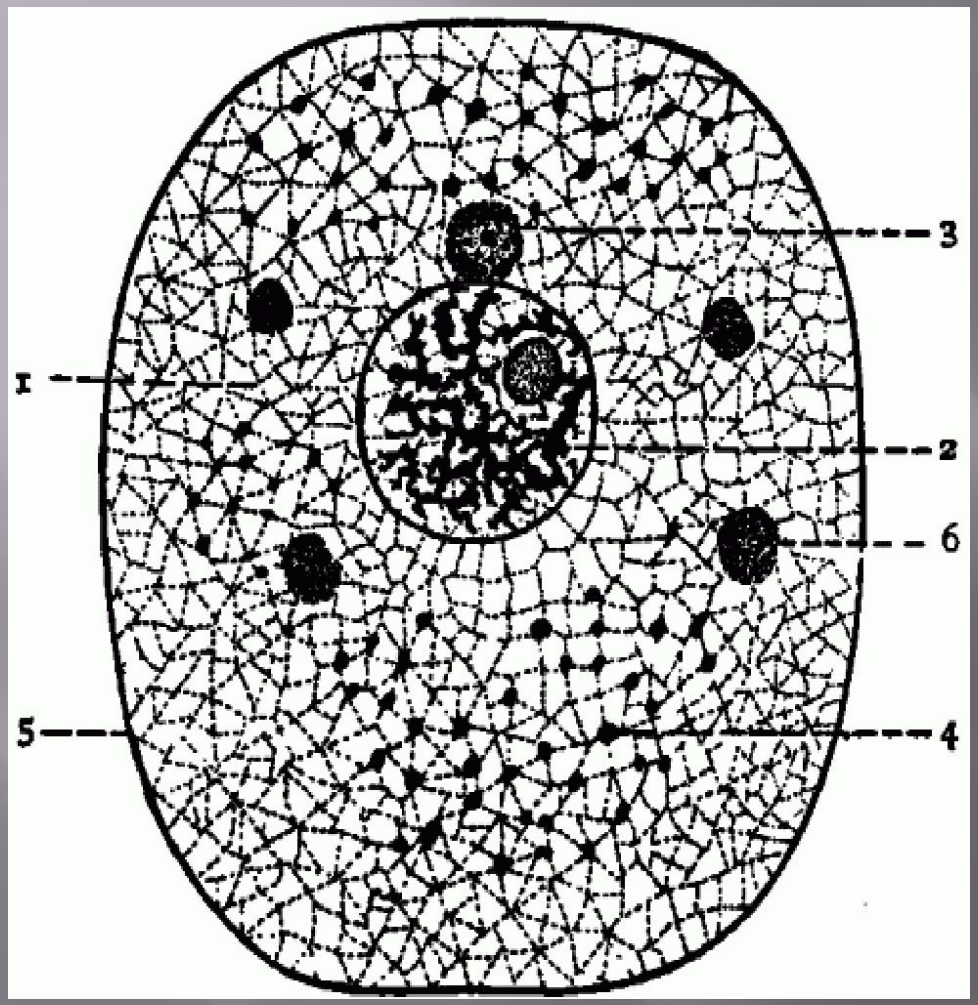
Developmental Physiology and School Hygiene

Lecture 2.

The Body Organization. Importance, Structure, and Work of Cells.

1. **The structure and importance of the cell.**
2. **Cell division and cell surroundings.**
3. **General and specific work of cells**
4. **The nature of body organization**
5. **The main physiological problems.**

The diagram of the cell and key terms:



- Tissue
- Protoplasm
- Nucleus
- Nucleoplasm
- Cytoplasm
- Cell-wall
- Attraction sphere
- Cell reproduction
- Lymph
- Intercellular material

The structure of the cell.

Cell

Cell-wall (*protection of the cell*)

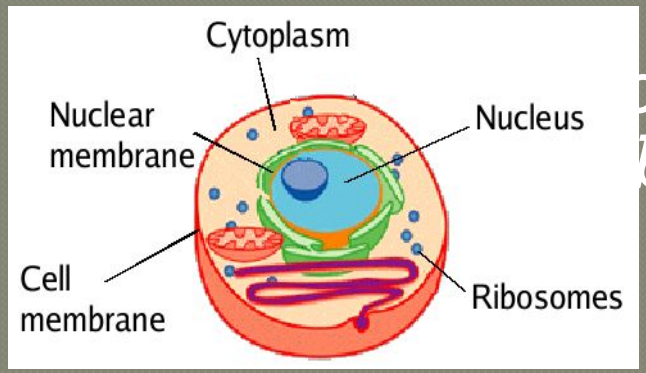
protoplasm (*physical basis of life*)

Nucleus (*nourishment and formation of new cells*)

main body (*surrounding the nucleus*)

cytoplasm (*all parts of the cell*)

attraction sphere (*cooperating with main body to form new cells*)



Robert Hooke discovered cells. He took microscopy as a hobby and used to view various specimen under his microscope. Once, he made a thin slice of cork and observed it under the microscope. Since corks are made from the oak trees, they were made up of cells. Hooke observed numerous tiny compartments and called them "cells".

Robert Hooke (28 July 1635 – 3 March 1703) was an English natural philosopher, architect and polymath.

The cell was discovered in 1665.

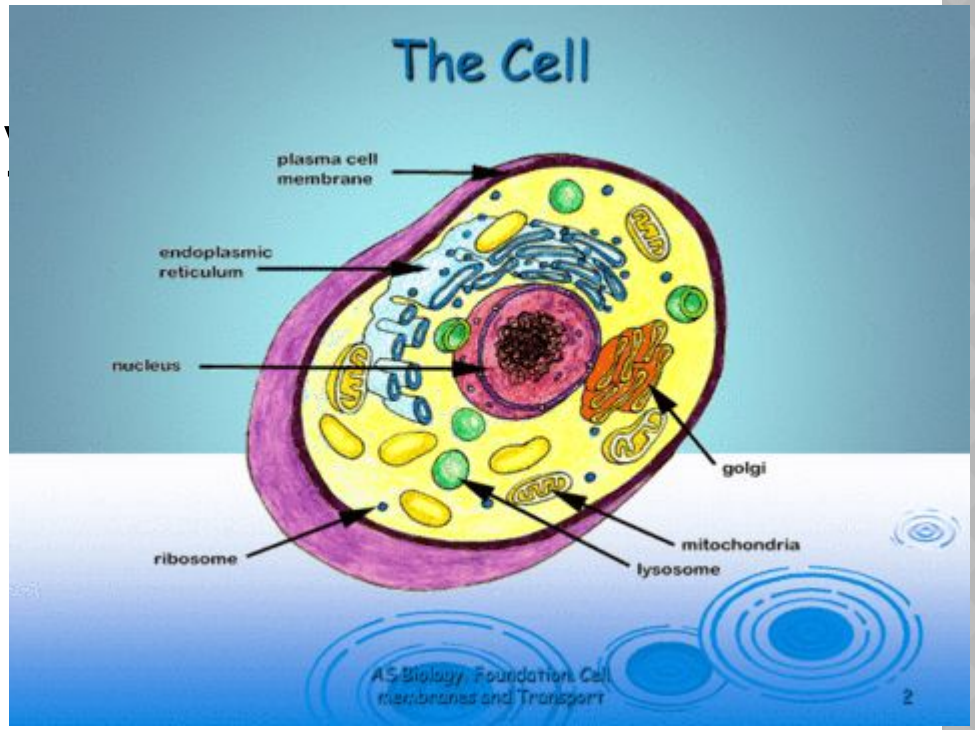
The cell theory, first developed in 1839 by Matthias Schleiden and Theodor Schwann, states that all organisms are composed of one or more cells, that all cells come from preexisting cells, that vital functions of an organism occur within cells, and that all cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.

Cells emerged on planet Earth at least 4.0–4.3 billion years

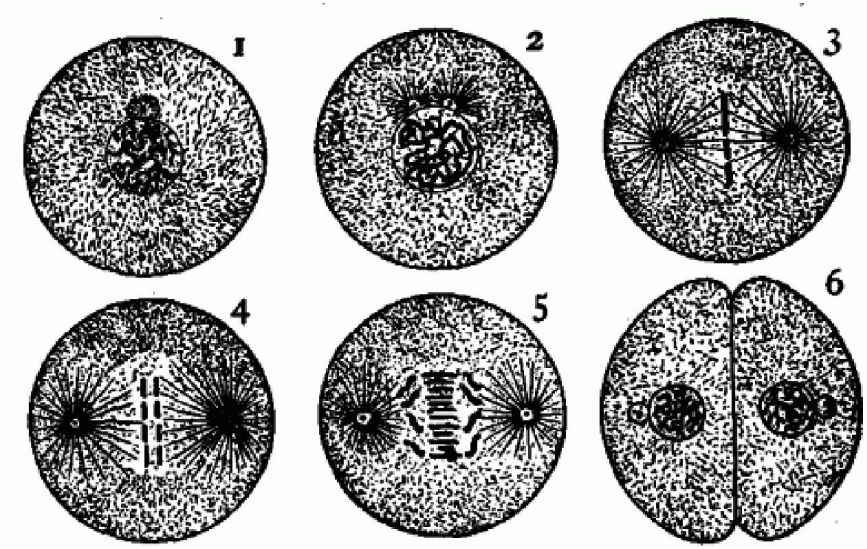
IMPORTANCE OF THE CELLS

a) Active agents in all of the tissues
b) Living, working parts of the body
c) Body “individuals”.

Cells build up the body and carry on its different functions.



Cell division and reproduction.



Rule 1:

The new cells are always formed by and from the old ones.

Rule 2:

Formation and growth of new cells lead to the full size of the body.

Rule 3:

When growth is complete, cell reproduction is supposed to stop.

Rule 4:

If tissues are injured or bones are broken the cell-reproduction continues.

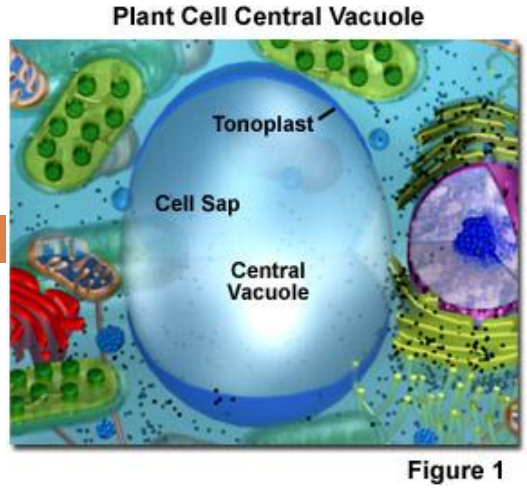


Figure 1

Cell surrounding

1) Water is necessary for cell-life

Take in materials

Give out materials

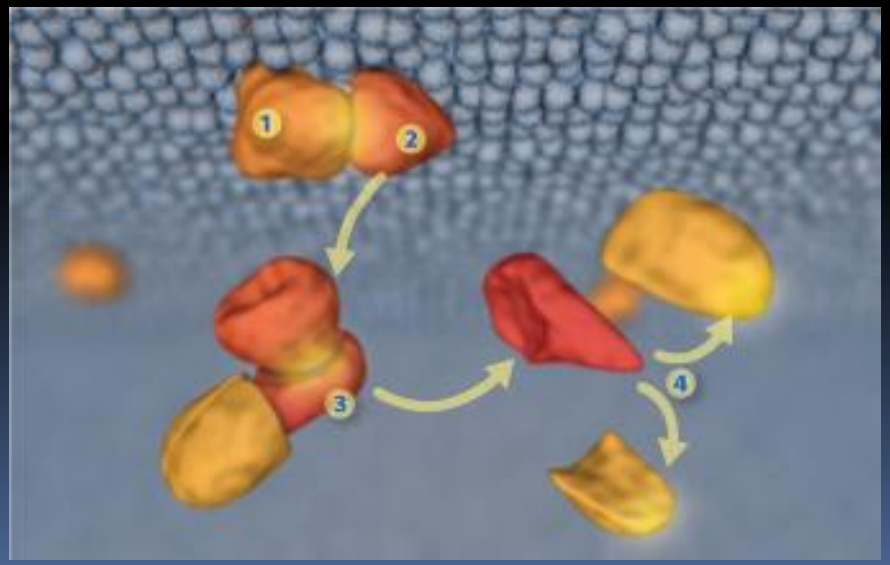
Essential part of protoplasm

2) No water cells become inactive and die

3) Fluid, oxygen and food to the cells are carried by the lymph through intercellular material.

General work of cells.
Three processes.

Absorption	Assimilation	Excretion
Taking water, food, and oxygen into cells	Additional absorption of materials to the protoplasm.	Throwing off of such waste materials as have been formed in the cells.

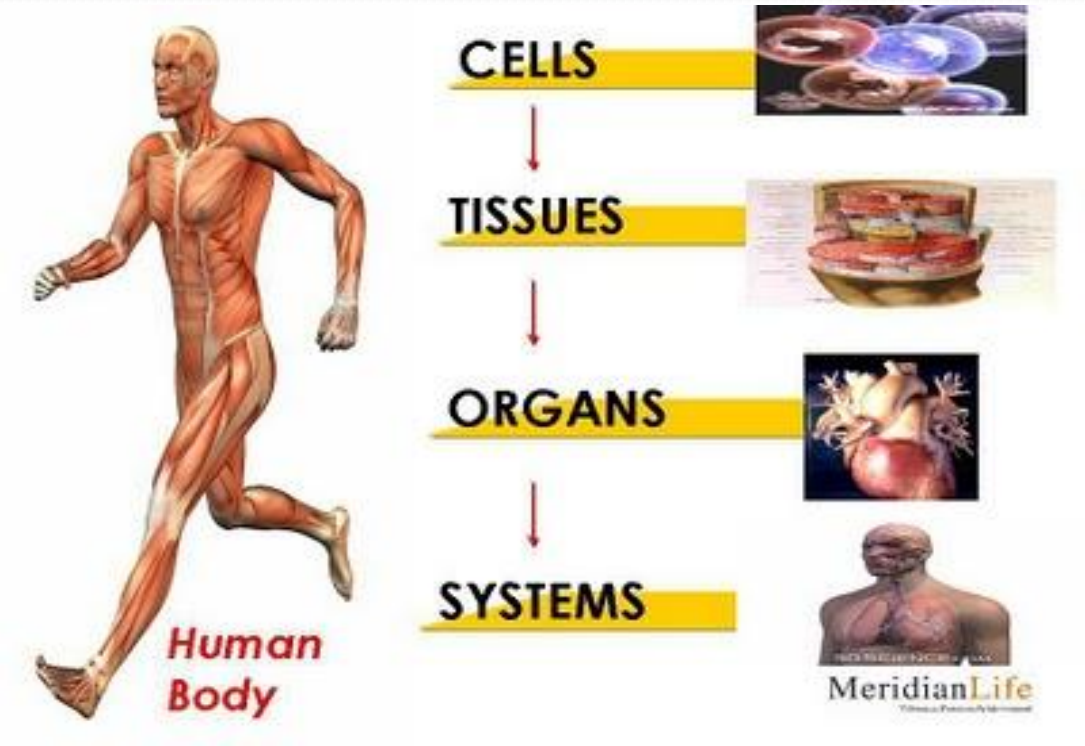


Nature of Body organization

1) A definite arrangement of the cells to form tissues
2) A definite arrangement of the tissues in the organ.
3) A definite arrangement of organs to form systems.

Supreme purpose:

Maintenance of the cell group

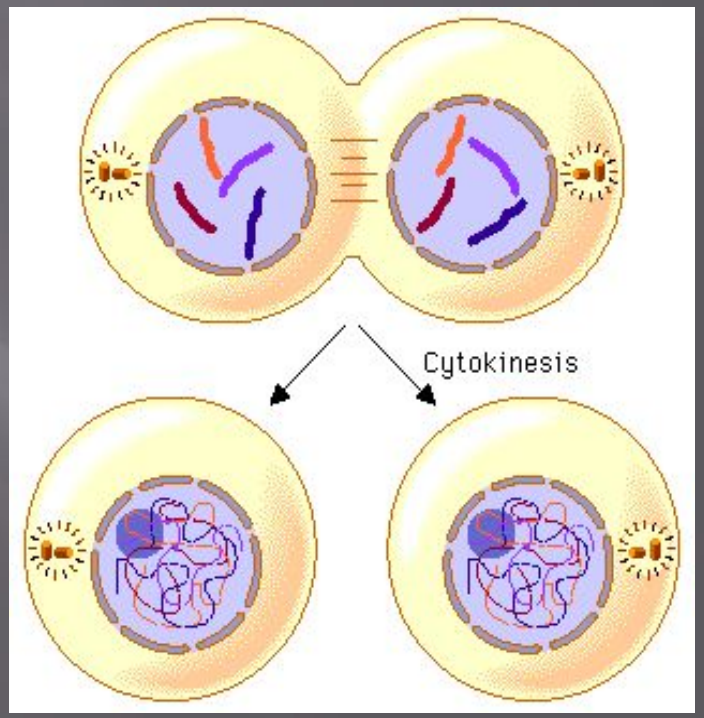


Maintenance of Life (organization and preservation of the protoplasm cell body)

1 purpose supply protoplasm with water, food, oxygen,

2 purpose remove any waste materials

Remember: cells rapidly exhaust the nutrient fluid.



The main physiological problems.

- Internal: through digestion, circulation, respiration and excretion maintaining the nutrient fluid for the cells.
- External: through the organs of motion and organs of special sense bringing the body into secure relations with its surrounding and satisfying its needs.

SEMINAR QUESTIONS:

1. Give an outline of a typical cell, locating and naming the main divisions;
2. How do the cells enable the body to grow? Describe the process of cell division;
3. How does the general work of cells differ from their special work? Define: absorption, assimilation, excretion.
4. What is the necessity for a nutrient fluid in the body?
5. Why is the maintenance of life the chief aim all the activities in the body?
6. State the two main physiological problems in the study of the body.