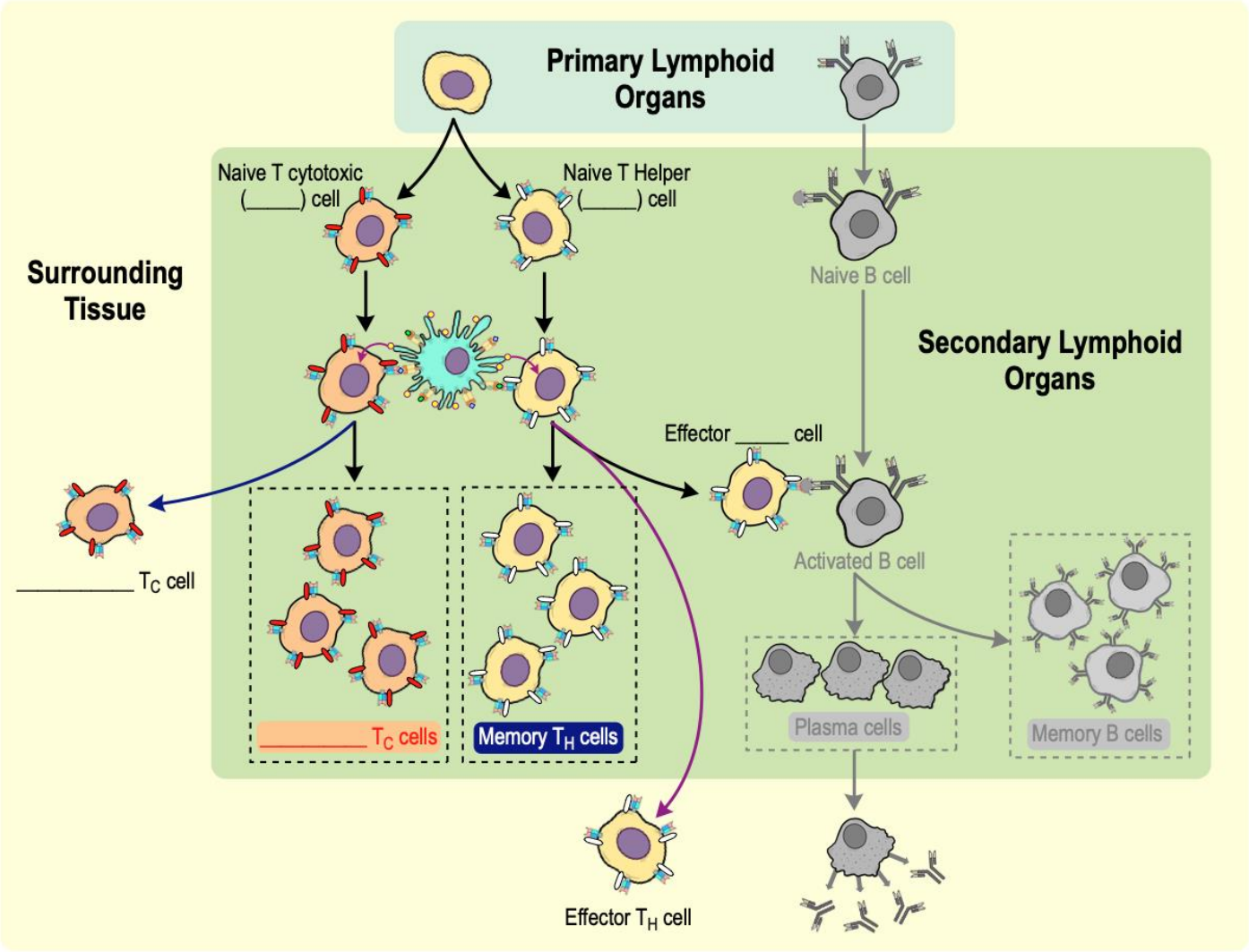
CONCEPT: INTRODUCTION TO T LYMPHOCYTES

●*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?

a) Cell-mediated immunity utilizes T cells while humoral immunity utilizes B cells to respond to infection.

b) Cell-mediated immunity involves antigens presented on APCs while humoral immunity involves free antigens.

c) Cell-mediated immunity responds to antigens outside of cells. Humoral immunity responds to antigens within a cell.

d) A and B.

e) B and C.

f) All of the above are major differences between cell-mediated and humoral immunity.

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T-Cell Receptors

●*Recall*: ____**-cells:** develop in the *thymus* & have thousands of *identical T-Cell Receptors* embedded in their membrane.

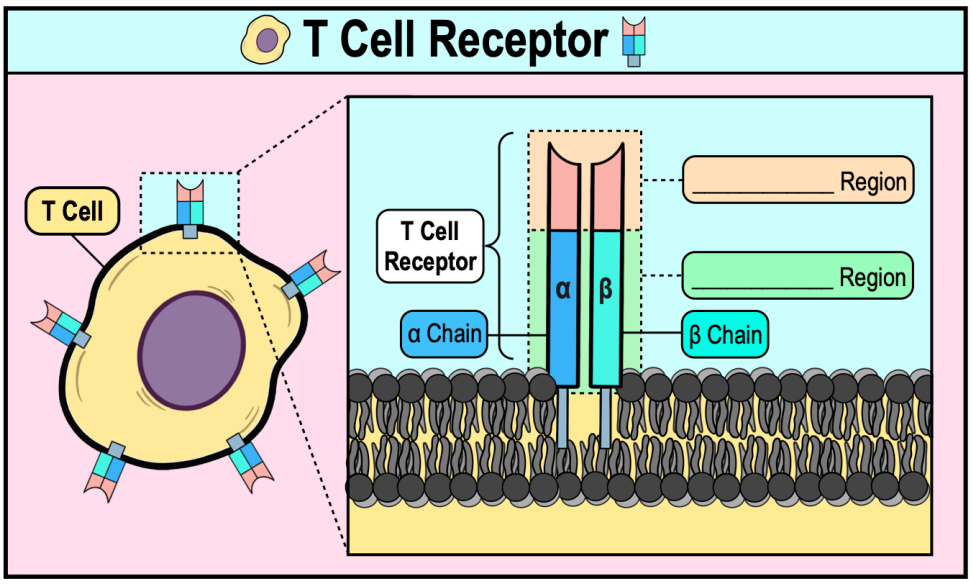
□ **T-Cell Receptors (_____s):** receptors allowing T-cells to recognize & "attack" specific *intracellular* pathogens.

●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***.

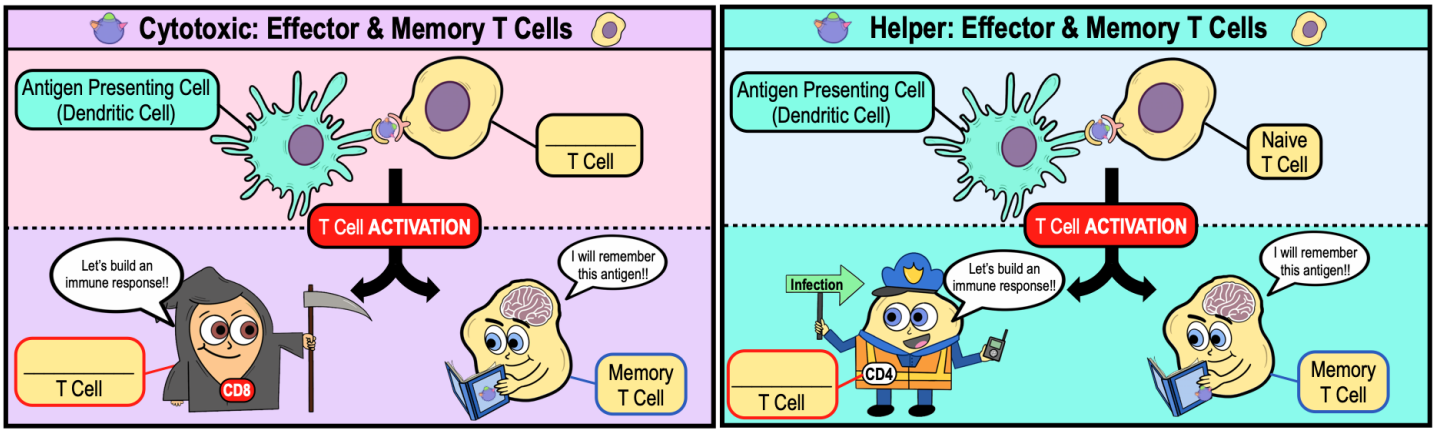
□ When **naive T cells** encounter a presented antigen on a *dendritic cell*, it is _____.

●*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:

a) Has encountered an antigen with its receptor but has not yet produced antibodies.
b) Has not yet encountered an antigen recognized by its receptors but is producing antibodies.
c) Has encountered an antigen and has undergone apoptosis.
d) Has fully developed antigen receptors but has not yet encountered an antigen.
e) Has produced antibodies despite not having developed receptors.

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

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

CONCEPT: INTRODUCTION TO T LYMPHOCYTES

Cytotoxic T Cells vs. Helper T cells

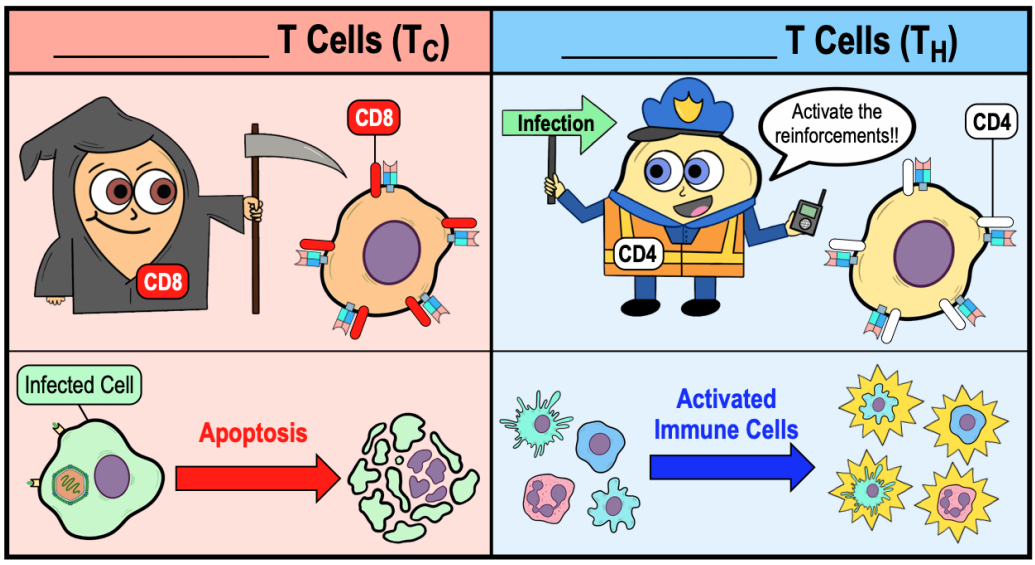
●Recall: there are ____ types of *effector & memory* T cells responsible for generating an immune response to antigens.

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.