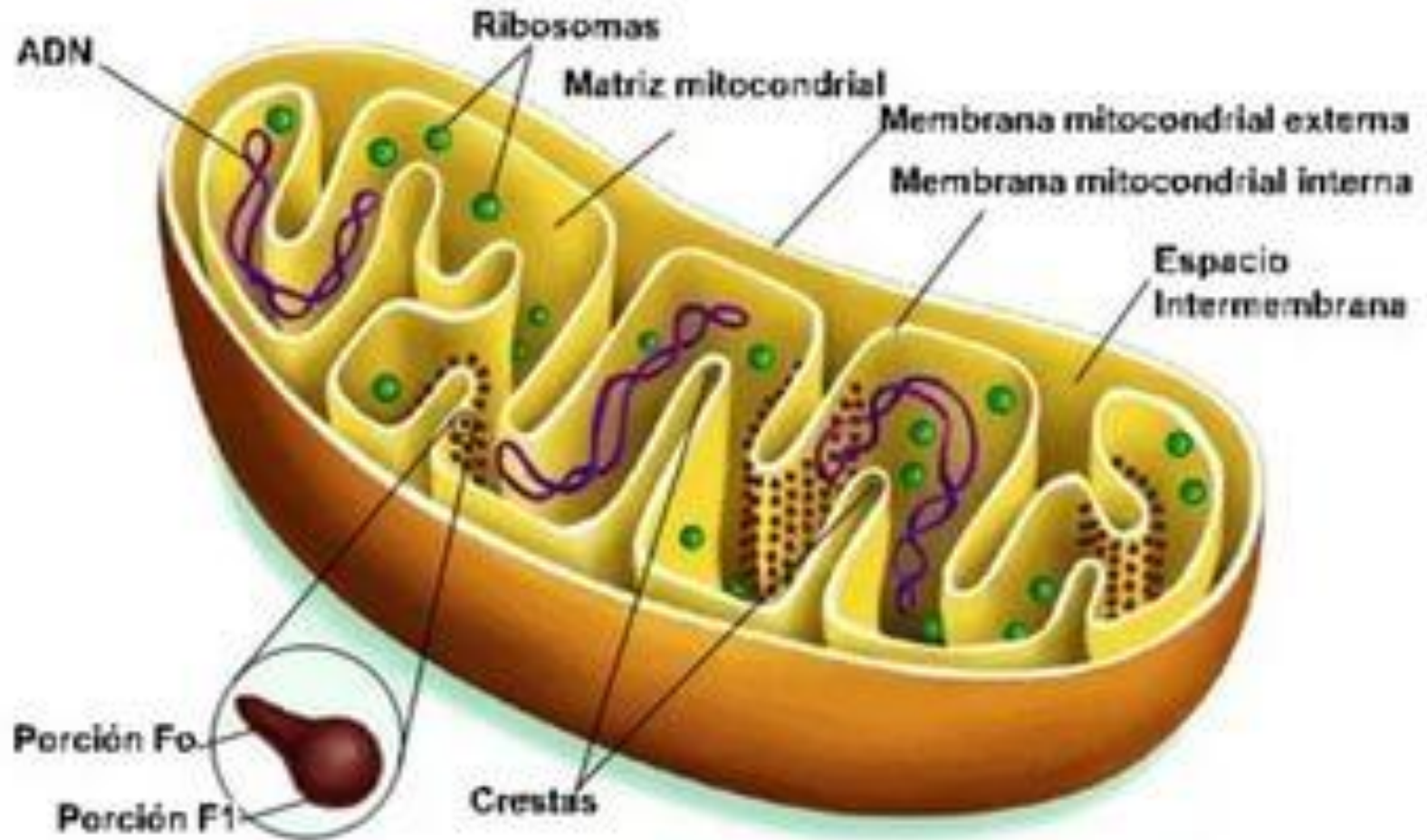
- 1) existence of plastids;
- 2) existence of a cellular wall from cellulose;
- 3) well developed system a vacuole;
- 4) absence centriol at division;
- 5) growth by stretching;
- 6) adult cells have the constant form.

# Structure of plant cell

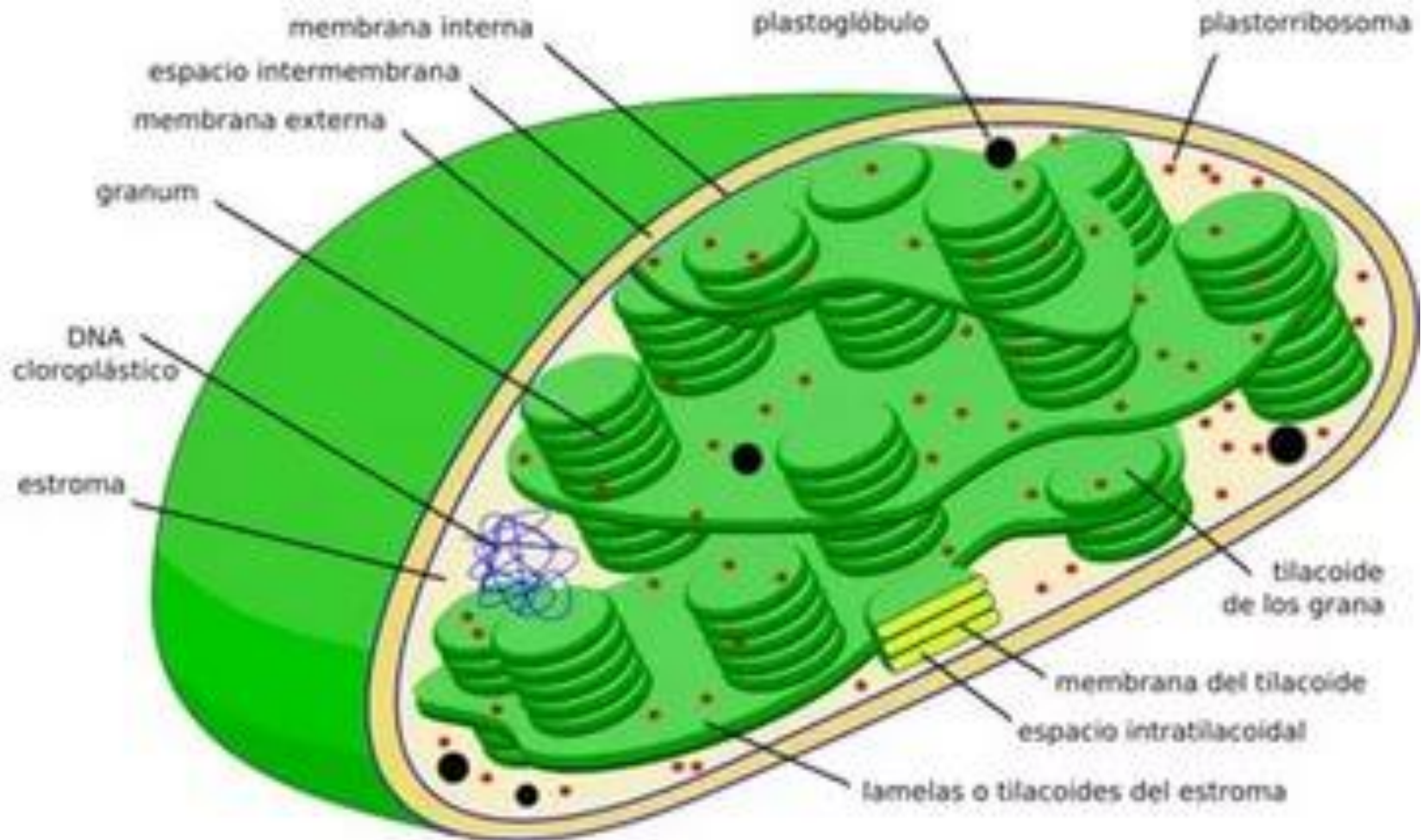




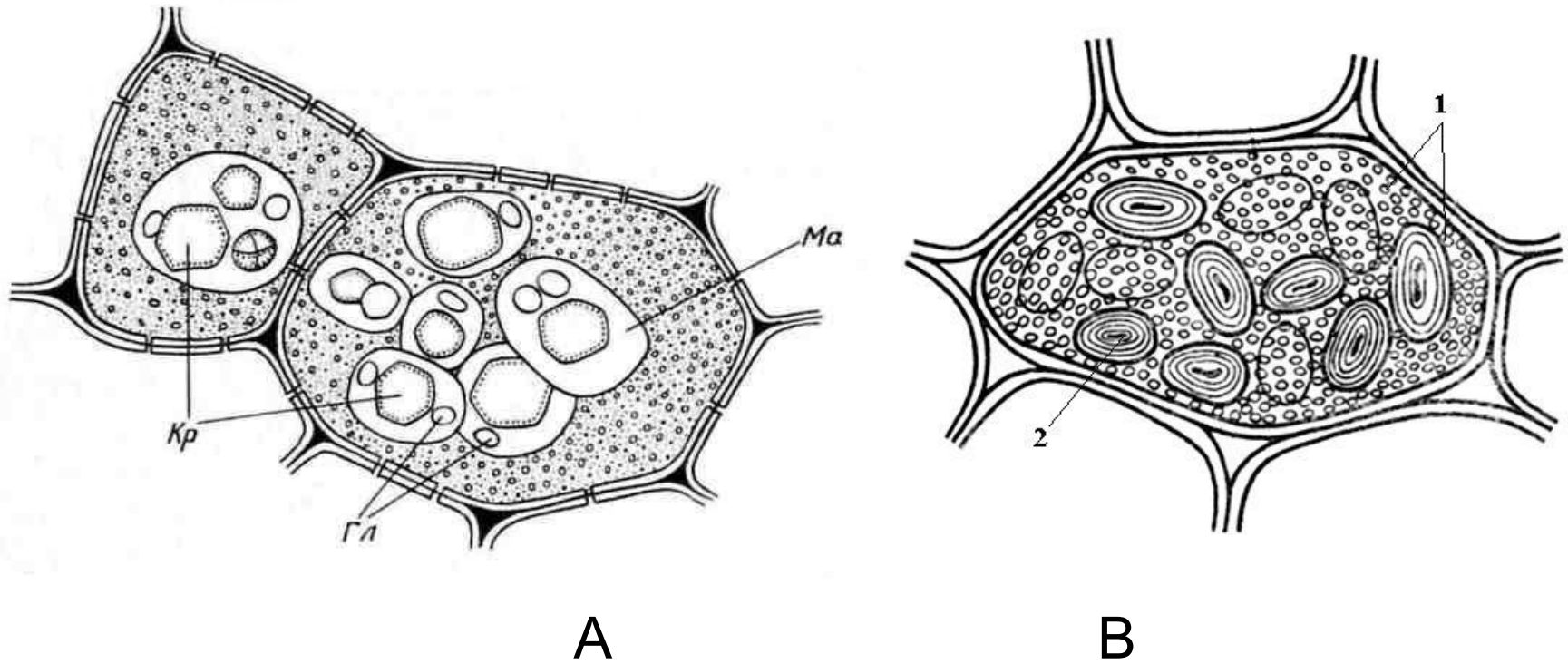
# Structure of mitochondrion



# Structure of chloroplast

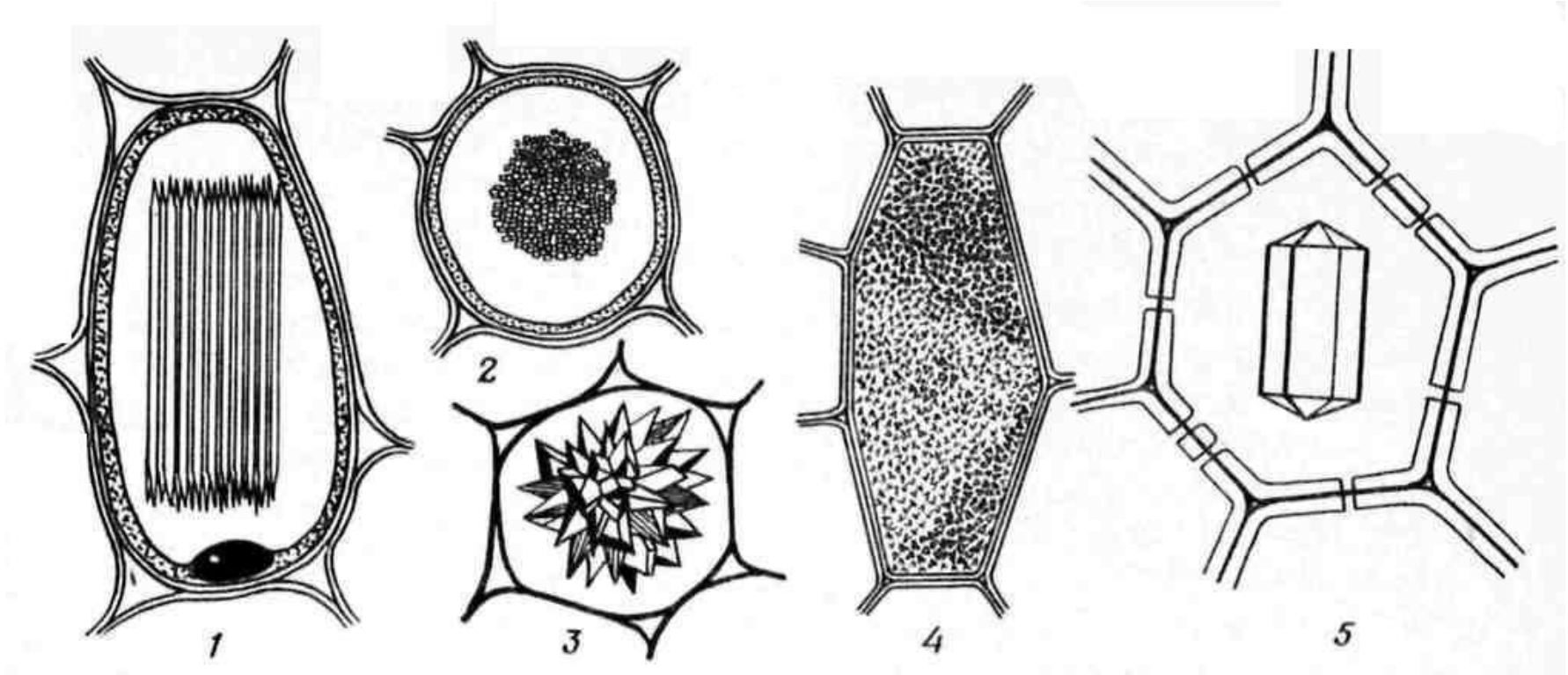


# Aileron granules inside of seed of *Rhicinus* (A) and bean (B)



*Kp* – protein crystals; *Гл* – globoids; *Ma* – protein matrix;  
1 – simple granules of starch, 2 – aileron granules

# Forms of crystals of calcium oxalate



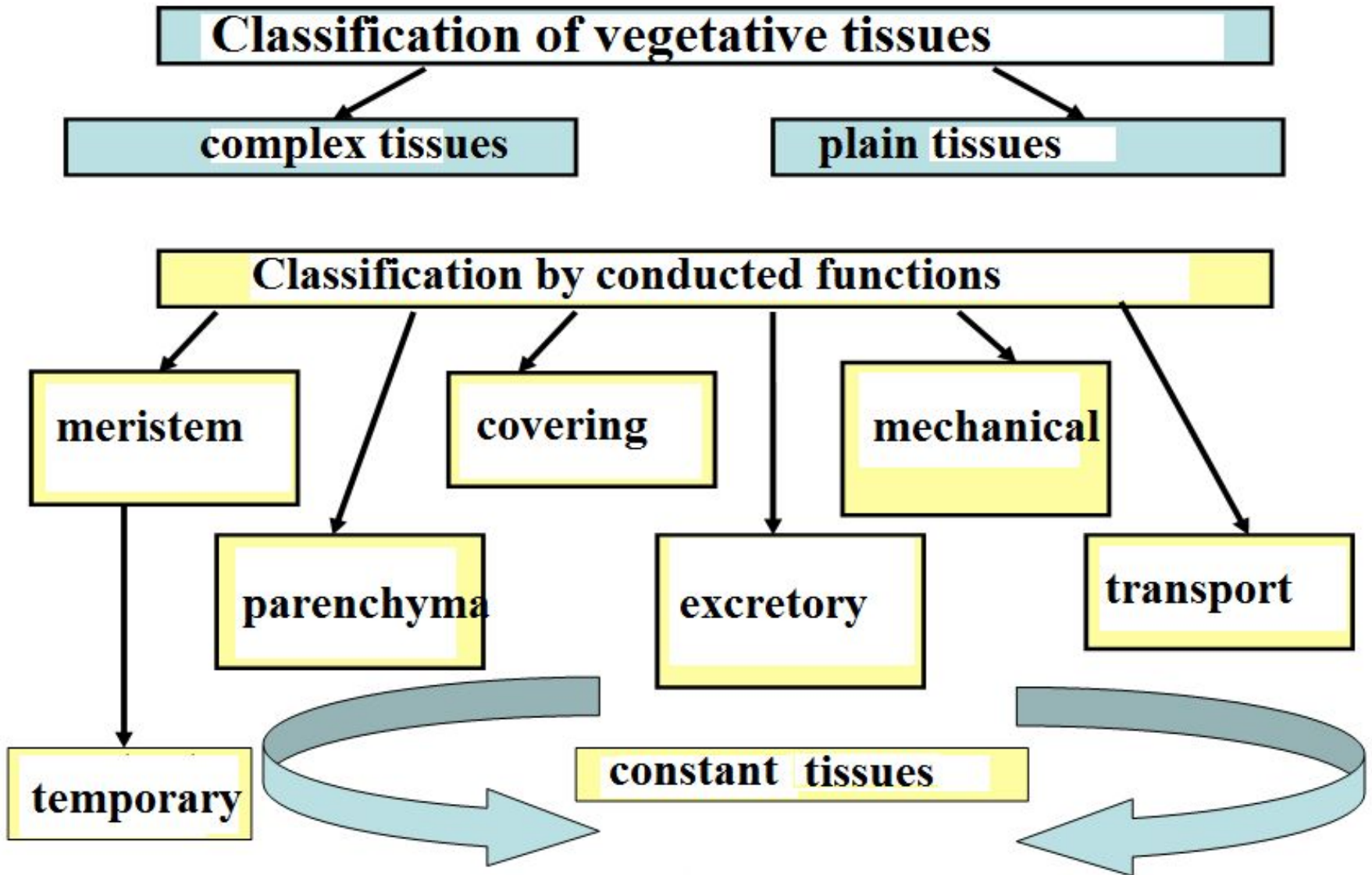
1,2 – raphides (1 – Lateral view, 2 – cross-section view); 3 – drusen; 4 – crystal sand; 5 – simple crystal

# Основные положения клеточной теории

1. The cell is an elementary, functional unit of a structure of all live (except viruses which have no cellular structure).
2. The cell is uniform system, it includes a set of the elements which are naturally connected among themselves representing the complete education consisting of the interfaced functional units - organelles.
3. Cells of all organisms are homologous.
4. The cell occurs only by division of a maternal cell.
5. The multi-cellular organism represents difficult system from a set of the cells united and integrated into the systems of tissues and bodies connected with each other.
6. Cells of prokaryotes and eukaryotes are the systems of different level of complexity and aren't completely homologous each other.
7. At the base of cell division and reproduction of organisms copying of hereditary information lays molecules of nucleonic acids. Regulations on genetic continuity treat not only a cell in general, but also mitochondrion, plastids, genes and chromosomes.
8. Cells of multi-cellular organisms are toti-potential, that is possess genetic potentialities of all cells of this organism, are equivalent according to genetic information, but differ from each other in a different expression (work) of various genes that results in their morphological and functional variety - to a differentiation.



# Classification of vegetation tissues



## Questions for self-checking:

- 1 Which signs of structure and life ability of plant let us to include them into living organisms?
- 2 Show the characterized peculiarities of animal and vegetable organisms.
- 3 Which the role of green plants for modern world?
- 4 Which role played plants for creation of modern soil and atmosphere?
- 5 Note the main direction of using of plants in life of modern humans?
- 6 Which branch of industries and science it is need knowledge about botany?
- 7 Which are the differences between animal and plant cells?
- 8 Make the list of main organelles of vegetative cell and their functions.
- 9 What the role of cellular wall for transport between cell and intracellular liquid?
- 10 What the main excretory and storage compounds of vegetative cell? How can we use this for identification of some species?
- 11 How can you determine every positions of cellular theory?
- 12 Take the definition of vegetable tissues.

## Test questions:

**Organelle which are characterized only for vegetative cell:**

- A) Cytoplasm
- B) Golgy apparatus
- C) Plastids
- D) Vacuole
- E) Mitochondrion
- F) Lysosome
- G) Centriol

**Organic compounds in structure of cellular membrane:**

- A) amino acids
- B) fat acids
- C) proteins
- D) Enzymes
- E) mineral salts
- F) Nucleonic acids
- G) Essential oils