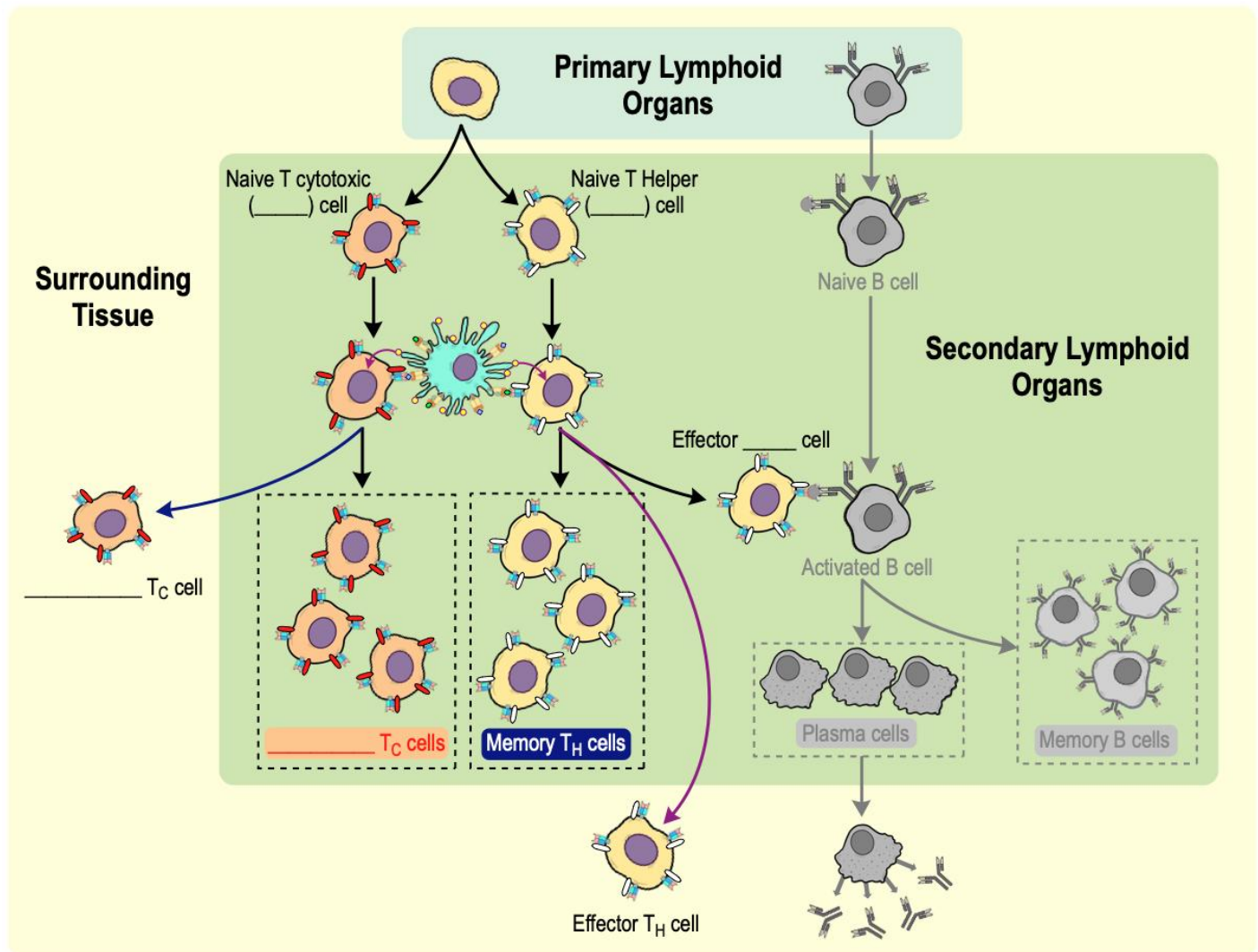


CONCEPT: INTRODUCTION TO T LYMPHOCYTES

- Recall: **Cell-Mediated Immunity:** adaptive immunity that targets & destroys *intracellular* pathogens using _____-cells.



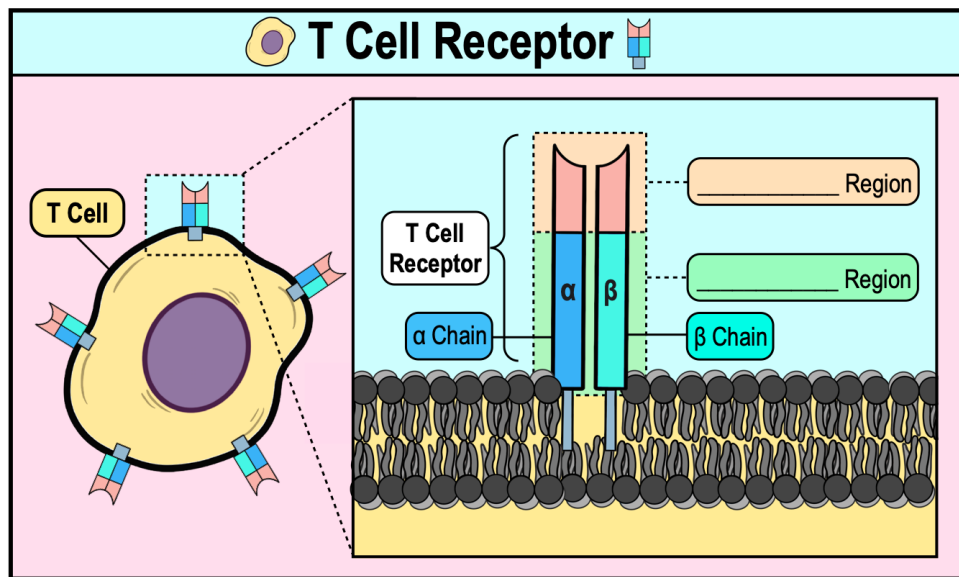
PRACTICE: Which of the following answers is a major difference between cell-mediated and humoral immunity?

- Cell-mediated immunity utilizes T cells while humoral immunity utilizes B cells to respond to infection.
- Cell-mediated immunity involves antigens presented on APCs while humoral immunity involves free antigens.
- Cell-mediated immunity responds to antigens outside of cells. Humoral immunity responds to antigens within a cell.
- A and B.
- B and C.
- All of the above are major differences between cell-mediated and humoral immunity.

CONCEPT: INTRODUCTION TO T LYMPHOCYTES

T-Cell Receptors

- **Recall:** ____-cells: develop in the *thymus* & have thousands of *identical T-Cell Receptors* embedded in their membrane.
 - **T-Cell Receptors (____s):** receptors allowing T-cells to recognize & “attack” specific *intracellular* pathogens.
- Each TCR consists of 2 polypeptide chains (α & β chains) linked via *disulfide bonds* & contain ____ different regions:
 - 1) **Variable Region:** region that ____ between different TCRs & directly ____ the *presented* antigen.
 - Amino acid sequence *variation* accounts for the many different types of antigens different TCRs bind.
 - 2) **Constant Region:** region closest to the *cell surface* & have ____ amino acid sequences.



PRACTICE: Which of the following is NOT a component of TCRs?

- a) Alpha chain.
- b) CD3 complex.
- c) Beta chain.
- d) Constant & Variable Regions.
- e) None of the above.

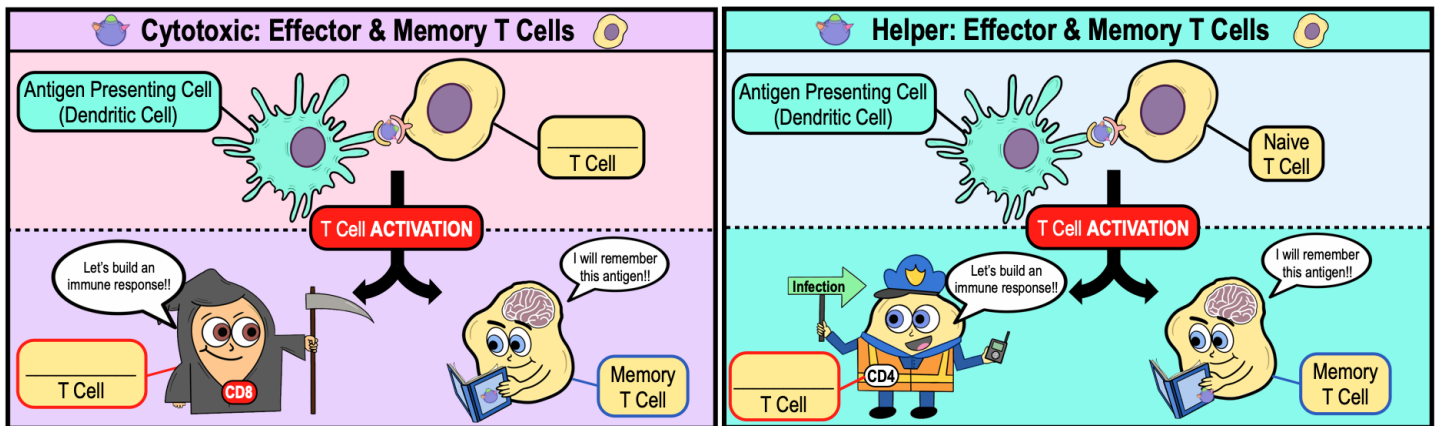
PRACTICE: What is the importance of the variable region of T-cell receptors?

- a) The variable region is the closest region to the cell's surface and stabilizes the receptor in the plasma membrane.
- b) The variable region directly binds to antigens.
- c) The variable region varies in its amino acid sequence allowing different TCRs to bind different antigens.
- d) The variable region directly binds to antibodies.
- e) A and B.
- f) B and C.
- g) C and D.

CONCEPT: INTRODUCTION TO T LYMPHOCYTES

Naive T Cells Become Effector & Memory T Cells

- Before a T cell encounters a *presented* antigen, it exists in an _____ form called a **naive T cell**.
 - When **naive T cells** encounter a presented antigen on a *dendritic cell*, it is _____.
- **Activated** T cells proliferate (*multiply*) & differentiate (*change phenotype*) to become **effector** or **memory** T cells.
 - **Effector T cells:** _____-lived cells generating an *immediate* immune response to 1st infection.
 - **Memory T cells:** _____-lived cells that “remember” the antigen & respond *faster* in future infections.
- There are 2 types of *effector* & *memory* T cells (cytotoxic vs. helper).



PRACTICE: a naive lymphocyte:

- Has encountered an antigen with its receptor but has not yet produced antibodies.
- Has not yet encountered an antigen recognized by its receptors but is producing antibodies.
- Has encountered an antigen and has undergone apoptosis.
- Has fully developed antigen receptors but has not yet encountered an antigen.
- Has produced antibodies despite not having developed receptors.

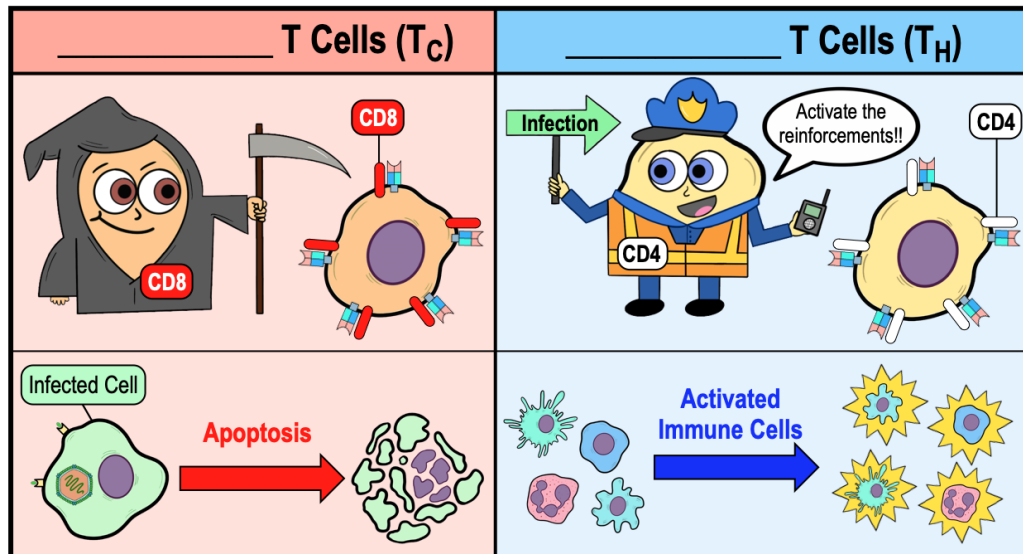
PRACTICE: Which of the following statements about effector T cells is NOT true?

- Effector T cells are long-lived cells that allow the immune system to respond quickly to subsequent infections.
- Effector T cells can take two forms: Cytotoxic T Cells & Helper T Cells.
- Effector T cells trigger an immediate immune response to a novel infection.
- Effector T cells are short-lived immune cells.
- All of the above statements about effector T cells are true.

CONCEPT: INTRODUCTION TO T LYMPHOCYTES

Cytotoxic T Cells vs. Helper T cells

- Recall: there are ____ types of *effector* & *memory* T cells responsible for generating an immune response to antigens.
 - 1) **Cytotoxic T Cell (T_C or ____ Cell)**: induces *apoptosis* of host cells infected with *intracellular* pathogens.
 - 2) **Helper T Cell (T_H or ____ Cell)**: produce cytokines to *help* stimulate & activate other immune cells (ex. B cells).
- **CD (Cluster of Differentiation) Markers**: *clusters* of surface proteins on T cells used to differentiate T_C & T_H cells.
 - CD markers ($T_C = CD8$ & $T_H = CD4$) _____ the interactions & functions of T_C & T_H cells.



PRACTICE: CD markers differentiate the two types of effector T cells. Cytotoxic T cells have _____ markers while helper T cells have _____ markers.

- a) CD3; CD4.
- b) CD4; CD5.
- c) CD8; CD6.
- d) CD8; CD4.

PRACTICE: Which of the following statements about cytotoxic T cells is true?

- a) When cytotoxic T cells encounter an antigen, they produce cytokines to stimulate other immune cells.
- b) When cytotoxic T cells encounter “presented” antigens, they send signals triggering apoptosis in the infected cell.
- c) When cytotoxic T cells encounter an antigen, they recruit B cells to produce antibodies.
- d) Cytotoxic t cells only recognize and respond to “free” antigens.