

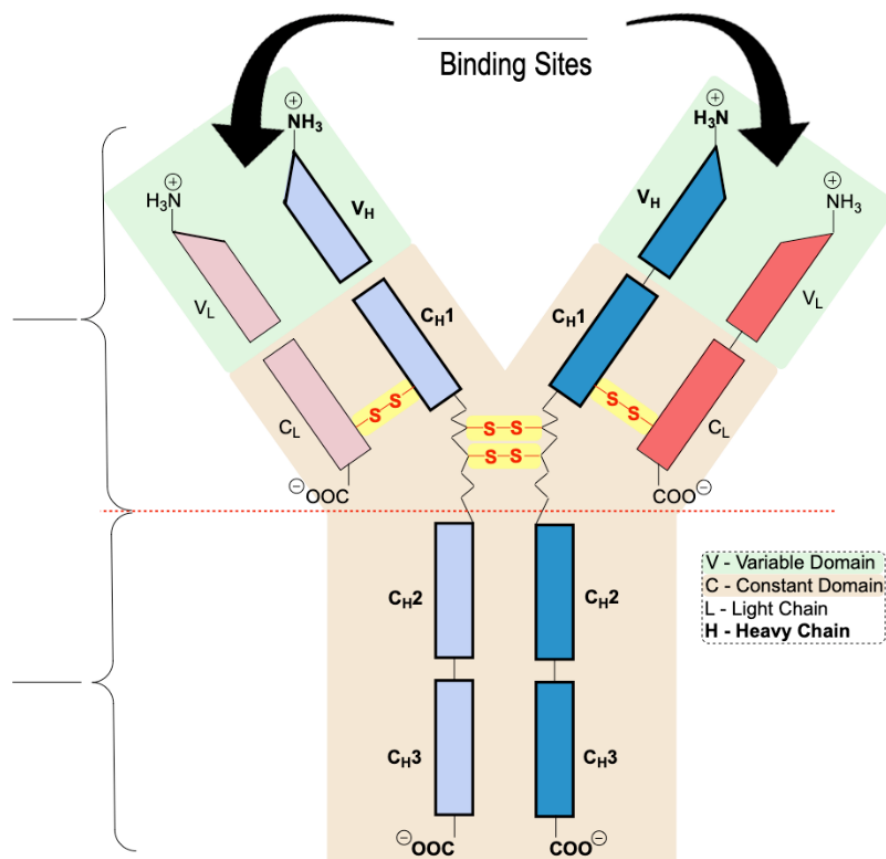
CONCEPT: ANTIBODIES

- **Antibodies:** “___”-shaped proteins produced by *plasma* cells that can bind antigens & generate an immune response.
 - Antibodies are also called *immunoglobulins* (or *Ig*) & they typically have the same general structure.

Antibody Structure

- Antibodies consist of ___ polypeptide chains: two *identical* ___ (L) chains & two identical ___ (H) chains.
 - These 4 chains are *covalently* linked together via ___ bonds.
- Each light & heavy chain has a *variable* region (___ domain) and a *constant* region (___ domain).
 - *V domain*: located at the tip (N-terminal) of each prong of the “Y” and contains the ___ binding site.
 - *C domain*: located at the hinge & stem of the “Y” and is recognized by ___ system cells.
 - If antibody is broken at the hinge of the “Y”, it leaves the prongs (___) and the stem (___).

EXAMPLE: Antibody Structure:



PRACTICE: _____ is another name for antibodies.

- a) Epitope.
- b) Immune protein.
- c) Antigen.
- d) Immunoglobulin.

CONCEPT: ANTIBODIES

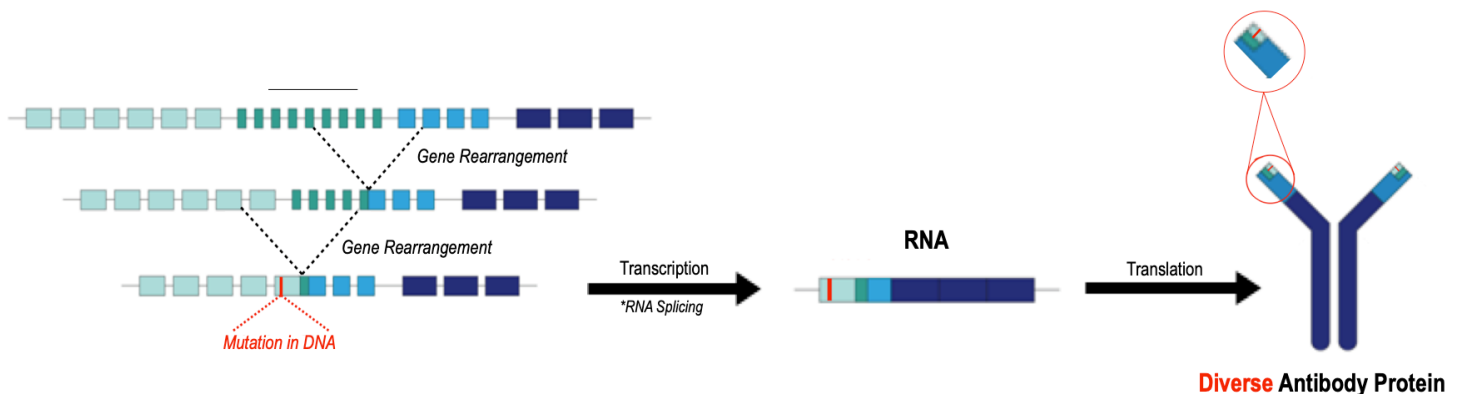
PRACTICE: An antibody's variable region:

1. Varies in amino acid sequence to allow different antibodies to bind different antigens.
 2. Is located in the hinge and stem regions of an antibody.
 3. Is a portion of the light chain of an antibody.
 4. Is a portion of the heavy chain of an antibody.
- a) 1 & 2. d) 1, 2, & 3.
b) 1 & 3. e) 1, 3, & 4.
c) 3 & 4. f) 1, 2, 3, & 4.

Antibody Diversity

- Our immune system has *potential* to produce an _____ number of *different* antibodies (perhaps $> 10^{18}$).
 - So many potential antibody possibilities that they all cannot be produced in one lifetime.
- *Question:* how is antibody diversity SO LARGE if humans only have ~25,000 genes?
 - Antibody diversity results from significant amounts of *gene* _____, *splicing*, & *mutations*.

EXAMPLE: Antibody diversity.



PRACTICE: Genetic recombination frequently occurs in the body's B cell population. Why is this advantageous to the immune system?

- a) More genetic diversity in antibody genes creates more diversity in antibodies.
- b) Having the ability to produce more diverse antibodies allows B cells to respond to a larger number of pathogens.
- c) More genetic diversity allows CD8 effector cells to be able to recognize and kill more endogenous pathogens.
- d) A and B.
- e) B and C.
- f) All of the above.