Universiti Malaysia PAHANG
Engineering • Technology • Creativity

BSB1163
CELL AND MOLECULAR BIOLOGY

CLASSES OF CELLS

By
NOOR SUHANA ADZAHAR
MUHAMMAD ADAM LEE ABDULLAH

Faculty of Industrial Science and Technology
nsuhana@ump.edu.my

Chapter 2
by Noor Suhana Binti Adzahar
http://ocw.ump.edu.my/course/view.php?id=482

Review

- List the fundamental properties shared by all cells.
- What the important of these properties.
- What is the source of energy that supports life?

Two Fundamentally Different Classes of Cells

- Prokaryotic and eukaryotic—distinguished by their size and the types of internal structures, or **organelles.**
- The structurally simpler, **prokaryotic cells include bacteria, whereas the** structurally
- More complex **eukaryotic cells include protists,** fungi, plants, and animals

DISCUSSIONS:
ILUSTRATE AND COMPARE FEATURES OF DIFFERENT CLASSES OF CELLS

- Prokaryotic cell
- Eukaryotic cell
  - Animal cell
  - Plant cells
- Virus

Features held in common by the two types of cells:

- Plasma membrane of similar construction
- Genetic information encoded in DNA using identical genetic code
- Similar mechanisms for transcription and translation of genetic information, including similar ribosomes
- Shared metabolic pathways (e.g., glycolysis and TCA cycle)
- Similar apparatus for conservation of chemical energy as ATP (located in the plasma membrane of prokaryotes and the mitochondrial membrane of eukaryotes)
- Similar mechanism of photosynthesis (between cyanobacteria and green plants)
- Similar mechanism for synthesizing and inserting membrane proteins
- Proteasomes (protein digesting structures) of similar construction (between archaebacteria and eukaryotes)

Organelles

Describe organelle.

Explain structure and functions of each organelle.

Chapter 2
by Noor Suhana Binti Adzahar
http://ocw.ump.edu.my/course/view.php?id=482

ORGANELLE	LOCATION	DESCRIPTION	FUNCTION
cell wall	plant, not animal	*outer layer *rigid, strong, stiff *made of cellulose	*support (grow tall) *protection *allows H2O, O2, CO2 to pass into and out of cell
cell membrane	both plant/animal	*plant - inside cell wall *animal - outer layer; cholesterol *selectively permeable	*support *protection *controls movement of materials in/out of cell *barrier between cell and its environment *maintains homeostasis
nucleus	both plant/animal	*large, oval	*controls cell activities
nuclear membrane	both plant/animal	*surrounds nucleus *selectively permeable	*Controls movement of materials in/out of nucleus
cytoplasm	both plant/animal	*clear, thick, jellylike material and organelles found inside cell membrane	*supports /protects cell organelles
endoplasmic reticulum (E.R.)	both plant/animal	*network of tubes or membranes	*carries materials through cell
ribosome	both plant/animal	*small bodies free or attached to E.R.	*produces proteins

mitochondrion	both plant/animal	*bean-shaped with inner membranes	*breaks down sugar molecules into energy
vacuole	plant - few/large animal - small	*fluid-filled sacs	*store food, water, waste (plants need to store large amounts of food)
lysosome	plant - uncommon animal - common	*small, round, with a membrane	*breaks down larger food molecules into smaller molecules *digests old cell parts
chloroplast	plant, not animal	*green, oval usually containing chlorophyll (green pigment)	*uses energy from sun to make food for the plant (photosynthesis)

To study cells…

- First culture of human cells: George Gey in 1951
- Obtained from a malignant tumour named HeLa cells
- Named after the donor: Henrietta Lacks
- Grown *in vitro*
- *http://www.radiolab.org/story/91716-henriettas-tumor/*

Discussions

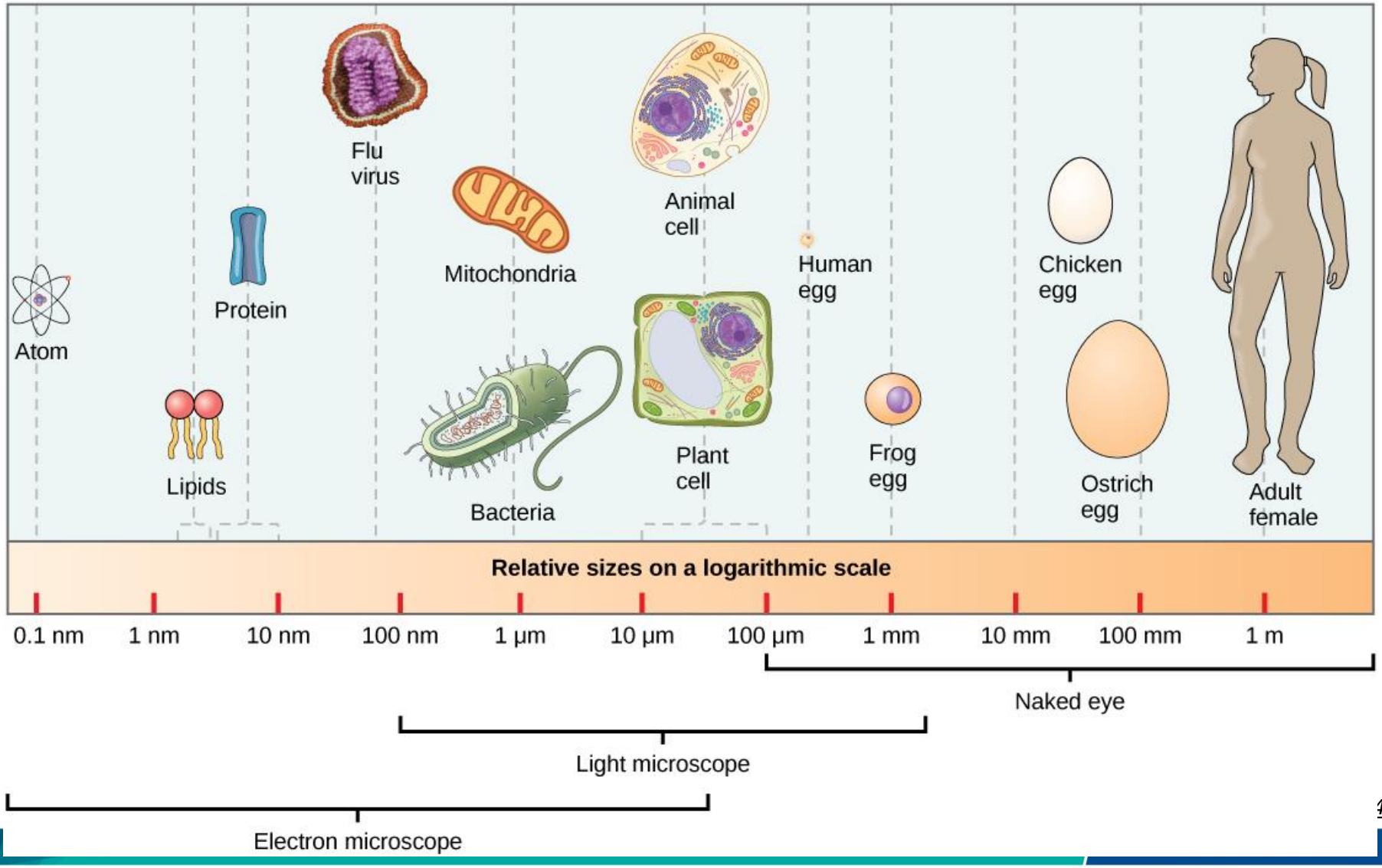
- How you can observe the cells?

Microscopy

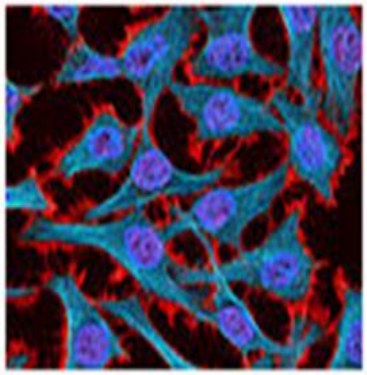
Microscope: An instrument that uses a lens or a series of lenses to magnify small objects.

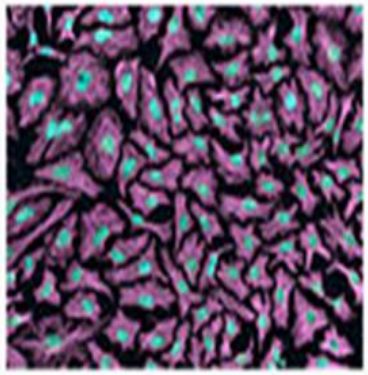
Which microscope to use?
What do you want to do?
Look at organisms, cells or tissues that are currently alive?
Look at the surface of a living thing?
Look at whole cells and how they connect?
Look at the surface of a sample?
Look at a cross-section of a sample?
Avoid removing moisture from the sample?

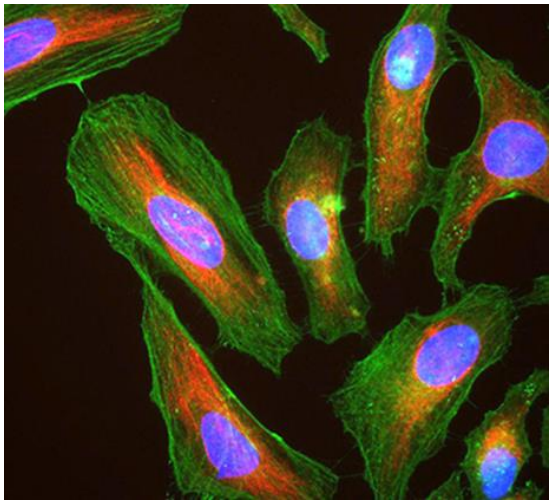
Size comparison

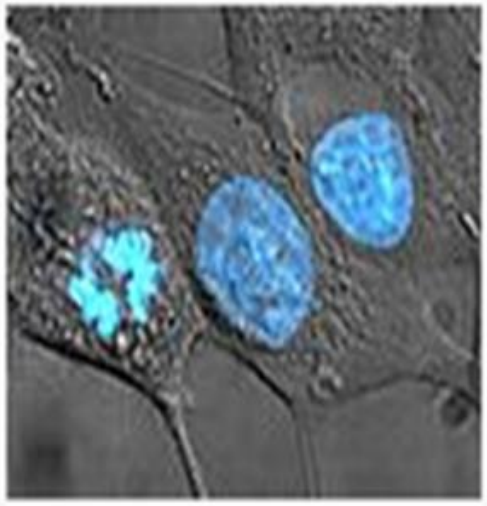


Images captured in different types of microscope









nti Adzahar

u.my/course/view.php?id=482