

# **NEET Biology** Short Notes

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#### Antigens

- The word 'antigen' derived its name as they are '**antibody generating**' molecules. They stimulate the production of antibodies in response to infection.
- They can be proteins or polysaccharides found on the cell walls of microorganisms or on the coats of viruses.
- The **antigens** are foreign 'molecules' that invade the body of an organism.
- Molecules such as pollen grains, shellfish, certain fruits and vegetables, chicken, feathers of birds, blood cells from other persons or animals, egg white, drugs, and chemicals, etc, can also act as antigens as they can also induce production of antibodies.

### Antibodies

- Antibodies are antigen binding glycoproteins
- They are synthesized by B- Cells, each with different amino acid sequence and a different antigen binding site.

#### **Basic Structure of Antibody Molecule**

- They are Y shaped molecule, having two identical antigen binding site, one at the tip of each arm, therefore called as bivalent.
- They contain 4 polypeptide chain, two identical Light Chain (containing 220 amino acids) and two identical heavy Chain (containing 440 amino acids).
- The light chain is bound to Heavy Chain by disulfide bridges and noncovalent linkages.
- The lower portions of the branches and the stem of the Y constitute the C-region.
- Since there is wide variation in the V-region, there can be a hundred thousand different antibodies.
- Immunoglobulins are classified into five major groups IgM, IgG, IgA, IgD and IgE based on the five types of heavy chains found in them.





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immunoglobulin Classes	Functions
lgA (Dimer)	Major Immunoglobulin found in colostrum of Milk in a nursing mother. Protection to neonate against pathogens during the first week after birth.
IgD (Monomer)	Function in activation of B cells by Ag
IgE (Monomer)	Mediates hypersensitivity reactions, Mediator in the allergic response.
IgG (Monomer)	Ability to pass through placenta enabling the mother to transfer her immunity to fetus.
IgM (Pentamer)	The first class of Immunoglobulin produced in a primary response to an antigen, first antibody to be synthesized by neonate. Activation of the complement system to eliminate the antigen.

#### The action of Antibody:

- ADCC (Antibody-Dependent Cell-Mediated Cytotoxicity): NK Cells binds with antibody to recognize their target cells and later results in the death of target cells.
- **Opsonization:** IgG molecules coat the surface of antigens, and this stimulates their recognition and digestion by phagocytes.
- **Agglutination:** Antibodies bind to antigens to produce large insoluble complexes which render them harmless and facilitate their destruction by other cells of the immune system.
- Activation of Complement: Complement system is a group of enzymes. They are triggered by the IgM-IgG bound to the surface of foreign cells. The activity of some of these enzymes leads to the formation of pores in the plasma membrane of the invading cells causing them to burst.

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