

Antigenicity defines how well something initiates an immune response. Antigens can activate B cells and T cells, which will then protect the body from pathogens. Sometimes, parts of one's own body can be antigenic, resulting in autoimmunity.

Antigenicity or antigenic reactivity refers to the capacity of viruses to bind to specific antibody molecules. The antigenicity of nonenveloped viruses resides in the antigenic sites or B-cell epitopes of capsid proteins that are recognized by the binding sites of antibodies. Protein epitopes are classified as either continuous or discontinuous depending on whether the amino acids included in the epitope are contiguous in the polypeptide chain or not. Most epitopes are discontinuous and since they consist of surface residues brought together by the folding of the peptide chain, their antigenic reactivity depends on the native conformation of the protein. The quaternary structure of viral capsids gives rise to epitopes known as neotopes. Neotopes arise either through conformational changes in the capsid proteins induced by intersubunit interactions or by the juxtaposition of residues from neighboring subunits forming a novel epitope. Immunogenicity is the ability of a protein to give rise to an immune response in a competent host and it can be defined only in the biological context of the host. Knowledge of the viral antigenic sites recognized by antibodies does not necessarily indicate which immunogenic structure initiated the production of antibodies in the immunized host. Failure to differentiate between antigenicity and immunogenicity is responsible for the lack of success in developing synthetic peptide vaccines against viral diseases.

Difference between antigenicity and immunogenicity

Immunogenicity – is the ability to induce humoral and /or cell mediated immune response. We know when B and T cells get activated by antigen, it results in effector cells and memory cells. For example, if B cell gets activated, it will differentiate into plasma B cell which secretes antibodies.

B cell + antigen = Plasma B cells (secretes antibody) + memory B cells

Such antigens are called **immunogen** more appropriately. These immunogens are large molecules with molecular weight at least >10,000 D and that is why they can induce the immune response.

Antigenicity – is the ability to combine with the final products of the humoral and/or cell mediated immune response. It is not activating the immune response rather it combines with the final products of the immune response. For example, as we just saw when B cells get activated it secretes antibodies and the antigens which have the property of antigenicity will combine to these antibodies.

Such antigens are called **haptens**. Haptens are small molecules with very low molecular weight and that is why they are not capable of inducing the immune response. An example of such hapten is drugs like penicillin.

Haptens can be immunogenic if they bind with carrier proteins because once they bind with carrier protein, it increases the molecular weight (becomes larger molecule) and thus it can induce the immune response.