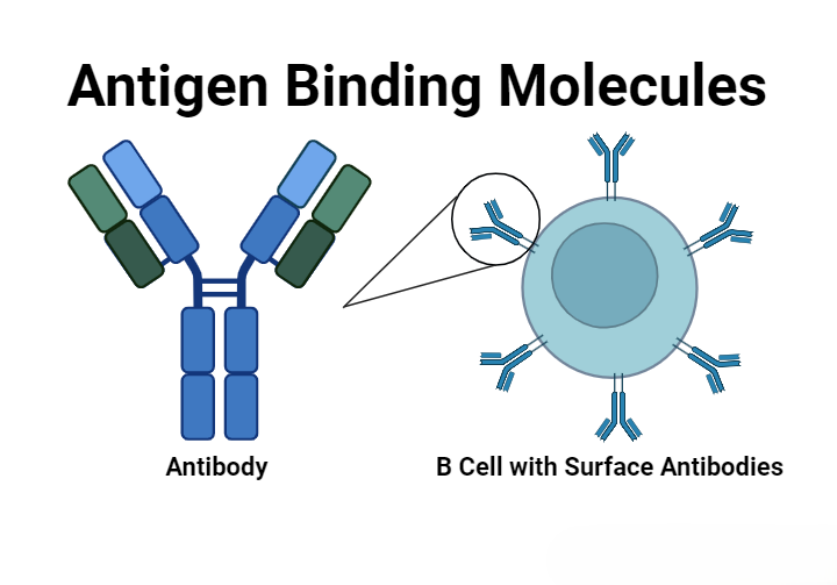
Document 6

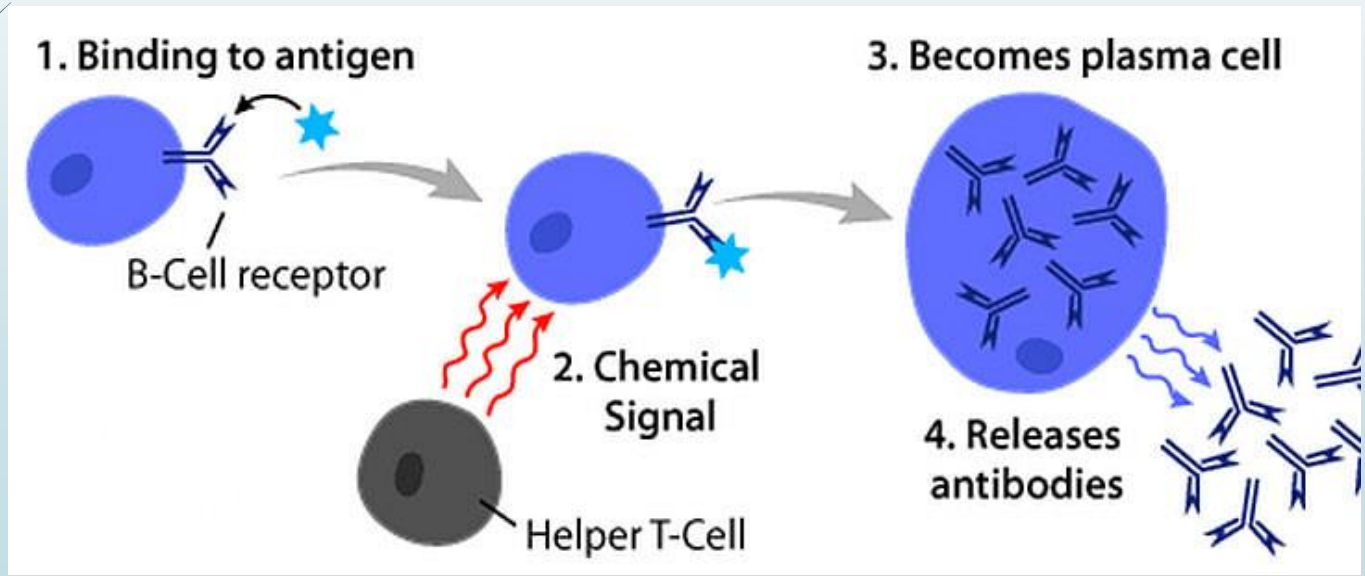
Antigen Recognition by B-lymphocytes

- **How does a B lymphocyte recognize an antigen?**



I. Antibodies

- Antibodies or immunoglobulins (Ig) are membrane receptors that can be displayed at the surface of B lymphocytes or found free in plasma.
- B lymphocytes differentiate into plasma cells after activation, and become able to release antibodies into the plasma.
- **Type of immune response induced by B lymphocytes:**
  Specific Humoral Immune Response.



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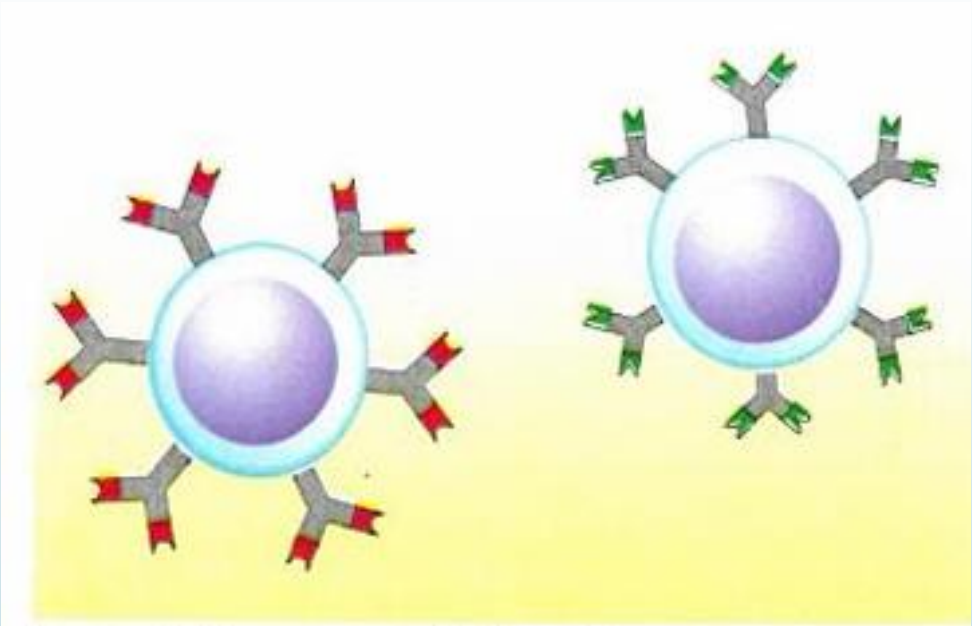
- There are different types of B lymphocytes in the body. Doc.a, p.125.



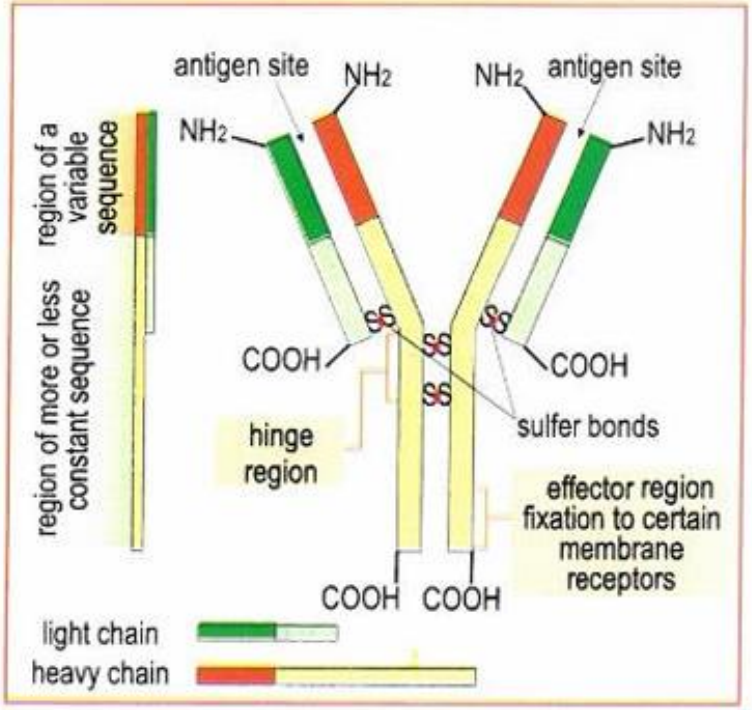
Doc.a *Different types of B lymphocytes.*

II. Structure of Antibodies (Immunoglobulins)

- They are Y shaped protein molecules.

➢ **Structure of Antibodies: Doc.c, p.125**

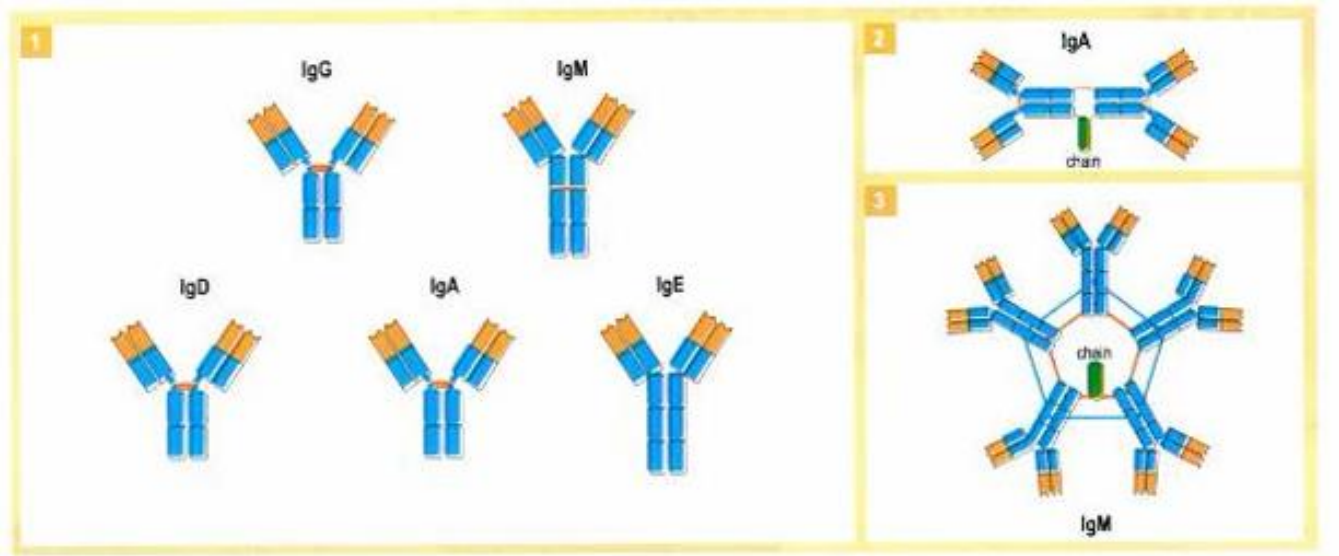
- They have 4 peptide chains: 2 heavy and 2 light, connected together by a disulfide bond.
- They have a constant region and a variable region.
- The variable region differs from one type of antibody to another. It has 2 antigen binding sites which bind to a specific epitope in a complementary manner.



Doc.c *Diagram of an antibody.*

- There are 5 classes of antibodies, depending on the variation in the constant region: Ig M, Ig A, Igg, Ig E and Ig D.

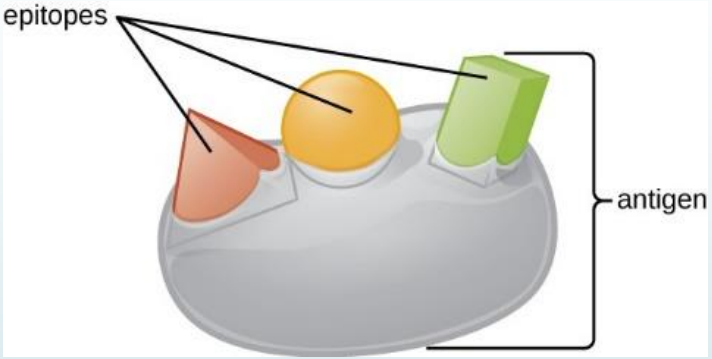
Doc.d, p.126.



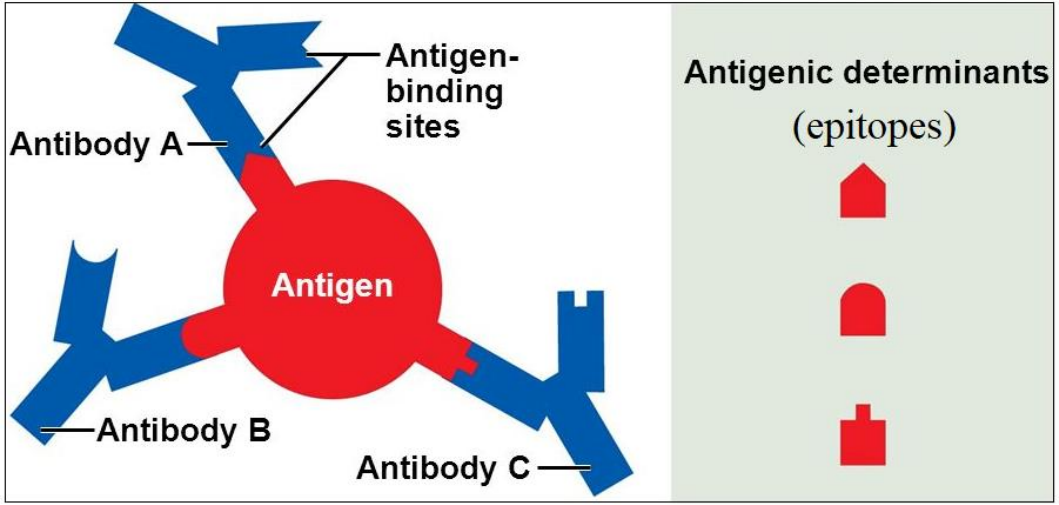
Doc.d *Classes and forms of human immunoglobulins: monomer (1), dimer (2), polymer(3).*

III. Epitope (Antigenic determinant)

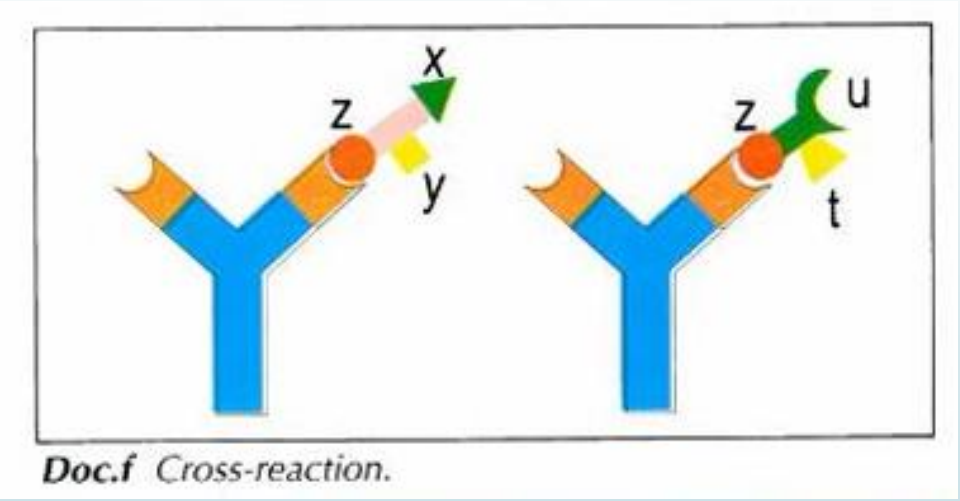
- An antigen is a substance that can be recognized by the immune system as non-self.
- An epitope is a molecule (part) of an antigen which can bind to a specific antibody and induces (causes) an immune response.



- Each antibody is specific for a certain epitope.
- An antigen may have several epitopes, so it can bind to many different antibodies.



- One antibody can bind to 2 different antigens if they have the same epitope. This is known as cross-reaction. Doc.f, p.126



Doc.f *Cross-reaction.*

- B lymphocytes can recognize free or soluble antigens in the blood.
- Immune complex is a formed by the binding of an antibody to its specific epitope.