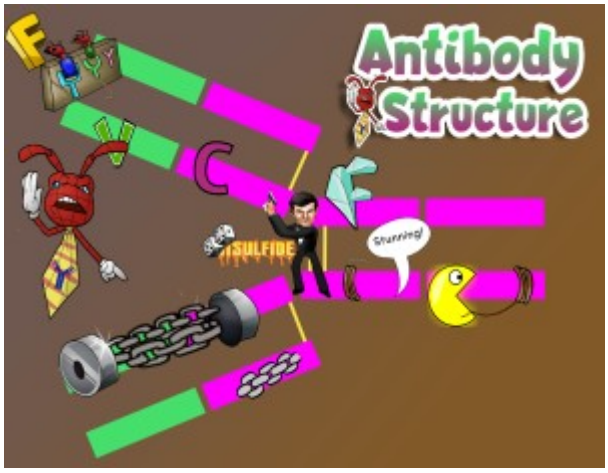
Antibody Structure



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V (Variable) Region
V
V region, also known as variable region, is responsible for antigen binding. The antibody is composed of four chains, each with a variable (V) region at the amino terminus that contributes to the antigen-binding site. Additionally, each chain has a constant (C) region that determines the isotype. The heavy chain's isotype determines the antibody's functional properties.

C (Constant) Region
C
Antibodies are proteins that have a constant region with a specific amino acid sequence that determines how they destroy antigens. There are five major classes of antibodies: IgM, IgG, IgA, IgD, and IgE. Each class has a different structure and function, but the amino acid sequence in their constant regions remains the same across all antibodies of the same class.

Fab
F-Ant-gem
Fab stands for Fragment Antigen Binding. Each B cell produces only one antigen specificity by determining the unique antigen-binding pocket of the idiotype. The fab region consists of light and heavy chains that can recognize antigens. The heavy chain is present in the Fab and Fc regions. The light chain is only present in the Fab region.

Antigen-Binding Site
Ant-gem Binding Site
The antigen-binding site is located between an antibody's heavy and light chains. The binding of the antibody to the unique region called an epitope occurs at the antigen-binding site, also known as the paratope. The paratope is situated at the tip of the variable region of the antibody, and it can bind to only one unique epitope.

Heavy Chain
Heavy-weight Chain
An antibody is comprised of two heavy chains and two light chains. The heavy chain of an antibody determines its class. Each chain has one NH2-terminal variable domain and one or more COOH-terminal constant domains, each consisting of about 110-130 amino acids. The heavy chain is situated in the inner part of the antibody structure, forming a Y-shaped pattern.

Light Chain
Light Chain
Two light chains and two heavy chains of the antibody come together to form a structure that resembles the shape of a "Y." An antibody always consists of two identical light chains, which are in the outside part of the antibody structure.

Disulfide Bonds
Dice-sulfide Bond
The four chains of an antibody (2 light chains and 2 heavy chains) are held together by a combination of non-covalent and covalent (disulfide) bonds.

Fc

F-Crystal

Fc stands for Fragment, crystallizable. The Fc region of IgM and IgG fixes complement. The Fc region utilizes the mnemonic of the 5 C's, which stand for Carboxy terminal, Constant, Carbohydrate side chains, Confers (determines) isotype (IgM, IgD, etc,.), and Complement binding.

Complement Binding

Complimenting Binding

Complement binding is present in the Fc region of the antibody structure.

Macrophage Binding

Mac-man Binding

Macrophage binding is present in the Fc region of the antibody structure.