



Determine the antigenicity

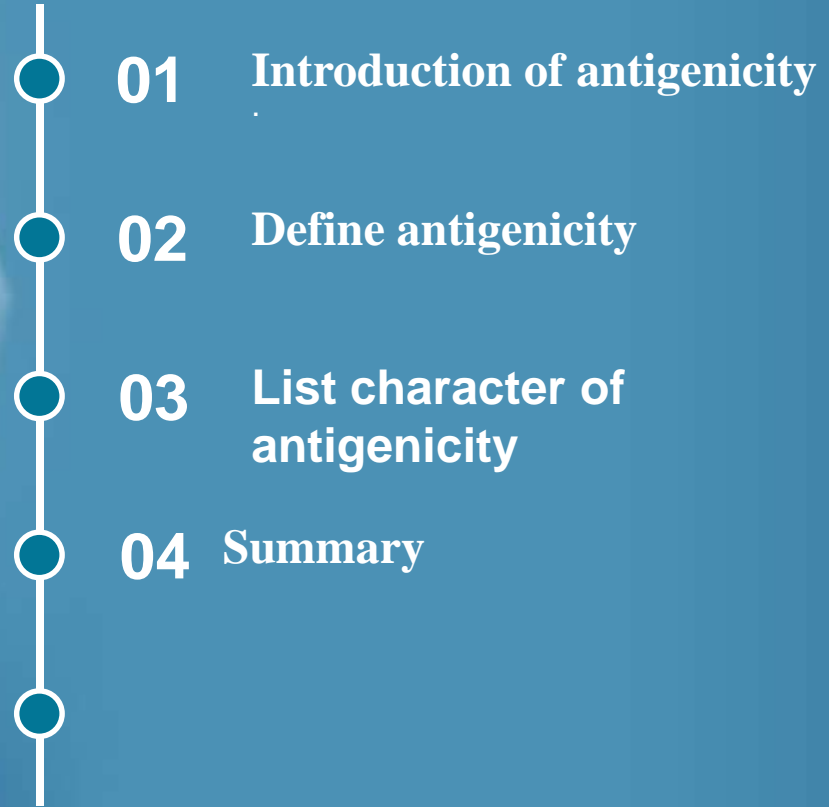
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Objective

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- 01 Introduction of antigenicity
 - 02 Define antigenicity
 - 03 List character of antigenicity
 - 04 Summary



Introduction:

- Antigenicity is the ability of a substance, known as an antigen, to bind
- specifically to components of the immune system, such as antibodies or T- cell receptors.
- This property is crucial because it determines how well the immune system can recognize and respond to potential threats like pathogens

Definition:

- The substance that possess antigenicity are known as **antigens**. When an antigen enters the body, it stimulates the production of **antibodies** or activates immune cells to eliminate, or neutralize destroy the antigen.

Size :

- Larger molecules (typically over 10,000 Da) tend to be more immunogenic. Proteins and polysaccharides are common examples of effective antigens, while smaller molecules (haptens) require a carrier to induce an immune response.

Chemical Nature:

- The presence of specific chemical structures, such as aromatic groups, contributes to the rigidity and overall antigenicity of these substances, making chemically complex antigens more effective at stimulating an immune response

Foreignness:

- For antigen to trigger an immune response, it must be different from the body's own molecules, Essentially, if the immune system identifies a substance from pathogens or allergens—it will initiate a response to attack or neutralize it.
- That's how the body distinguish between its own components and those that could pose a threat, ensuring that the immune system targets harmful invaders effectively.

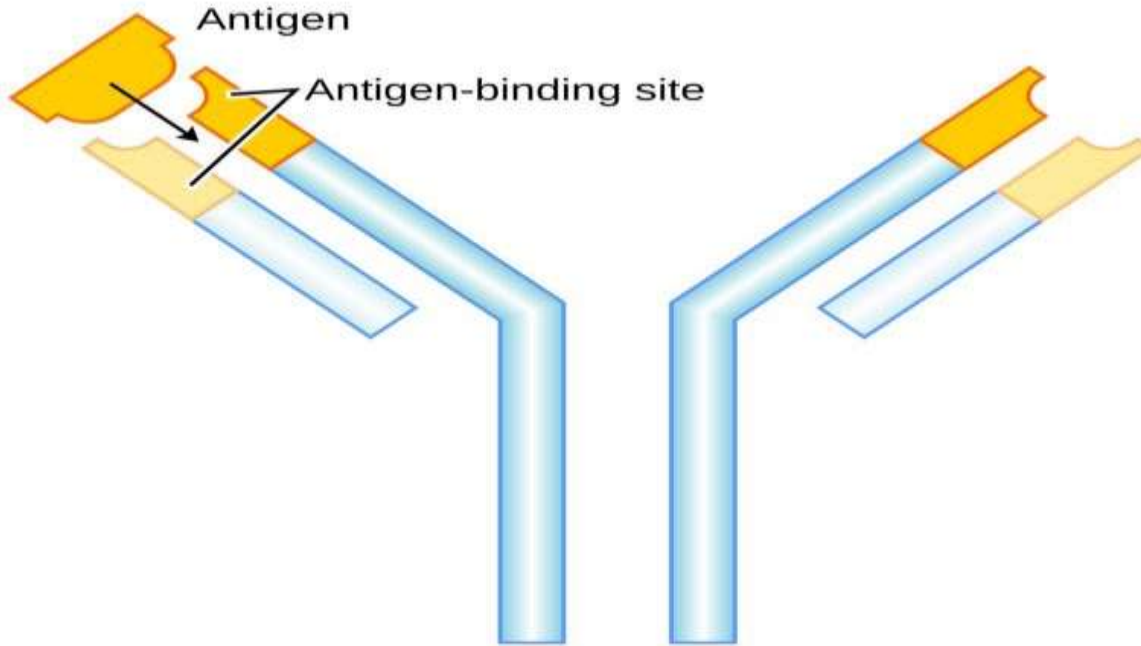
Susceptibility to tissue enzymes:

- How easily an antigen can be broken down by the body's enzymes.
- When an antigen is quickly broken down, it creates smaller pieces that can be shown to immune cells. This helps the immune system recognize and respond to the antigen better.
- So, antigens that are easily broken down tend to trigger a stronger immune response because they are processed in a way that helps the body fight off potential threats more effectively.

Antigen Specificity:

- Antigen specificity refers to the ability of the immune system to recognize and respond to specific antigen, Each antibody is designed to bind to a particular antigen, This specificity is important because it allows the immune system to target harmful invaders, like bacteria and viruses, without attacking the body's own cells.

Antigens



Antibody

Species specificity

- Means that certain antigens are unique to specific species
- Species specificity means that certain antigens can provoke an immune reaction in one species but not in others. For example, a protein from a specific virus may effectively stimulate an immune response in humans but not in mice or birds.

Auto-specificity

- Immune system's ability to recognize and respond to its own body's proteins, known as self-antigens.
- For example, proteins like thyroglobulin or lens proteins can become autoantigens under certain conditions, causing the body to mount an inappropriate immune response against itself.

Organ Specificity

- Unique antigens found in specific organs or tissues of the body.
- Each organ, like the brain, kidney, or liver, has its own set of antigens that can trigger an immune response. proteins from the brain might be different from those in the heart, allowing the immune system to recognize and respond to them accordingly.

Heterogenic heterophile specificity

- Means that some antigens can trigger immune responses in different species. For example, a protein from a virus might cause both humans and rabbits to react similarly. This shows how certain germs can affect various animals, helping scientists understand how diseases spread and how vaccines might work for different creatures. This cross-reactivity is important for vaccine development and understanding immune responses across different organisms.

Summary:

- The substance that possess antigenicity are known as antigens.
- Size: Larger molecules tend to be more immunogenic.
- Chemical Nature: The presence of specific chemical structures
- Foreignness: For antigen to trigger an immune response, it must be different from the body's own molecules
- Susceptibility to tissue enzymes: how easily an antigen can be broken down by the body's enzymes.
- Antigen Specificity: Antigen specificity refers to the ability of the immune system to recognize and respond to specific antigen
- Species specificity: means that certain antigens are unique to specific species
- Auto-specificity: immune system's ability to recognize and respond to its own body's proteins
- Organ Specificity unique antigens found in specific organs
- Heterogenic heterophile specificity: means that some antigens can trigger immune responses in different species.

Reference:

- Kumar, S. (2016). *Essentials of Medical Microbiology (2016)*
- The first known official use of heterophile was on 1932



Thank you