Compare presence of:	**Plant**	**Animal**
Plasma membrane		
Cell wall		
Mitochondria		
Centrioles		
Tonoplast		
Chloroplast		
Lysosome		
Microtubules		
Cilia/flagella		
Gap junctions		
Tight junctions		
Desmosomes		
Plasmodesmata		

Type of Junction	**Plant**	**Animal**
Sealing Junctions		
Communication Junctions (aid flow of materials from cell to cell).		

trans- = across; **-port** = a harbor (*transport vesicle:* a membranous compartment used to enclose and transport materials from one part of a cell to another)
ultra- = beyond (*ultracentrifuge:* a machine that spins test tubes at the fastest speeds to separate liquids and particles of different densities)
vacu- = empty (*vacuole:* sac that buds from the ER, Golgi, or plasma membrane)

STRUCTURE YOUR KNOWLEDGE

1. The table below lists the general functions performed by an animal cell. List the cellular structures associated with each of these functions.

Functions	Associated Organelles and Structures
Cell division	a.
Information storage and transferal	b.
Energy conversions	c.
Manufacture of membranes and products	d.
Lipid synthesis, drug detoxification	e.
Digestion, recycling	f.
Conversion of H2O2 to water	g.
Structural integrity	h.
Movement	i.
Exchange with environment	j.
Cell to cell connections	k.

2. This table lists structures that are unique to plant cells. Fill in the functions of these structures.

Plant Cell Structures	Functions
Cell wall	a.
Central vacuole	b.
Chloroplast	c.
Amyloplast	d.
Plasmodesmata	e.

TEST YOUR KNOWLEDGE

MULTIPLE CHOICE: *Choose the one best answer.*

1. Which of the following is/are not found in a prokaryotic cell?
   a. ribosomes
   b. plasma membrane
   c. mitochondria
   d. a and c
   e. a, b, and c

2. Resolving power of a microscope is
   a. the distance between two separate points.
   b. the sharpness or clarity of an image.
   c. the degree of magnification of an image.
   d. the depth of focus on a specimen's surface.
   e. the wavelength of light.

3. Which of the following is *not* a similarity among the nucleus, chloroplasts, and mitochondria?
   a. They contain DNA.
   b. They are bounded by two phospholipid bilayer membranes.
   c. They can divide to reproduce themselves.
   d. They are derived from the endoplasmic reticulum system.
   e. Their membranes are associated with specific proteins.

4. The pores in the nuclear envelope provide for the movement of
   a. proteins into the nucleus.
   b. ribosomal subunits out of the nucleus.
   c. mRNA out of the nucleus.
   d. enzymes into the nucleus.
   e. all of the above.

5. The ultrastructure of a chloroplast could be seen best using
   a. transmission electron microscopy.
   b. scanning electron microscopy.
   c. phase-contrast light microscopy.
   d. cell fractionation.
   e. fluorescence microscopy.

6. Which of the following is *incorrectly* paired with its function?
   a. peroxisome—contains enzymes that break down H_2O_2
   b. nucleolus—produces ribosomal RNA, assembles ribosome subunits
   c. Golgi apparatus—processes, tags, and ships cellular products
   d. lysosome—contains pigments in plant cells
   e. ECM (extracellular matrix)—supports and anchors cells, communicates between inside and outside of cell

7. The cytoskeleton is composed of which type of molecule?
   a. protein
   b. cellulose
   c. chitin
   d. phospholipid
   e. calcium phosphate

8. A growing plant cell elongates primarily by
   a. increasing the number of vacuoles.
   b. synthesizing more cytoplasm.
   c. taking up water into its central vacuole.
   d. synthesizing more cellulose.
   e. producing a secondary cell wall.

9. The innermost portion of a mature plant cell wall is the
   a. primary cell wall.
   b. secondary cell wall.
   c. middle lamella.
   d. plasma membrane.
   e. plasmodesmata.

10. Contractile elements of muscle cells are
    a. intermediate filaments.
    b. centrioles.
    c. microtubules.
    d. actin filaments (microfilaments).
    e. fibronectins.

11. Microtubules are components of all of the following *except*
    a. centrioles.
    b. the spindle apparatus for separating chromosomes in cell division.
    c. tracks along which organelles can move using motor molecules.
    d. flagella and cilia.
    e. the pinching apart of the cytoplasm in animal cell division.

12. Of the following, which is probably the most common route for membrane flow in the endomembrane system?
    a. rough ER → Golgi → lysosomes → nuclear membrane → plasma membrane
    b. rough ER → transport vesicles→ Golgi → vesicles → plasma membrane
    c. nuclear envelope→ rough ER → Golgi → smooth ER → lysosomes
    d. rough ER → vesicles → Golgi → smooth ER → plasma membrane
    e. smooth ER → vesicles → Golgi → vesicles → peroxisomes

13. Proteins to be used within the cytosol are generally synthesized
    a. by ribosomes bound to rough ER.
    b. by free ribosomes.
    c. by the nucleolus.
    d. within the Golgi apparatus.
    e. by mitochondria and chloroplasts.

14. Plasmodesmata in plant cells are similar in function to
    a. desmosomes.
    b. tight junctions.
    c. gap junctions.
    d. the extracellular matrix.
    e. integrins.

15. In a cell fractionation procedure, the first pellet formed would most likely contain
    a. the extracellular matrix.
    b. ribosomes.
    c. mitochondria.
    d. lysosomes.
    e. nuclei.

Use the cells described as follows to answer questions 16–20.

a. muscle cell in the thigh muscle of a long-distance runner
b. pancreatic cell that manufactures digestive enzymes
c. macrophage (white blood cell) that engulfs bacteria
d. epithelial cell lining digestive tract
e. ovarian cell that produces estrogen (a steroid hormone)

16. In which cell would you expect to find the most tight junctions?

17. In which cell would you expect to find the most lysosomes?

18. In which cell would you expect to find the most smooth endoplasmic reticulum?

19. In which cell would you expect to find the most bound ribosomes?

20. In which cell would you expect to find the most mitochondria?

FILL IN THE BLANKS *with the appropriate cellular organelle or structure.*

_____ 1. transports membranes and products to various locations

_____ 2. infoldings of mitochondrial membrane with attached enzymes

_____ 3. consists of collagen, proteoglycans, and fibronectins

_____ 4. small sacs with specific enzymes for a particular metabolic pathway

_____ 5. stacks of flattened sacs inside chloroplasts

_____ 6. anchoring structure for cilia and flagella

_____ 7. semifluid medium between nucleus and plasma membrane

_____ 8. system of fibers that maintains cell shape, anchors organelles

_____ 9. connection between animal cells that creates impermeable layer

_____ 10. membrane surrounding central vacuole of plant cells