I. Cell Theory
   A. Robert Hooke

   B. Four main principles
      1. all organisms consist of one or more cells
      2. smallest living things
      3. life is a continuous form of descent
      4. 

   C. Limited in size
      1. surface-to-volume ratio
         - surface area
      2. intracellular communication

   D. Structural and functional unit of life
      - sack of rich nutrient broth

      1. cytoplasm
      2. substructures

   E. Active and vital

II. Cell Structure
   A. Main components
      1. cell membrane (plasma membrane, plasmalemma)
         a. regulation of transport in and out

         b. some molecules not well regulated

         c. some are well regulated

         d. selective permeability

      2. cytoplasm (with organelles)

   B. Cell Membrane
      1. composition
         a.

         b.

         c.
2. lipid bilayer
   a. phospholipids
   b. orientation critical

3. membrane proteins
   a. may be transmembrane proteins
   b. selective transport
   c. enzymes
   d. receptors for signal transduction

4. Fluid Mosaic Model
   1. membrane is not solid
   2. molecules not covalently bonded together
   3. lipid is like a 2-D fluid
   4. molecules move and some “float”

III. Cell Types
   A. Prokaryotes (bacteria)
      1. simple
      2. no organelles
      3. some substructures

   B. Eukaryotes
      1. membrane-bound organelles
      2. nucleus

IV. Structure of Eukaryotic Cells
   A. Cytoskeleton – structural framework extending throughout cytoplasm
      1. protein fibers
      2. functions:
         a. “skeleton and muscle” of the cell
b. maintains cell shape
   c. movement
   d. connects organelles

B. Microtubules
   1. hollow cylindrical structures
   2. support (scaffolding)
   3. movement
      - cilia and flagella (motility)
      - organelles and chromosomes

C. Microfilaments
   1. solid rods of protein (like actin)
   2. function mainly for contraction (like in muscle cells)

D. Motility
   1. cilia

   2. flagella-

   3. structure: 9+2
      - axoneme