# Cell Test Review→ The Cell, Plasma Membrane, DNA, Protein Synthesis

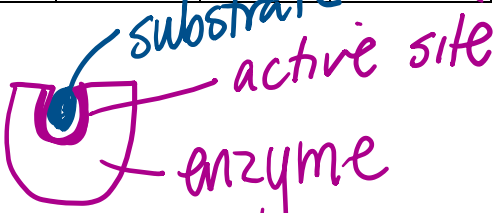
**Name:** ★Key★

**Learning Goals:**

| Learning Goals | *No Evidence 0* | *Beginning 1* | *Developing 2* | *Proficient 3* | *Sophisticated 4* |
|---|---|---|---|---|---|
| I can explain the role of enzymes in the body | | | | | |
| I can explain the structures and functions of the various parts of the cell and membrane | | | | | |
| I can explain the process of DNA Replication | | | | | |
| I can explain the process of protein synthesis and how it leads to mutations | | | | | |

**Learning Goal #1: I can explain the role of enzymes in the body**

1. What is an enzyme? Draw and label the active site, substrate, and enzyme.



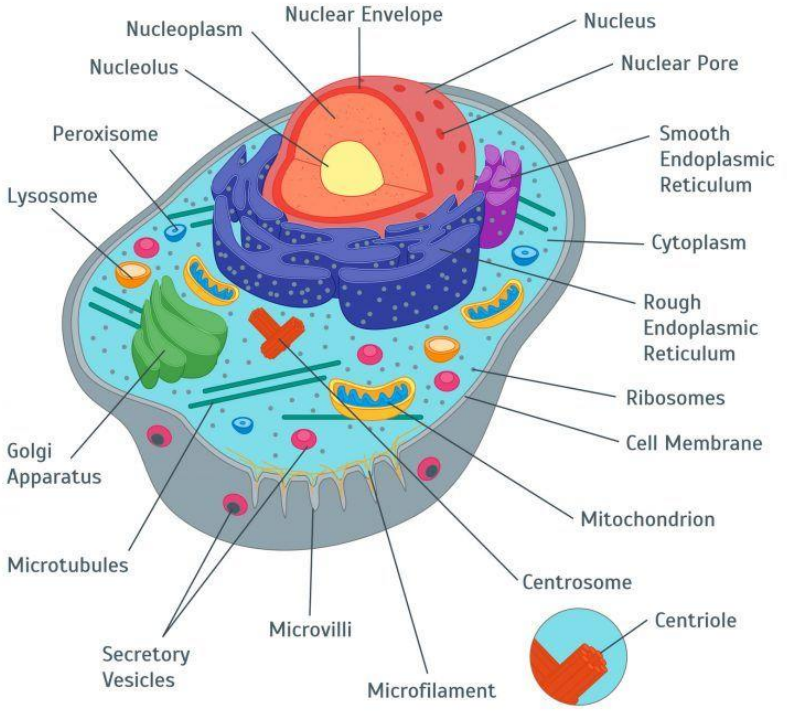

2. What does an enzyme do and how does it work?
   - hydrolysis (rip polymer apart) Catabolic Enzyme
   - dehydration synthesis (put polymer together) Anabolic. Enzyme

3. What are the 6 factors that impact enzyme functioning and how does it impact it?
   1. enzyme concentration
   2. Substrate concentrate
   3. pH
   4. temperature
   5. inhibitor
   6. co-enzyme

4. What happens if an enzyme denatures? What does this mean?
   - it will uncoil and lose it's shape. The substrate will not be able to bind to it so the reaction won't happen.

**Learning Goal #2: I will be able to label on a diagram and describe the function of the following organelles and part of the cell (including membrane)**

5. Draw an animal cell and label the following organelles. State the function of each:
   a. cell membrane control in/out
   b. cytoplasm jelly
   c. golgi body packaging
   d. lysosome break down old
   e. mitochondria ATP production
   f. nucleus (hold DNA)
   g. nuclear pore in/out nucleus
   h. nucleolus RNA production
   i. chromatin uncoiled DNA
   j. nuclear envelope nucleus membrane
   k. chromosomes DNA coiled
   l. ribosomes protein synthesis
   m. smooth and rough ER transport
   n. vesicles transport
   o. vacuole water




6. Explain what the role of a cell membrane is. Outline the changes that might occur when a cell is placed in an isotonic, hypertonic, or hypertonic solution.

Cell membrane
★controls what goes in + out of cell

Isotonic
- balanced $H_2O$
90% $H_2O$ 90% $H_2O$

Hypotonic cell burst
water enters cell
90% $H_2O$ 70% $H_2O$

Hypertonic cell shrink
70% $H_2O$ 90% $H_2O$

7. What are the different ways that materials will move into and out of a cell?

water
↓
osmosis
thru aquaporins

Small molecules uncharged
★diffusion thru bilayer

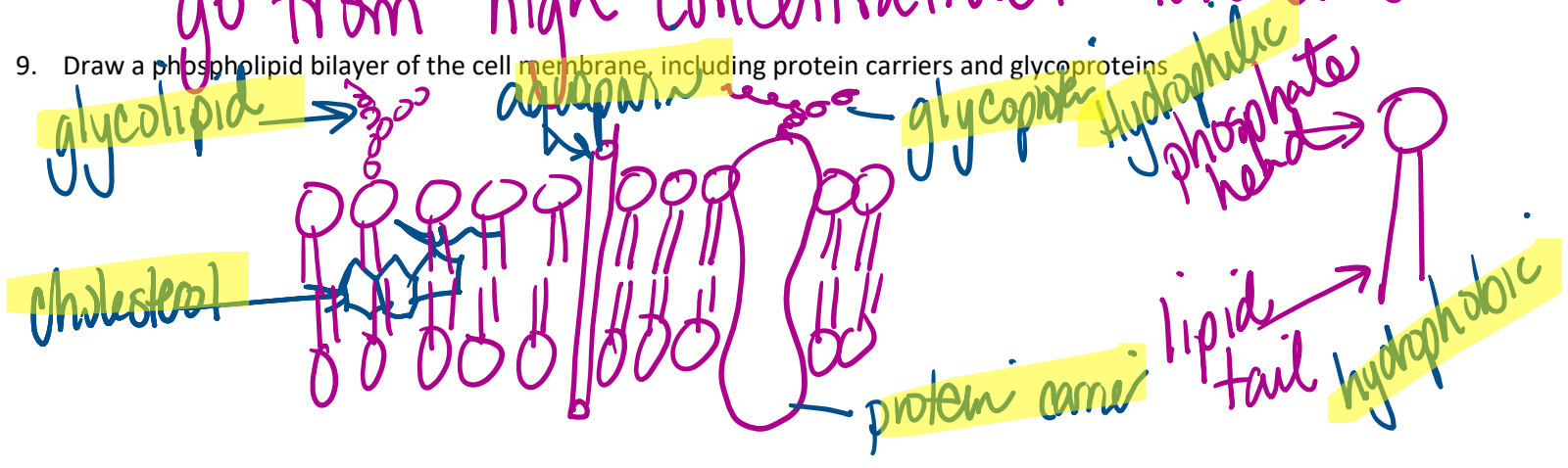
large molecules + charged
★thru protein carriers

Against gradient
★active transport
★needs ATP

8. Compare and contrast osmosis and diffusion.

Osmosis + diffusion both go from high concentration to low. concentration

9. Draw a phospholipid bilayer of the cell membrane, including protein carriers and glycoproteins



10. Explain the difference between active and passive transport.

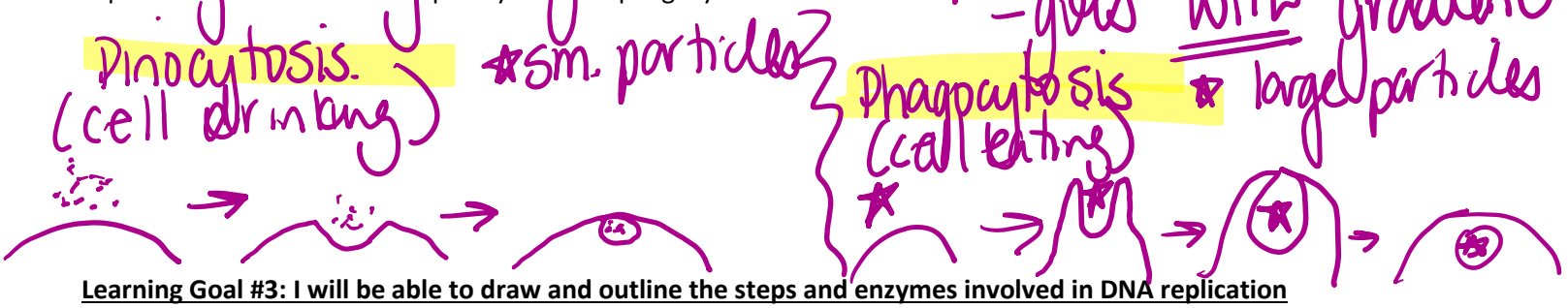
**Active transport**
- uses a protein channel
- must have ATP
- goes against gradient

**Passive transport**
- uses a protein ch.
- no ATP required
- goes with gradient

11. Explain the different between pinocytosis and phagocystosis.

**Pinocytosis** (cell drinking) ★ sm. particles

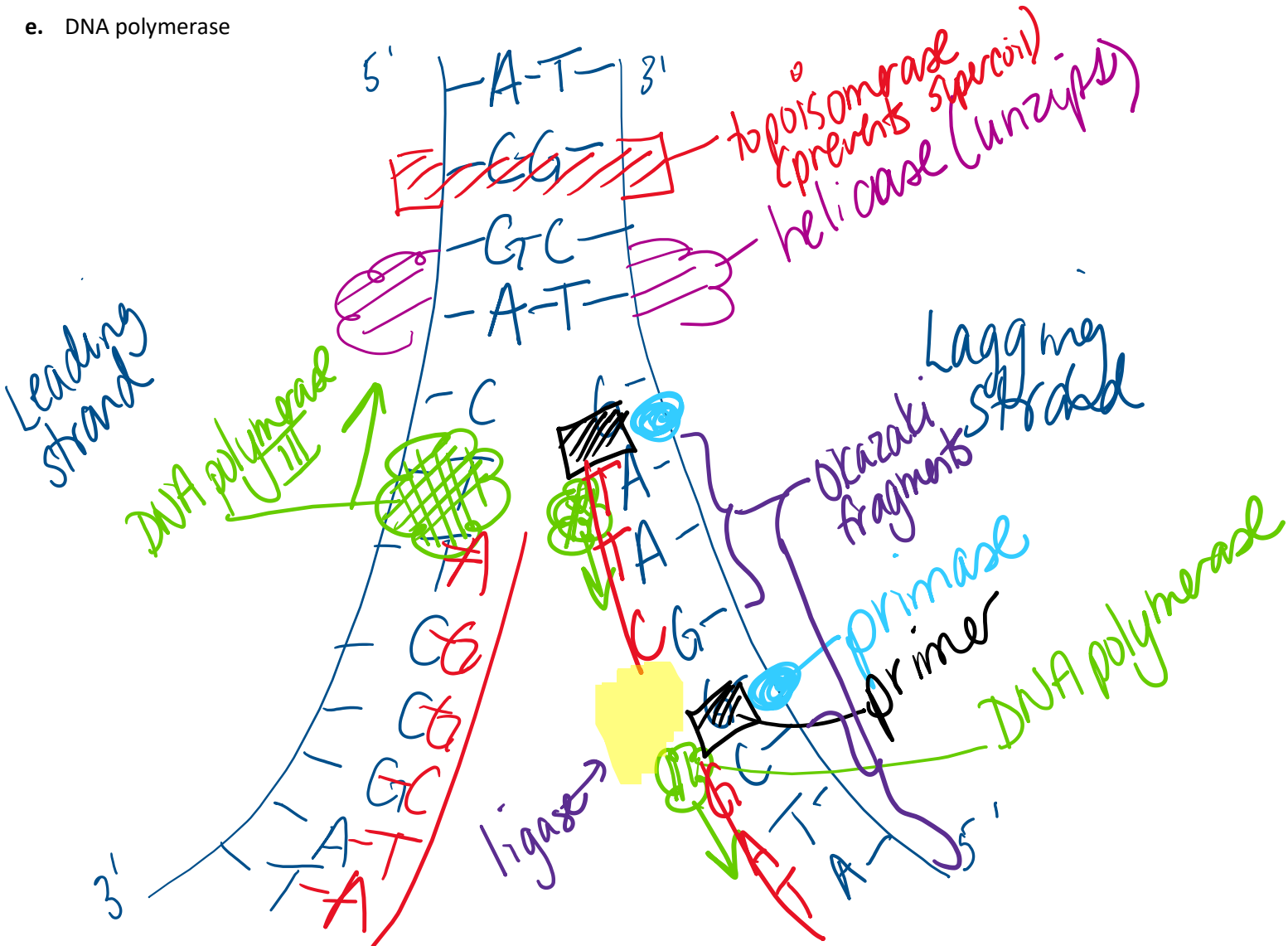
**Phagocytosis** (cell eating) ★ large particles



**Learning Goal #3: I will be able to draw and outline the steps and enzymes involved in DNA replication**

**12.** Draw and label the process of DNA replication. Be sure to label:

**a.** Leading strand
**b.** Lagging strand
**c.** Okazaki fragments
**d.** Helicase
**e.** DNA polymerase
**f.** Single stranded binding proteins
**g.** Ligase
**h.** Nitrogen base pairs
**i.** 3' and 5' ends



**Learning Goal #4: I will be able to draw and explain the steps in protein production (transcription and translation)**

1. Where does transcription occur? Nucleolus

2. What are two modifications made to the mRNA transcript before it leaves the nucleus?

1) remove introns + splice together exons
2) G' cap and poly A tail

3. Where does translation occur? Ribosome

4. What enzyme is used to place nucleotides into the mRNA transcript? RNA polymerase

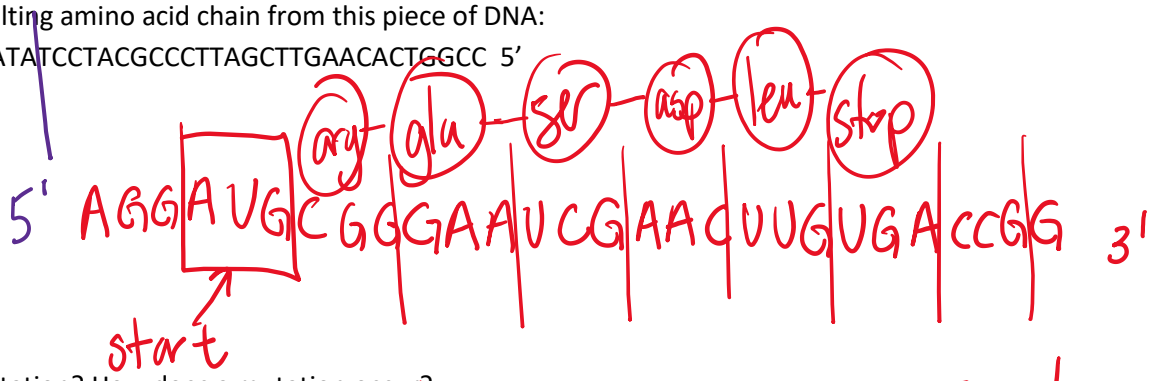
5. How does the mRNA strand indicate that the amino acid chain is finished? stop codon

6. What enzyme unwinds the original DNA strand to prepare it for transcription? RNA helicase

7. Which is removed as waste material, the exons or the introns? introns are waste DNA code

13. Give the resulting amino acid chain from this piece of DNA:

3' TATATCCTACGCCCTTAGCTTGAACACTGGCC 5'




14. What is a mutation? How does a mutation occur?

- mutation is when there is a random misread in transcription which changes mRNA code
- This can change the amino acid sequence, which changes protein folding

15. What are the 2 main types of mutations? Explain.

- Point Mutation (substitution)
- Frame Shift (addition/subtraction)

16. What does a change in protein structure do to the functioning of the protein?

- May change structure which impacts active site