

Concepts of Biology
Guided Reading Notes
Chapter 4

1 Cells are the Basic Units of Life

4.1 All organisms are composed of cells

- Cell theory states the following:
 - ✓
 - ✓
 - ✓

4.2 Metabolically active cells are small in size

- Cells must remain _____ in order to have an adequate amount of _____ per cell _____.

4.3 Microscopes allow us to see cells

- **Compound light** microscopes use lenses and focus _____ through a _____.
- **Transmission electron** microscopes _____.
- **Scanning electron** microscopes _____ and _____ electrons on _____ and _____.

4.4 Prokaryotic cells evolved first

- Prokaryotic cells have the following characteristics
 - ✓
 - ✓
 - ✓

4.5 Eukaryotic cells contain specialized organelles: An Overview

- Eukaryotic cells have the following characteristic
 - ✓
 - ✓

2 Protein Synthesis Is a Major Function of Cells

4.6 The nucleus contains the cell's genetic information

- **Genes** composed of _____, are located on _____.
- **RNA** is produced in the _____.
 - ✓ rRNA is produced in the _____; becomes _____.
 - ✓ mRNA specifies the _____ of _____ acids during _____ synthesis.
 - ✓ tRNA is used in the assembly of _____ during _____ synthesis.
- **Nuclear pores** in the nuclear envelope permit _____ between the _____ and the _____.

4.7 The ribosomes carry out protein synthesis

- **Ribosomes** in the _____ and the _____ synthesize _____.

4.8 The endoplasmic reticulum (ER) synthesizes and transports proteins and lipids

- The ER produces _____ (rough ER) and _____ (smooth ER) for _____ as well as _____ that are secreted from the _____.
- Transport **vesicles** from the _____ carry _____ and _____ to the _____ apparatus.

4.9 The Golgi apparatus modifies and repackages proteins for distribution

- Enzymes modify _____ attached to proteins.
- Vesicles leave the _____ and travel to the _____, where _____ occurs.

4.10 Pulse-labeling allows observation of the secretory pathway

- Electron microscopy confirms that labeled _____ in the ER are transported in _____ to the _____, then appears in _____ at the plasma membrane.

3 Vesicles and Vacuoles Have Varied Functions

4.11 Lysosomes digest macromolecules and cell parts

- _____ and _____ are **membranous sacs**.
- _____, which are produced by the _____ apparatus, contain hydrolytic _____.

4.12 Peroxisomes break down long-chain fatty acids

- **Peroxisomes**, which are membrane-bound _____ resembling _____, break down long-chain _____.

4.13 Vacuoles have varied functions in protists and plants

- **Vacuoles** are larger than _____ and usually _____.
- Plant cells have a large _____ that stores _____ and _____ and maintains _____.

4.14 The organelles of the endomembrane system work together

- The ER, _____, _____, and other _____ make up the _____ system.

4 A Cell Carries out Energy Transformations

4.15 Chloroplasts capture solar energy and produce carbohydrates

- **Chloroplasts** carry on _____.
- **Thylakoids** (containing chlorophyll) capture _____ and the _____ synthesize _____.

4.16 Mitochondria break down carbohydrates and produce ATP

- _____ carry on cellular _____.
- **Matrix** breaks down _____ and the **crisetae** produce _____.

(Draw the diagrams shown on p. 74)

4.17 Malfunctioning mitochondria can cause human diseases

- Mutations in _____ have been linked to various diseases.
- **mtDNA** can be used to trace _____.

5 The Cytoskeleton Maintains Cell Shape and Assists Movement

4.18 The cytoskeleton consists of filaments and microtubules

- **Actin filaments** are organized in _____ and _____.
- **Intermediate filaments** are _____ assemblies of _____.
- _____

- **Microtubules** are made of the globular _____ . They act as tracks for _____ .
- The **MTOC** regulates _____ and is located in the _____ .

4.19 Cilia and flagella contain microtubules

- **Cilia** (short) and **flagella** (long) are whiplike _____ from the _____ .
- _____ and _____ grow from basal bodies, perhaps derived from _____ .

6 Multicellular Organisms, Cells Join Together

4.20 Modifications of cell surfaces influence their behavior

- _____ have cell walls; Plant cells are joined by _____ .
- Animal cells are joined by _____ junctions, _____ junctions, and _____ junctions.