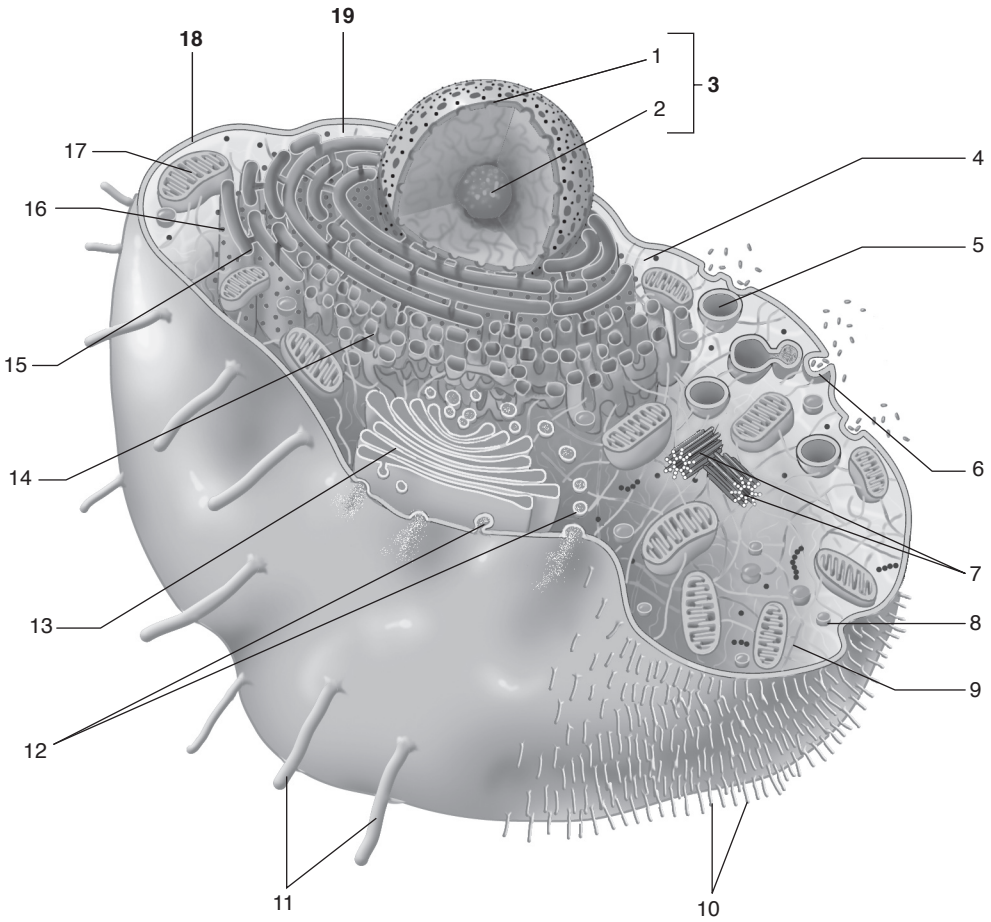
1. Cell Structure

a. Label the diagram of the cell by placing the numbers of the structures by the labels listed.

7 Centrioles	**17** Mitochondrion	**15** RER
11 Cilia	**1** Nuclear envelope	**4** Ribosome in cytoplasm
19 Cytoplasm	**2** Nucleolus	**16** Ribosome on RER
13 Golgi complex	**3** Nucleus	**12** Secretory vesicles
5 Lysosome	**6** Phagocytic vesicle	**14** SER
9 Microtubule	**18** Plasma (cell) membrane	**8** Vesicle
10 Microvilli		



b. Write the terms that match the phrases in the spaces at the right.

1) Endoplasmic reticulum with ribosomes.	**RER**
2) Forms cytoskeleton (two answers).	**Microfilament**
	Microtubule
3) Packages materials for export from cell.	**Golgi apparatus**
4) Sites of protein synthesis.	**Ribosomes**
5) Composed of DNA and protein.	**Chromosomes**
6) Intranuclear site of rRNA synthesis.	**Nucleolus**
7) Sites of cellular respiration.	**Mitochondria**
8) Controls movement of materials between nucleus and cytoplasm.	**Nuclear envelope**
9) Endoplasmic reticulum without ribosomes.	**SER**
10) Vesicles of digestive enzymes.	**Lysosomes**
11) Provides motility for sperm.	**Flagellum**
12) Short cylinders formed of microtubules.	**Centrioles**
13) Semi-liquid around organelles.	**Cytoplasm**
14) Short, hairlike projections that move substances across cell surfaces.	**Cilia**
15) Controls movement of materials into and out of the cell.	**Cell membrane**
16) Sites of aerobic cellular respiration.	**Mitochondria**
17) Contains chromosomes.	**Nucleus**
18) Forms channels for material transport in the cytoplasm.	**Endoplasmic reticulum**
19) Molecule determining inheritance.	**DNA**
20) Organelle controlling cell functions.	**Nucleus**

2. Transport Through Plasma Membranes

a. Match the terms and phrases.

Diffusion Osmosis Phagocytosis Pinocytosis

1) Diffusion of water.	**Osmosis**
2) Engulfment of small particles.	**Phagocytosis**
3) Engulfment of liquid droplets.	**Pinocytosis**
4) Movement of molecules from an area of higher concentration to areas of lower concentration.	**Diffusion**
5) Results from random molecular movement.	**Diffusion; Osmosis**

b. Identify the transport processes as either active (A) or passive (P).

A By carrier proteins	**P** Osmosis
P Diffusion	**A** Pinocytosis
A Phagocytosis	**A** Exocytosis

c. Consider the solutions below that are separated by a selectively permeable membrane. Use arrows to show the direction of diffusion. In 1, show the direction of *water* movement. In 2, show the direction of *solute* movement.

1)

A ← B	
10% protein solution	5% protein solution

2)

A → B	
10% salt solution	5% salt solution

3) In 1, which solution is hypotonic? **B**

4) In 2, which solution is hypertonic? **A**

5) Describe what happens when a human cell is placed in a hypotonic solution. **Water enters the cell causing it to swell and finally burst.**

3. Cellular Respiration

a. Write the summary equation for the cellular respiration of glucose. Words may be used instead of chemical formulas.

Glucose + oxygen → carbon dioxide + water + energy

b. Completion

1) List the products of cellular respiration. **Carbon dioxide** **Water** **Energy**

2) The source of energy captured in ATP. **Glucose**

c. Explain why cellular respiration is a continuous process. **A continuous supply of ATP is required to provide energy for the metabolic processes of life.**

4. Protein Synthesis

Completion

1) The genetic code consists of the sequence of bases in _____ molecules. **DNA**

2) The genetic code is transcribed to the sequence of bases in _____ molecules. **mRNA**

3) Molecule that carries instructions for protein synthesis to ribosomes. **mRNA**

4) Molecule that carries amino acids to ribosome for addition to amino acid chain. **tRNA**

5) Small molecules that join to form a protein during translation. **Amino acids**

5. Cell Division

a. Indicate the type of cell division described by the statements.

1) Provides new cells for growth and repair. **Mitotic cell division**

2) Forms sperm and ova. **Meiotic cell division**

3) Daughter cells have same chromosome number and composition as parent cell. **Mitotic cell division**

4) Daughter cells have half the number of chromosomes as the parent cell. **Meiotic cell division**

b. Select the phase of the cell cycle described by the statements.

Interphase Prophase Metaphase Anaphase Telophase

1) Division of the cytoplasm. **Telophase**

2) Replication of chromosomes. **Interphase**

3) Chromosomes appear as threadlike bodies. **Prophase**

4) Chromatids move toward ends of spindle. **Anaphase**

5) New nuclei start to form. **Telophase**

6) Occupies most of cell cycle. **Interphase**

7) Chromosomes line up at equator of spindle. **Metaphase**

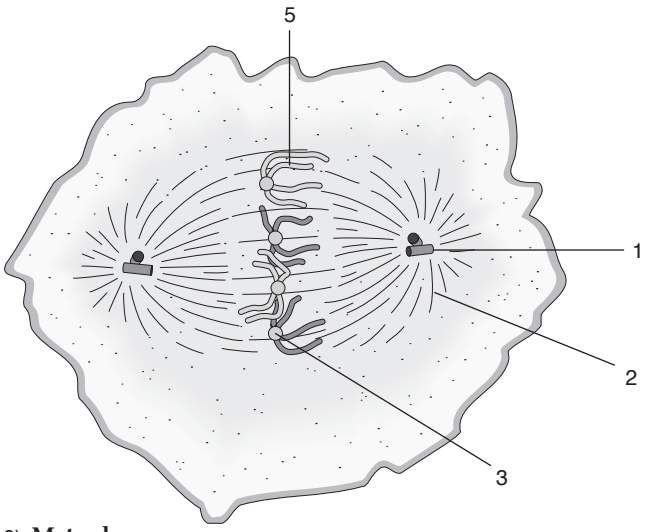
8) Cell performs its normal functions. **Interphase**

c. Human body cells have 46 chromosomes. How many chromosomes are in daughter cells formed by mitotic cell division? **46**

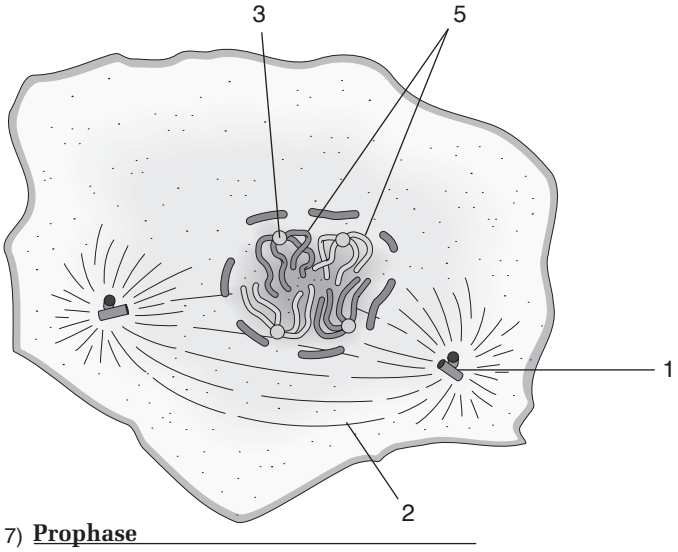
d. Write the names of the mitotic phases in the spaces provided and place the numbers of the cell parts in the spaces by the correct label.

1 Centrioles **4** Chromosome **2** Spindle fiber

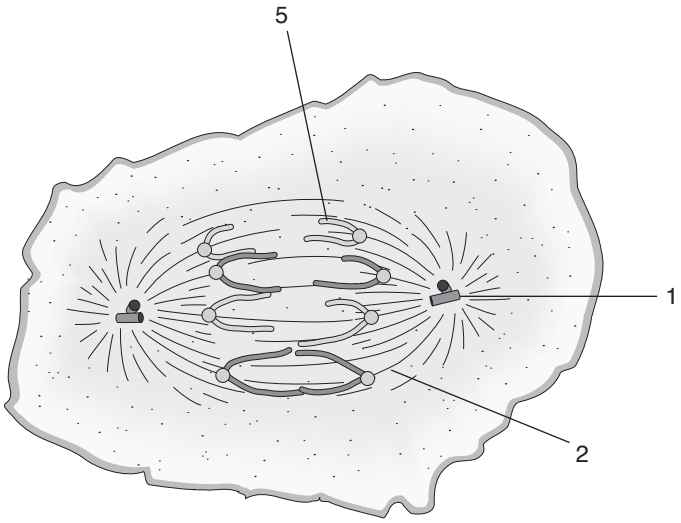
3 Centromere **5** Chromatid



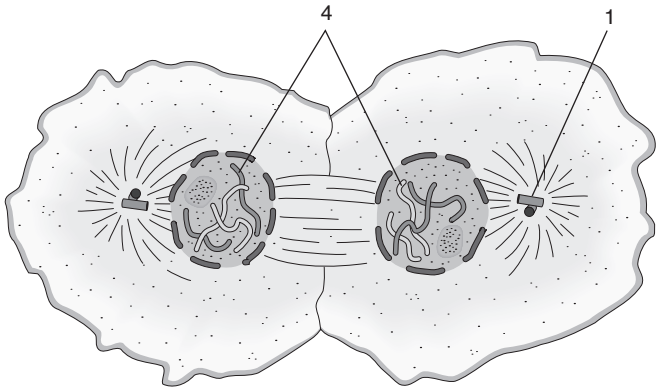
6) **Metaphase**



7) **Prophase**



8) **Anaphase**



9) **Telophase**

6. Clinical Applications

a. When you drink a glass of water, how does the water enter the blood? **By osmosis**

Why does this occur? **Water concentration in the blood is less than that in the digestive tract.**

b. Explain why a chemical therapy drug that disrupts formation of spindle fibers kills cancerous cells. **It prevents normal cell division.**