

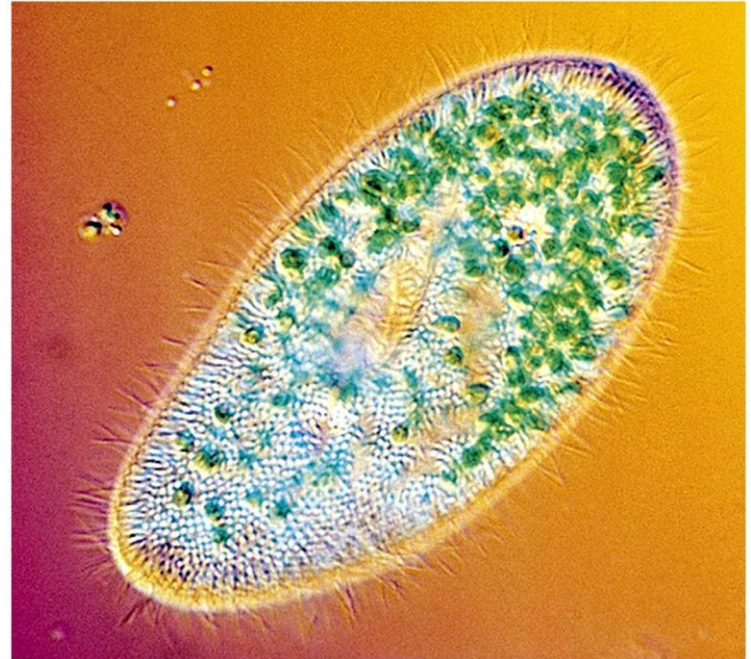
# Cell

M. Zajček, 5.B



# Cells

- smallest living unit
- most are microscopic (10-100  $\mu\text{m}$ )
- in human body  
→  $10^{12}$ - $10^{18}$  cells



# Discovery of Cells

- Robert Hooke (17th century)
  - observed sliver of cork
  - saw “row of empty boxes”
  - started to use the term cell



# Cell theory

- Theodor Schwann (1838),  
Matthias Schleiden (1839)  
→ all living things are made  
of cells
- Rudolf Virchow (1858)  
→ all cells come from cells



Schleiden



Schwann



Virchow

# Principles of Cell Theory

- all living things are made of cells
- smallest living unit of structure and function of all organisms is the cell
- all cells carry genetic information
- all cells arise from preexisting cells  
(this principle discarded the idea of spontaneous generation)



# Cell Types

- Prokaryotic (bacteria, cyanobacteria)
- Eukaryotic (plants, fungi, animals)

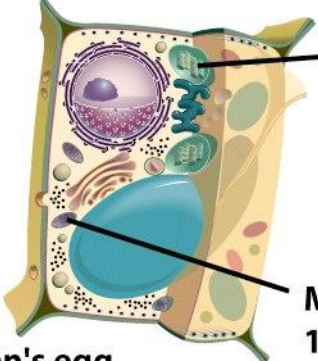


# Eukaryotic cell

- a bounded nucleus (karyoplasm and nucleolus inside)
- cytoplasm, cytoplasmatic membrane
- mitochondria, plastids (semiautonomic organelles)
- endoplasmatic reticulum (rough and smooth), Golgi apparatus
- lysosomes
- vacuoles

# Cell Size

Typical plant cell  
10–100  $\mu\text{m}$



Chloroplast  
2–10  $\mu\text{m}$

Mitochondrion  
1–5  $\mu\text{m}$

*Trypanosoma* (protozoan)  
25  $\mu\text{m}$  long



*Chlamydomonas* (green alga)  
5–6  $\mu\text{m}$



HIV (AIDS virus)  
100 nm

Poliovirus  
30 nm



DNA molecule  
2 nm diameter



Hen's egg  
65 mm



Human red blood cell  
7–8  $\mu\text{m}$  diameter



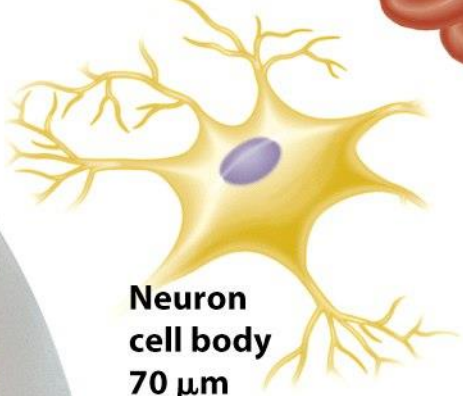
T4 bacteriophage  
225 nm long



*Escherichia coli* (bacterium)  
1–5  $\mu\text{m}$  long



Tobacco mosaic virus  
300 nm long



Neuron cell body  
70  $\mu\text{m}$

Unaided vision

Light microscopes (down to 200 nm)

Electron microscopes (down to 0.5 nm)

1 mm      100  $\mu\text{m}$       10  $\mu\text{m}$       1  $\mu\text{m}$       100 nm      10 nm      1 nm      0.5 nm



**Thanks for your attention!**