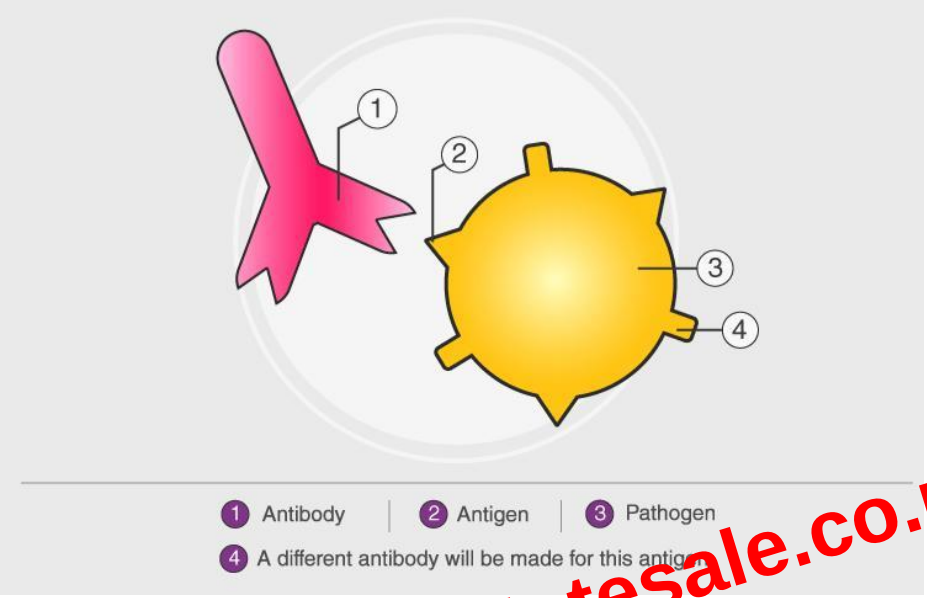
# ANTIGEN

**Antigens are molecules or molecular structures that are foreign to the body and generally induce**



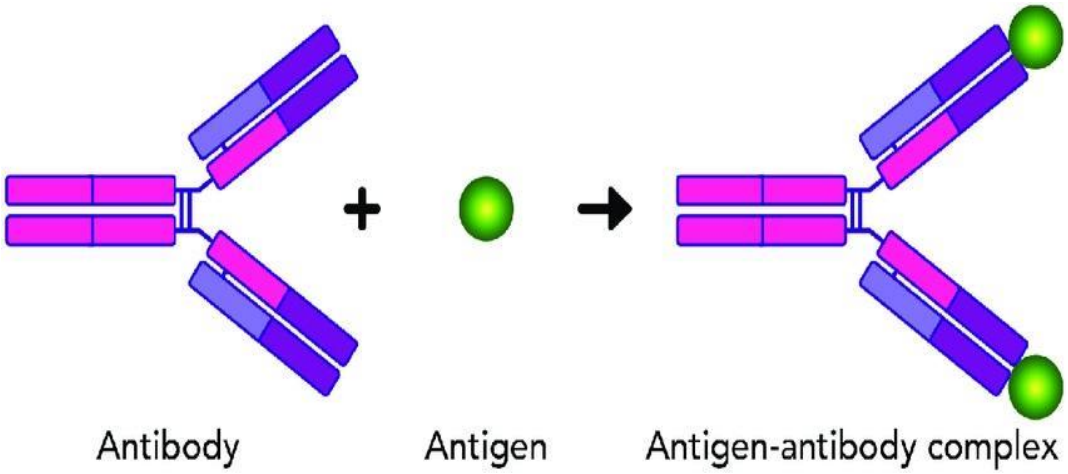

**an immune reaction in the form of the production of antibodies against them.**



## Antigen

- In simple words, antigens can be anything that doesn't belong to the body and are foreign.
- Even though antigens are usually defined by the induction of an immune response, all antigens might not induce an immune response. The antigens that induce a response are termed **immunogens**.
- The ability of antigens to elicit an immune response depends on the presence of specific regions on the antigens called antigenic determinants. The determinants bind to receptor molecules with the complementary structure on immune cells to elicit a response.
- Antigens are indicated by the term 'Ag', and these can occur in different forms like pollen, viruses, chemicals, or bacteria.
- The concept of antigen arose from the fact that our body can distinguish between the components of the body and foreign particles.
- In response to these antigens, the body induces the production of antibodies that act against the said antigens.
- Most antigens in humans are proteins, peptides, or polysaccharides; however, lipid and nucleic acids can also act as antigens when combined with proteins or polysaccharides.
- In addition, antigens might also be intentionally introduced into the body in the form of vaccines in order to induce the adaptive immune system of the body against the antigen.

## Properties of Antigens




- An antigen-antibody complex or immunogenic complex is a molecule formed by binding multiple antigens to antibodies.
- The binding of antibody and antigen is determined by the epitope and paratope present in the antigen and antibody, respectively.
- The ability of antibodies to fight against multiple pathogens is due to their ability to distinguish between different antigens.
- The interaction between antigens and antibodies is highly specific, and it is determined by the amino acid sequence in the epitope and paratope of the species.
- The complex is formed by an antigen, antibody reaction which is then subject to a number of responses like complement deposition, opsonization, and phagocytosis.
- The shape and size of the immune complex are determined by the ratio of antigen to antibody. The size, in turn, determines the effect of the immune complex.
- Antigen-antibody complexes have become an important tool in understanding the antigen-antibody interaction and determining the basis of molecular recognition between an antibody and antigens.
- Immune complexes also play a role in regulating antibody production as the binding of antigen to cell receptors activates signaling cascade leading to the activation of antibodies.
- Even though immune complexes are essential for different immune functions, the deposition of the immune complex can lead to several autoimmune diseases like arthritis and scleroderma.



## Antigen Examples

### 1. Blood group antigens