Study Guide for Midterm 1

1. Monosaccharides – glucose, fructose, galactose
   Disaccharides – sucrose, maltose, lactose
   Polysaccharides – starch (rice), glycogen (animals), cellulose (plants)

2. Hypotonic – cytolysis = "pop", hemolysis = red blood cell popping
   Hypertonic – plasmolysis = "shrink", crenation = red blood cell shrinking
   Isotonic – nothing happens (in equilibrium)

3. Smooth Endoplasmic Reticulum (ER) – lipid synthesis
   Rough Endoplasmic Reticulum (ER) – makes proteins for export or membrane proteins
   Mitochondria – powerhouse of the cell
   Cilia – locomotion
   Flagella – locomotion
   Chloroplasts – contains chlorophyll, the pigment needed for photosynthesis
   Leucoplasts – starch storage bodies in plants
   Microfilaments – provide strength and support
   Lysosomes – suicide bags or sacks; digest bacteria and "foreign" material
   Microtubules – used in cells division and cell movement
   Golgi complex – three segments of Golgi complex (cis→medial→trans)
   Cuts proteins and adds carbohydrates,
   Packaging and shipping centers of the cell

4. Electrons = atomic number; negatively charged particle
   Protons = atomic number; positively charged particle
   Neutrons = atomic mass-atomic number; neutral charge
   Atomic number – equal to the number of proton and electrons for that atom
   Atomic mass – how much an atom weighs
   Atomic model structure –

5. Ions – charged atoms or molecules formed by the loss or gaining of electrons
   Cations (+) and Anions (-)

6. Proteins – made up of many amino acids
   Polysaccharides – complex combination of many sugars (carbohydrates)
   Fluid mosaic model – every cell membrane has a mixed combination of phospholipids, glycolipids, sterols, and proteins
   Cytoskeleton – composed of three main components: microfilaments, intermediate filaments, and microtubules

7. Diffusion – the passive movement of materials from an area of greater concentration to an area of lesser concentration
   Osmosis – diffusion of water across a selectively permeable membrane from an area of greater concentration to an area of lesser concentration
   Cytolysis – "popping"

Plasmolysis – "shrinking"
Phagocytosis – form of cell eating (large particles)
Peptide bond – forms as a condensation reaction joins the amino group of one amino acid and the carboxyl group of the next in line
pH = -log of the hydrogen concentration; a buffer is a substance that resists a change in pH
Acidity – pH 1-6.5
Neutral – pH 7
Basic – pH 7.5-14

8. Plant cells – organelles compressed toward outer edges of the cell, have chloroplasts, have a cell wall
Animal cells – organelles evenly distributed throughout cytoplasm

9. Integral proteins – imbedded within cell, very difficult if not impossible to remove
Transmembrane proteins – extends the entire length of the membrane
Peripheral proteins – loosely attached to the cell membrane on the inside or the outside
Transport proteins – allow the movement of materials into and out of the cell
Receptor proteins – receive a signal from outside the cell and pass it inside
Recognition proteins – display "self" signals to identify cells
Adhesion proteins – permit cell-cell junctions

10. Hooke – focused a microscope on thinly sliced cork and saw tiny compartments and named them "cells"
Leuwenhoek – looked at bacteria by scraping tartar off his teeth and examining it under a microscope

11. Active transport – requires energy, usually in the form of ATP, usually against a gradient
Passive transport – passive movement of materials from an area of greater concentration to an area of lesser concentration
Facilitated diffusion – diffusion across a membrane using a carrier molecule
Endocytosis – the movement of substance into the cell
Exocytosis – the removal of substances from within the cell
Phagocytosis – form of cell eating where large particles or cells are engulfed by the white blood cell
Contractile vacuoles – used by bacterium to remove internal water
Sodium/Potassium pump (Na^+ / K^+) – most famous active transport, 3 Na^+ go out of cell while 2 K^+ enter cell

12. Magnification

Eyepiece	Objective	
10X	4X	multiply together (10 x 4 = 40X)

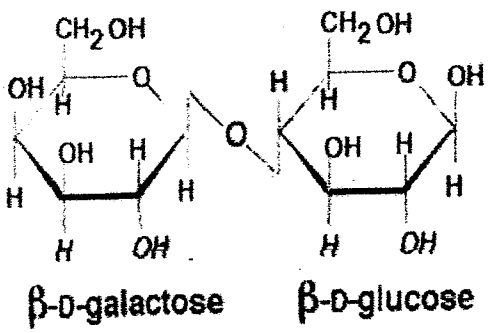
Resolution

$R = (.61 / N.A.) \times (\lambda)$

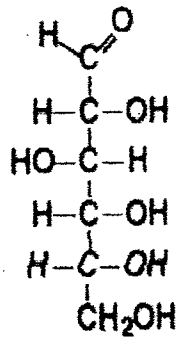
N.A. = .1 and λ = 400nm

$R = (.61 / .1) \times (400nm) = 2400nm$

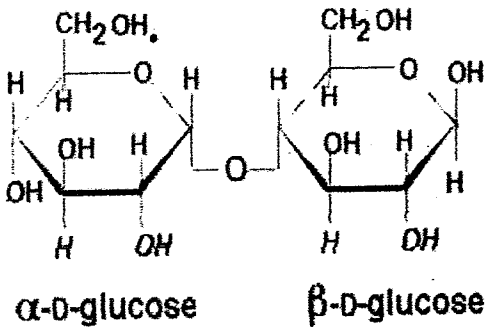
13. Lactose



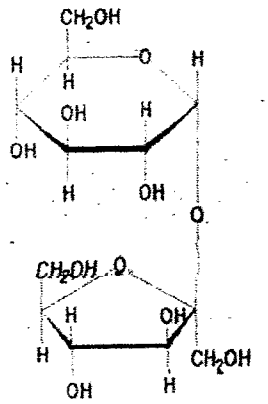
Glucose



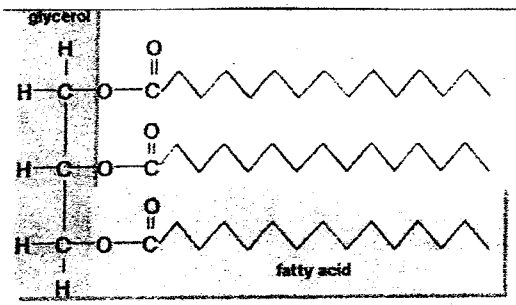
Maltose



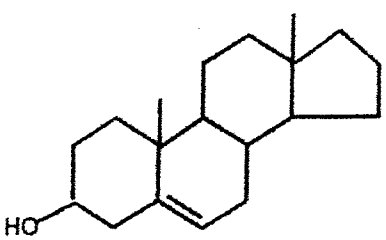
Sucrose



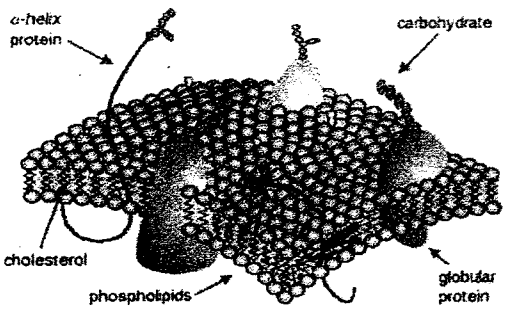
Fat



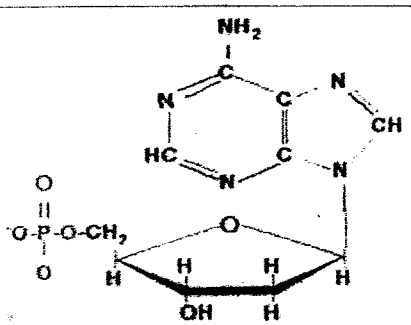
Steroid



Fluid Mosaic Model

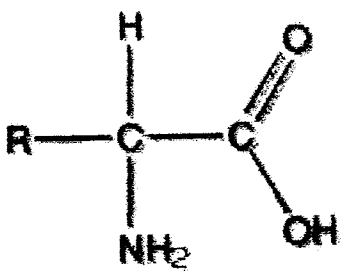


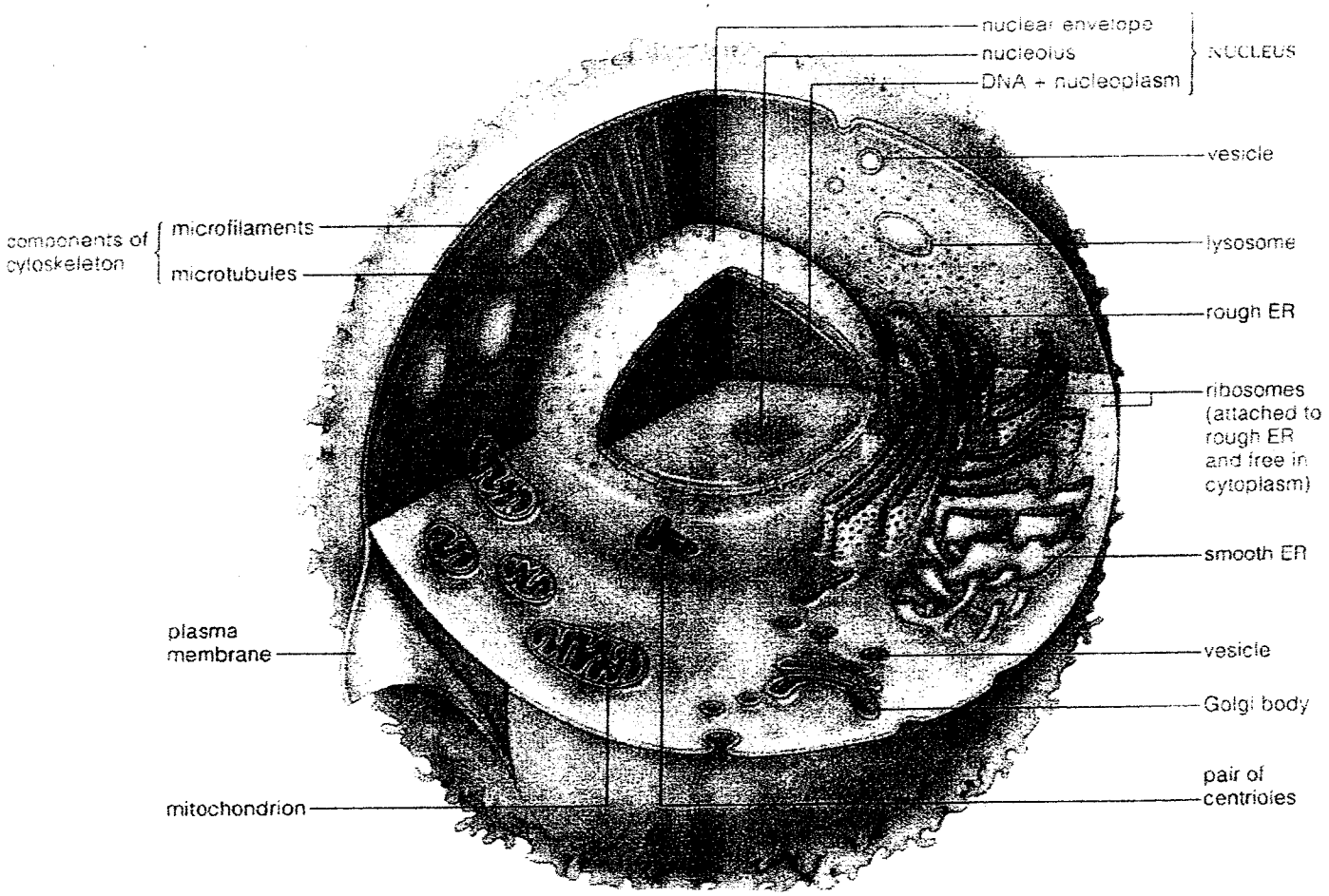
Nucleotide



DNA (double helix)

Amino Acid





15. Enzymes – a type of protein that speeds up a chemical reaction
Substrates – a reactant molecule that is specifically acted upon by an enzyme
Enzyme optima – Enzymes require certain conditions for them to function correctly
pH effects on enzymes – pH is important to enzyme activity because it changes the SHAPE of the enzyme
Temperature effects on enzymes - Temperature is important to enzyme function because it changes the SHAPE of the enzyme

Practice Exam Question for Midterm 1

1. These organelles are found in animal cells and are used primarily in the transport of materials into and out of cells;
   a. tonoplasts
   b. vacuoles
   c. vesicles
   d. plastids
   e. peroxisomes

2. Which cellular structure is NOT surrounded by at least one membrane?
   a. chloroplast
   b. nuclei
   c. lysosome
   d. ribosome
   e. Golgi body

3. Proteins are made of monomers (building blocks) called:
   a. fatty acids
   b. triglycerides
   c. monosaccharides
   d. peptides
   e. amino acids

4. The principal storage form for sugar in higher animals is:
   a. sucrose
   b. starch
   c. glucose
   d. trehalose
   e. glycogen

5. What cellular structure makes it possible for a cell to differ structurally and biochemically from its surroundings?
   a. cell wall
   b. nucleus
   c. endoplasmic reticulum
   d. phospholipids
   e. cell membrane

6. The endoplasmic reticulum is said to be rough if it has attached:
   a. ribosomes
   b. plastids
   c. mitochondria
   d. vesicles
   e. Golgi complexes

Study Guide for Midterm 1 (50 questions)

1. Examples of monosaccharides, disaccharides, polysaccharides
2. Effects of hypotonic, hypertonic and isotonic solutions on a blood cell
3. Functions of both kinds of E.R., mitochondria, cilia, flagella, chloroplasts, leucoplasts, microfilaments, lysosomes, microtubules, microfilaments, Golgi complex,
4. Electrons, protons and neutrons, atomic number, atomic mass, atomic model structure
5. Ions-examples and which have gained or lost electrons
6. Building blocks for proteins, polysaccharides, fluid mosaic model of cell membrane, cytoskeleton
7. Know these words: diffusion, osmosis, cytolysis, plasmolysis, phagocytosis, peptide bond, pH
8. Know differences between plant and animal cells
9. Know the different types of proteins (integral, transmembrane etc.)
10. People to know: Hooke, Leuwenhoek,
11. Know kinds of transport: active, passive, facilitated diffusion, etc.
12. Know how to compute magnification and resolution
13. Study the molecules shown in the biochemistry powerpoint handout (the ones I told you to study)
14. Study the cell diagram
15. Be sure that enzymes, substrates, enzyme optima, plus pH and temperature effects on enzymes are in your grasp.
16. **Read the book carefully!**