Acquired immunity

It immunity acquired by an individual after birth as a result of exposure to various factors of any place in the body in response to the entry antigen or is the ability to make up immunity against factors such as microbes, chemical compounds and toxins ..... and produce specific antibodies. and being characterized as the quality and specialization for one of the types of antigens is called also the name of the specific immune. Specific Immunity can be divided into two types by the body's response towards entry antigens

1- **Humoral immunity**

And the so-called B-cell immunity in this type of immunity the body activation of B-lymphocyte to produce specific antibodies combine with foreign body and destroy it.

humoral immunity can be defined as one of the types of active immunity which the body can make up the antibodies as a response to the presence of foreign body or antigens.

2 - **Cell mediated immunity**

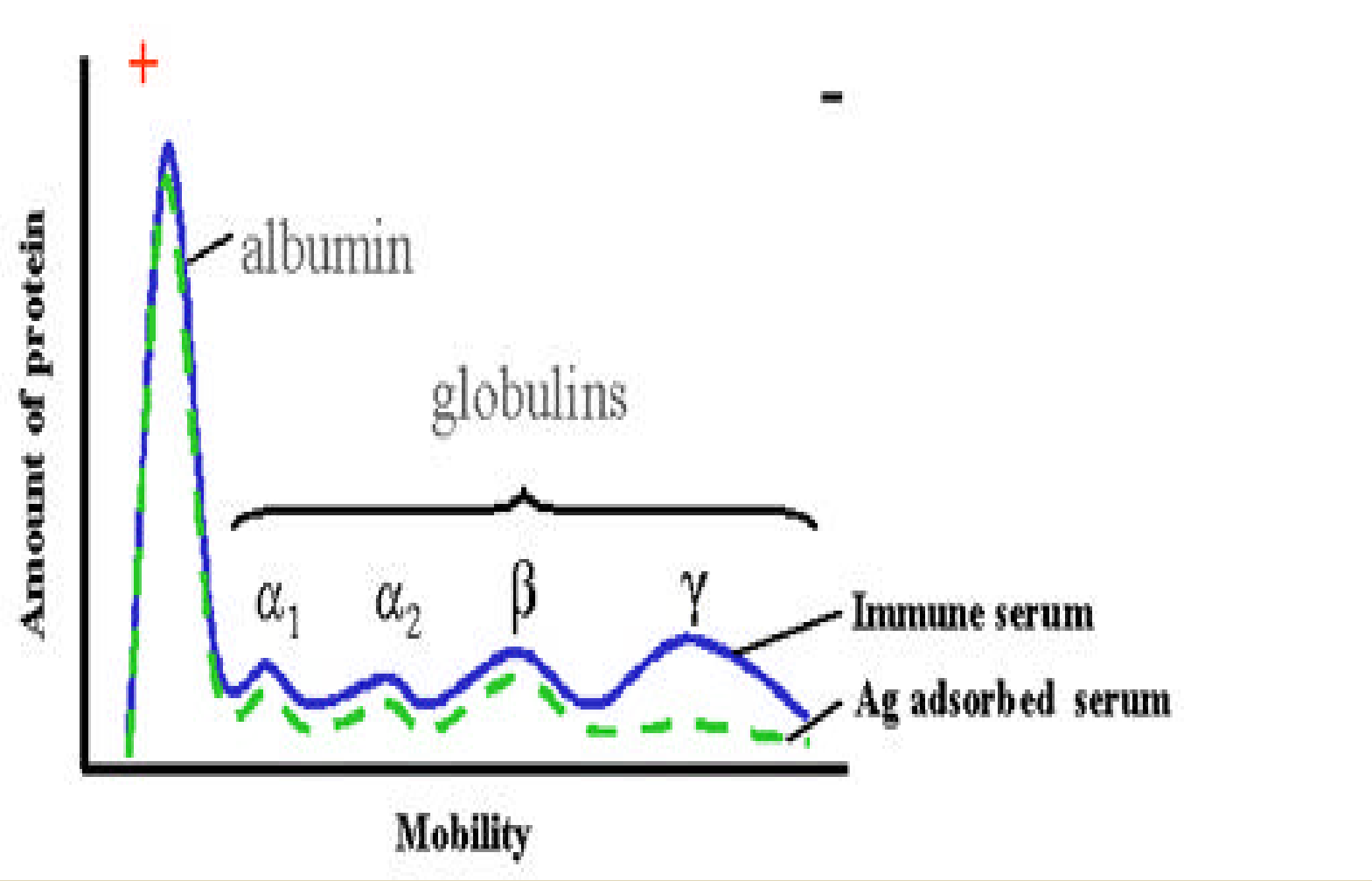
The so-called T-cell immunity in this type of immune works on the composition of many different types of lymphocytes that recognize any foreign object from the body and attack it. This is called a type of immune immunity derived from lymphocytes, because you own lymphocytes to fight and attack foreign objects.

Antibodies

It is consist of glycoproteins and be present in the serum and fluid in vertebrate animals, some of which will be carried on the surface of B-cell works as a receptor to antigenic determinants, other types of immunoglobulin be free in the blood and lymph and be a link between B-cell and antigen whose presence induce for B cells to production of antibodies from plasma cells and memory cells.

classified immunoglobulin to five molecules which IgE, IgD, IgA, IgM,and IgG, and these molecules differ from each other in terms of molecular weight, size, shipment and site amino acids, as well as the amount of carbohydrates associated Moreover, there are two active molecules in immunoglobulin, the first molecule be specialized for the link antigen Fab (Fragment Antigen Binding), the second molecule called Fc (Fragment Crystalline) and the function of different usually called Effector function where this molecule binds immunoglobulin to host tissues and cells of the immune system, as well as linking to first complement (C1q) Special activate complement (classical way), Immunoglobulin divided depending on the heavy chain to the class and subclass (these chains are linked to each by double sulphurous bonds) to:

1-IgG - Gamma -2. IgM - Mu -3. IgA - Alpha -4. IgD - Delta -5. IgE -Epsilon



Class of Immunoglobulin:

IgG: the Immunoglobulin types is high concentration in the human serum presence about 70-75% of total Immunoglobulin, included tow molecular from single chains with molecular weight 146,000 Dalton, IgG is very important Immunoglobulin where appear in secondary stimulates the immune response, all subclass of IgG can pass throw placenta and these can give a high degree of negative immunity to the fetuses and newborns.

The normal rate of IgG in the body 800-1500 mg / 100 ml and this percentage will increase in cases of primary biliary cirrhosis , liver diseases , Malnutrition and rheumatoid arthritis, and lower normal rate of IgG in case of Chronic Leukemia and deficiency Immunoglobulin as well as in Lymphoid aplasia.

IgM: concentrate about 10% of the proportion of Immunoglobulin in the body, the order of molecules are penta-mere, molecular weight about 970,000 Dalton, is IgM appear in primary response, there is this protein within the vessels and there is usually accompanied response against complexes antigenic special in blood and bones disease, IgM activate classical pathway of complement when associated antigen with IgM,
The normal ratio of IgM 45-150 mg / 100 ml, and this percentage increases in adult infected by Trypanosomiasos , malaria, as well as Mononucleosis disease , SLE and rheumatoid arthritis. and decreases normal rate of IgM in the case of deficiency Immunoglobulin, infection lymph glands and chronic leukemia.

IgA: a concentrate about (15-20%) of the total human Immunoglobulin, and more than (80%) of IgA a single form (Monomer), but it was observed in some mammals that IgA serum be polymorphic(polymer). Binary forms (Dimer) of IgA found in secretions of mucous membranes such as saliva and milk as well as the urogenital channel, either Secretary -IgA have under two subclass (IgA2, IgA1) and has the weight of molecularly estimated 385,000 Dalton because its association with other proteins known as endocrine component, the functional importance given to the Secretary IgA because the activation process and go through the mucosal epithelial tissue.

Natural ratio of IgA is 50-350 mg / 100 ml and this percentage will increase in the event of injury Wiskott-Aldrich syndrome and Liver Cirrhosis at specific stages of infection with some autoimmune diseases such as rheumatoid arthritis and infection SLE. And decreases the IgA from the normal limit in the case of genetic disease and chronic leukemia.

IgD: a concentrate less than 1% of the total Immunoglobulin located on the surfaces of membranes B cells, weighed Molecular 180,000 Dalton, there IgD on the surface of B cells which has the ability to develop and is stimulating, it appears IgD after IgM on the surface of B-cell and plays a role in regulating the immune response.The natural rate is less than 6 mg / 100 ml, and increased in the case of chronic injuries.

IgE: rare presence in the serum, but there is usually on the surfaces of basophiles of white blood cells and mast cells accounted for less than 0.01% in the serum, its ability to bind to Basophile in circulation, as well as mast cells located within tissue, we also note that the IgE sincere on the surfaces of mucous cells of the nose, that this type of Immunoglobulin perhaps develops immunity against some worms, but the associated presence with allergies, asthma, hay fever, and weight molecular 190000 Dalton. normal rate for this Immunoglobulin is less than 25 µg / 100 ml, and increased in the case of parasitic infections and allergies, immune disorders and myeloma IgE, and lower in the case of gamaglobulinema, failure in the production of Immunoglobulin.

Immunoglobulin fashion:

immunoglobulins are proteins so that there are antigenic and this feature allows divide them into three modes:

1 - Isotypes immunoglobulin can be distinguished antigenically with it's there at every normal human being, for example, the IgG and IgM are two isotypes of different in **Fc** region.

2 - Allotype are addition antigen in immunoglobulin differ among people in different genes that symbolizes the many shapes of heavy and light chains.

3 - Idiotype are antigenic determinants of the **Fab** region and called any of these antigenic determinants as self-part and linked only with the antibodies which stimulate it.

Antibody functions:

The basic function of the antibody is a link with foreign antigens, and other functions:

1 - Agglutination: include antibody association with the bacterial cells or viruses, but noted that IgM can do this process with ease and for its ability to link more than one antigen. The Fab portion of the antibody work this function.

2 - Opsonization: Takes antibodies bacteria-mediated interaction occurs between the receptors on the surface of bacterial cells and the correlation antigen within the molecule antibody **Fab** and then linked by special receptor on the phagocytosis surface by **Fc** portion followed by the process of phagocytosis.

3 - Neutralization of toxins: antibodies neutral some of the toxins produced mediated by some bacterial species, such as the neutral of antibodies type IgG to tetanus toxins and lead to moving the immune responses, **Fab** portion of the antibody work this function.

4 - Immobilization of Bacteria: The antibody paralyze the movement of cilia or flagella when some bacterial species moving and thus prevent them from escaping until the arrival of the phagocytic cells and we note that effective portion in this area is **Fab** of the antibody.

5 - Complement activation: This process occurs especially with the help of **Fc** of the antibody for each of the IgM, IgG and lead to the death of the bacterial cell by complement effective.

6- Mucosal protection: by S-IgA and as will as IgG but less than IgA, S-IgA prevent pathogen to linked on the mucous membrane surface, this function work by **Fab** portion.

7 – IgE function:

As a result of the presence of antigens, such as some parasitic worms note that IgE linked with mast cells by receptors owned on their surface called (IgE **Fc** receptors), leading to release of factors intermediate mast cells that lead to the contraction of smooth muscle, which can also lead to diarrhea and thus push out parasites .

8 – Precipitation

This process includes a link soluble antigens with the antibody to form a immune complex which can be removed easily by phagocytic cells or perhaps it is removed mediated activation of complement, within this process, we note that the Fc and Fab are working together.

9 - Fetus immunity through the placental transport of IgG

The IgG is the only class of immunoglobulin who can cross throw placenta and enters the fetal circulation which gives the fetus immune protection, and this protection is very important, especially in the first three months of pregnancy.

Antibody production:

Produces antibodies from B-Cells after its transformation into the cells of plasma, and begin the process mainly when ingestion of antigen by the kind of phagocytic cells called Antigen Presenting Cell and play these cells digest antigen partially introduced its determinants antigenic receptors on their surface to identify them cells of another type called T-Cells and then transported reference to B cells that activated and multiply and transform to Plasma cells and these cells produce antibodies that are associated specifically with antigen which stimulated to produce them. well as differentiate other types of B cells to memory cells, which play an important role in the production of antibodies faster when the body is exposed to the same antigen a second time, in addition to the remains of some types of antibodies, one of the type IgM and IgD linked on the surface of B-cells in the form of receptors and the function link antigen directly and then stimulate B cells to produce antibodies for antigen faster, knowing that the antibodies of the IgM type associated with the surface of B cells be monomer but not pentmer.

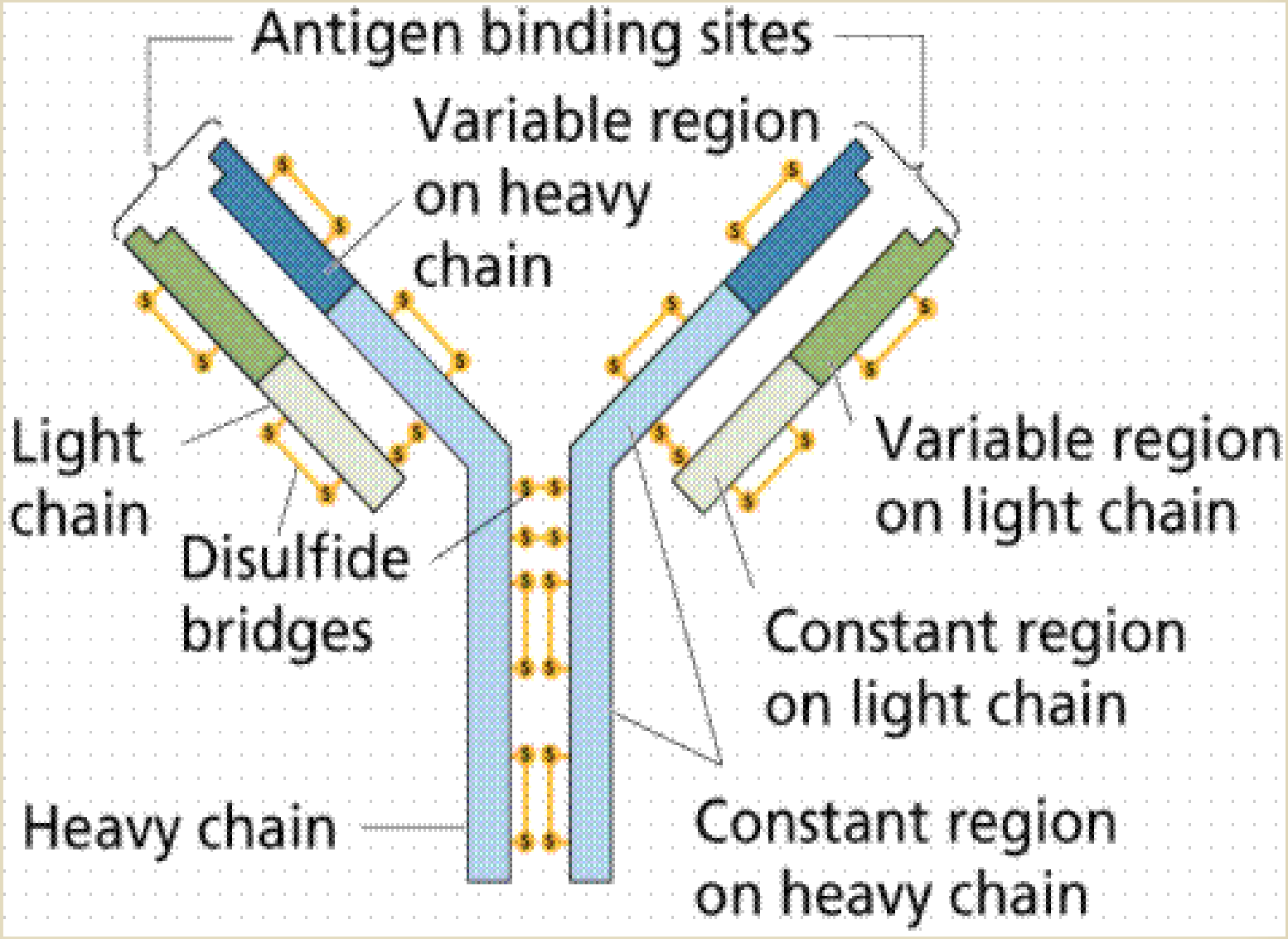
Types of antibodies:

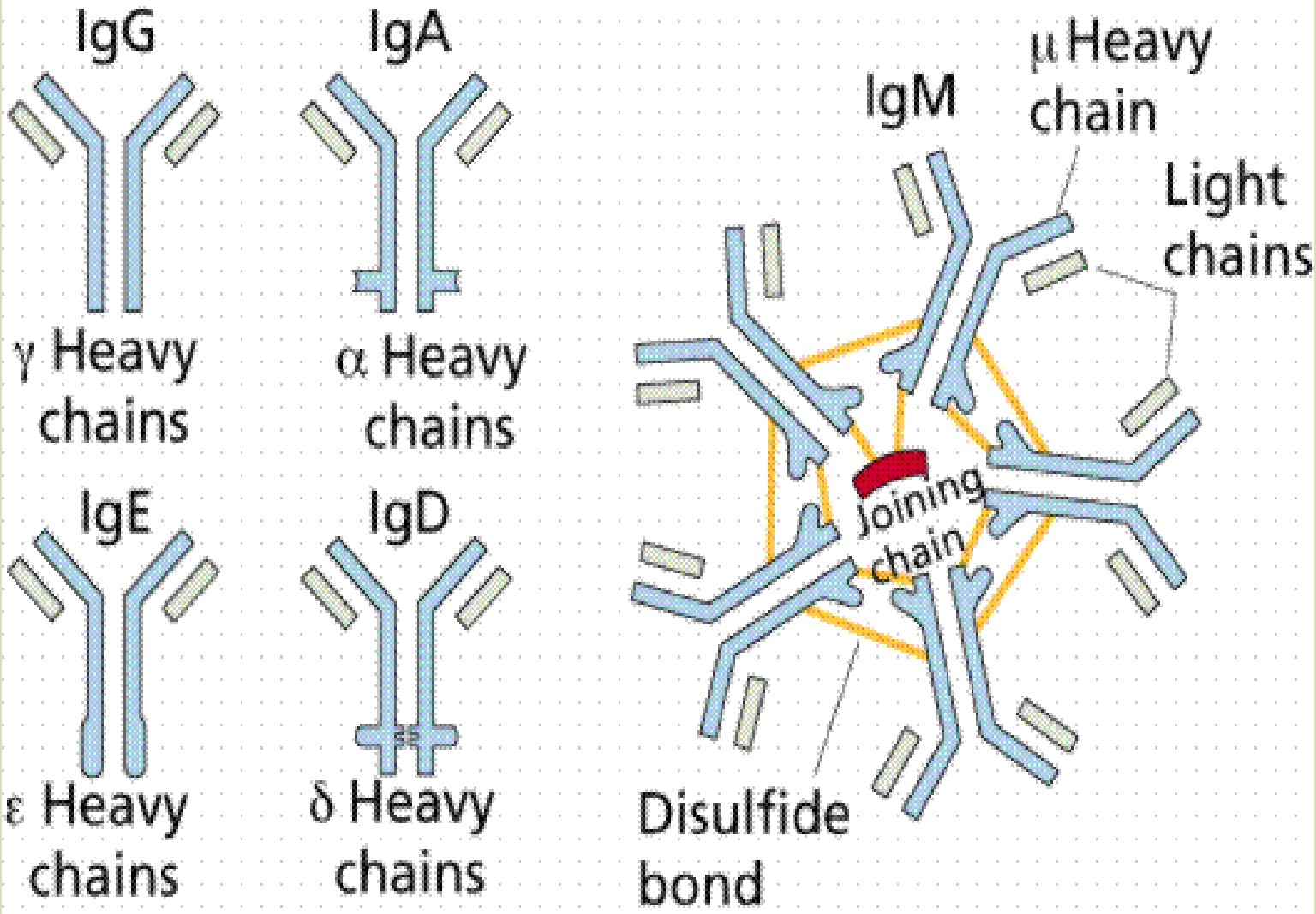
- Polyclonal Antibodies

Which produce different cells is chemically different immunologically and interact with different antigenic determinants on the antigen, and is obtained by injection in laboratory animals repeatedly.

- Monoclonal Antibodies

Produces monoclonal antibodies from a strain plasma cells which are similar chemically and immunologically and interact with specific antigen and uses the mouse in general in production, these antibodies very specific and is obtained from the one clone of the hybrid B cell, which stimulated one antigen.


Antigen binding sites
Variable region on heavy chain
Light chain
Disulfide bridges
Variable region on light chain
Constant region on light chain
Heavy chain
Constant region on heavy chain


IgG
γ Heavy chains
IgA
α Heavy chains
IgE
ε Heavy chains
IgD
δ Heavy chains
IgM
μ Heavy chain
Light chains
Joining chain
Disulfide bond