Definition

- Antibody is a large protein ,constitiutes γ-gloublin produced by plasma cells
- It is used by the immune system to identify and nutralize pathogens such as bacteria and viruses
- Antibodies are also called Immunogloublins
- The antibody recognizes a unique molecule of the harmful agent called ANTIGEN,via the variable region

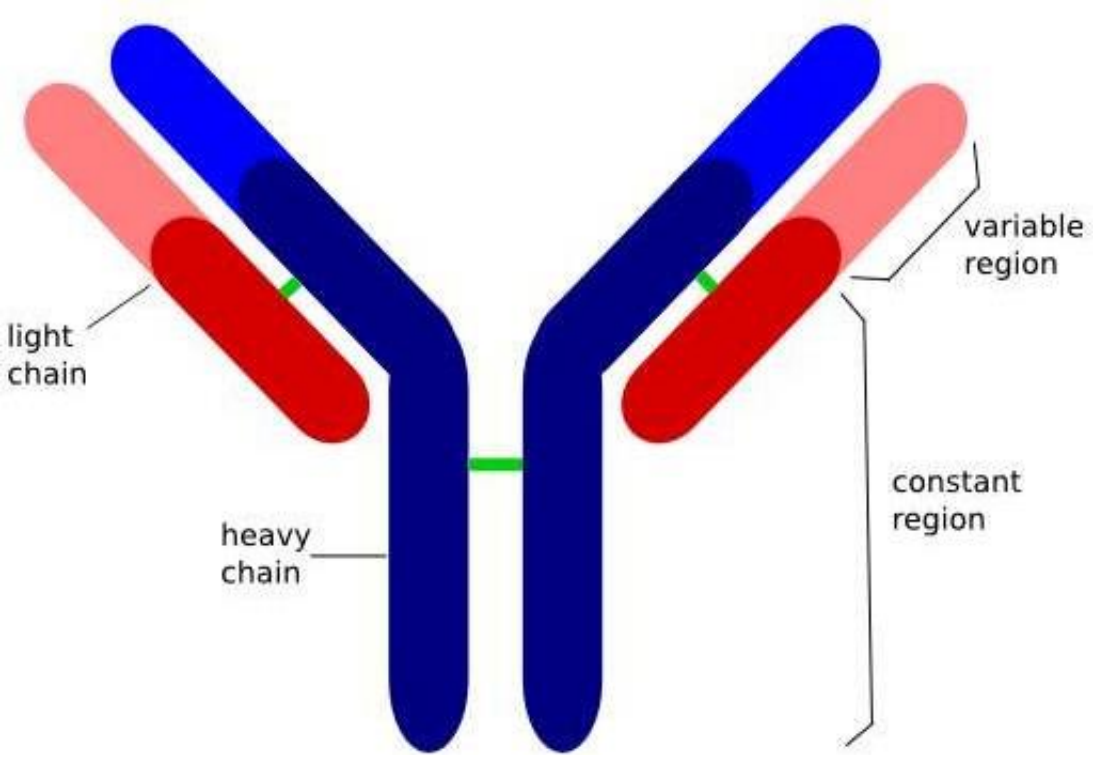
History

- In 1940s some facts are recognised :
- Antibodies is genrally bivalent
- Antibodies contains hapten ,it is a heterogenous with respect to affinity
- Antibodies are different classes based on Ultra Centrifugation,Electrophorosis

STRUCTURE

- All antibodies share a basic structure
- Antibodies are heavy globular plasma proteins[or]glycoproteins
- The attached glycans are critically important to the structure and function of the antibody
- Each antibody is heterodiamer with a molecular weight of approximately 150KD

Basic structure of Antibody



IMMUNOGLOBULIN DOMAINS

- Antibody is composed of two identical heavy polypeptide chains and two identical light chains,bonded via interchain disulphide[s-s] linkages
- Each chain is composed of structural domains called Immunoglobulin domains
- These domains contains about 70-110 aminoacids

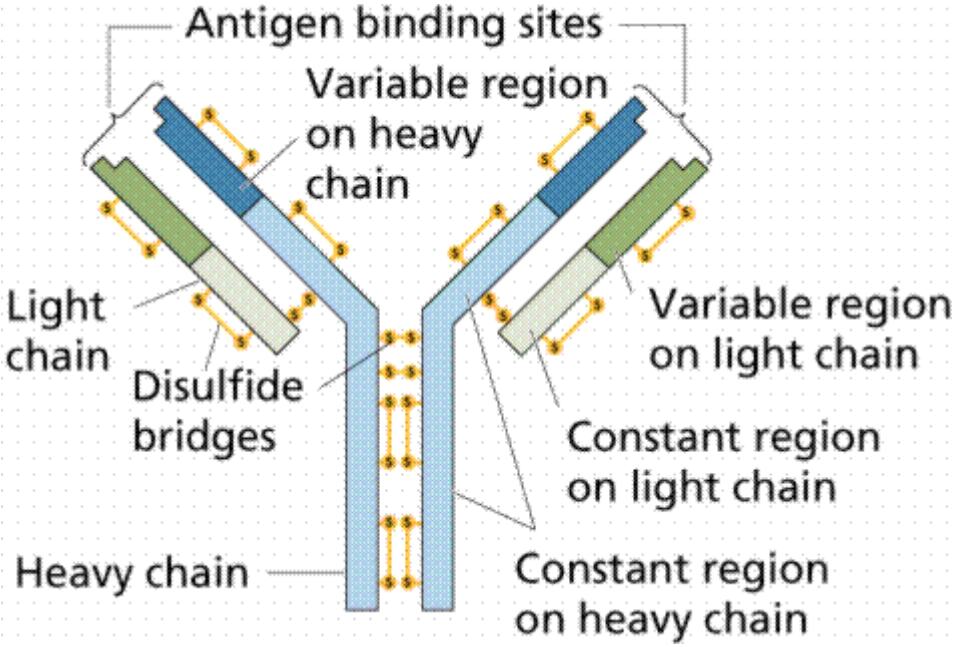
HEAVY CHAINS

- Five types of heavy chains are present
- They are;1)alpha(α) 2)gamma(γ) 3)delta(Δ)
- 4)epsilon 5)mu(μ)
- Each heavy chain has two regions,one constant region and one variable region
- Alpha and gamma chains contains approximately 450 aminoacids, where as mu and epsilon chains have approximately 550 aminoacids

LIGHT CHAINS

- Two types of light chains are present
- They are;1)kappa 2)lambda
- All antibodies have one of the two kinds of light chains
- A light chain has two successive domains,one constant domain and one variable domain
- The approximate length of a light chain is 211-217 aminoacids

Sites of Immunogloublin



DIFFERENT CLASSES OF ANTIBODIES

- There are five classes of antibodies are present
- They are;1)IgG 2)IgM 3)IgA
- 4)IgD 5)IgE
- The antibody classes are named as correspond to their heavy chain types

1)IgG

- They makes up approximately 80% of the serum antibodies
- They has a half-life of 7-23 days
- IgG is a monomer and has 2-epitope binding sites
- This is the only class of antibodies that can cross the placenta and enter the fetal circulation

Functions

- Immunity to new born
- Neutralisation of Toxins
- IgG3 binds to Fc receptor by Phagocytosis

2)IgM

- They makes up approximately 13% of the serum antibodies
- They has a half-life of about 5 days
- Most of the IgM are pentamer and has 10 - epitope binding sites.some are momomer
- It is the first immunoglobulin class produced in a primary response to antigen

functions

- Activation of classical pathway
- Defence against multivalent antigens
- Act as Opsonin

3)IgA

- They makes up approximately 6% of the serum antibodies
- They has a half-life of approximately 5 days
- IgA is a dimer and has 4-epitope binding sites
- They found mainly in body secretions such as saliva,mucous,tears,colostrum and milk

Functions

- It as a Seceratory antibody
- Effective against virus that causing Influnza
- Production to Infant gut

4)IgD

- They makes up approximately 0.2% of the serum antibodies
- IgD is a monomer and has 2-epitope binding sites
- This class antibodies are found on the surface of B-lymphocytes

Function

- B cell activation.
- Act a receptor for antigen binding

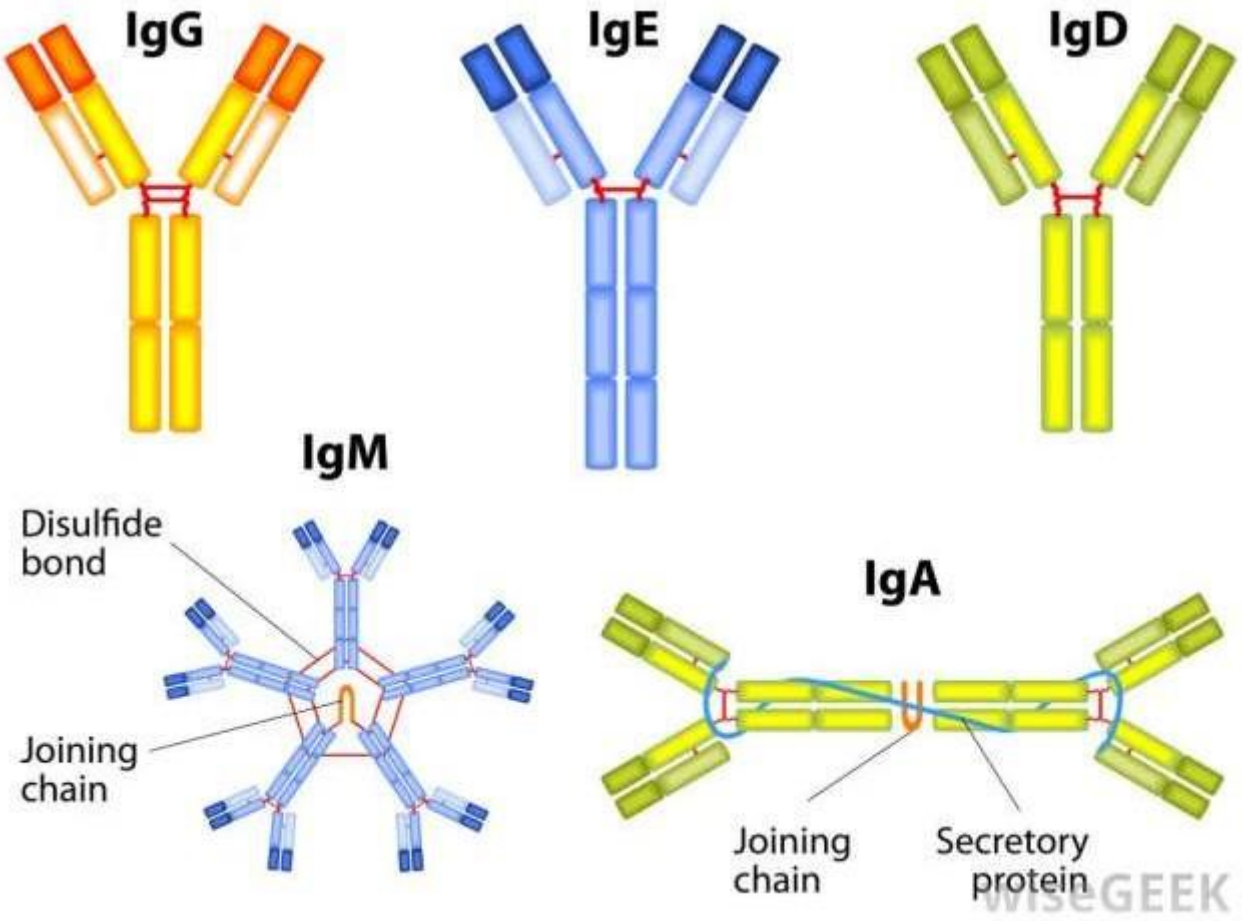
5)IgE

- It was discovered by KandT Ishizaka
- It is very low concentration in blood(17-450ng/ml)
- It contain small percentage of Lympocytes

Functions

- Responsible for Immediate hypersensitivity
- Binds to Fc receptor on basophils and mast cells
- Release of substance like histamine ,vasoactive mediators

Structures of Antibodies



Thank you