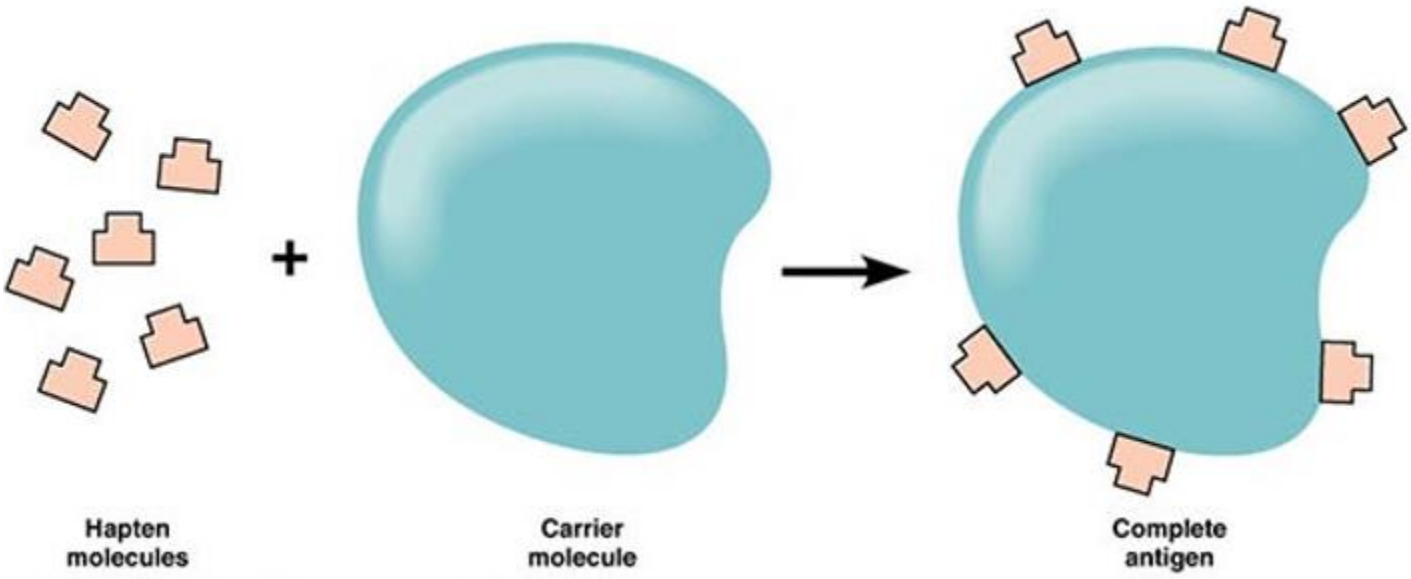
Lecture five **Dr. wurood &Dr. Zaid**

(Superantign & haptens & adjuvants)

Hapten

Hapten is a molecule that reacts with specific antibody but is not immunogenic by itself, it can be made immunogenic by conjugation to a suitable carrier. Many drugs like penicillins are haptens. A hapten is essentially an incomplete antigen. These small molecules can elicit an immune response only when attached to a large carrier such as a protein; the carrier typically does not elicit an immune response by itself.



Super antigen

When the immune system encounters a conventional T-dependent antigen, only a small fraction (1 in 104 -105) of the T cell population is able to recognize the antigen and become activated (monoclonal/oligoclonal response). However, there are some antigens which polyclonally activate a large fraction of the T cells (up to 25%). These antigens are called superantigens .

Or:-

Superantigens (SAgs) are secreted proteins (exotoxins) that exhibit highly potent lymphocyte-transforming (mitogenic) activity directed towards T lymphocytes

Examples of superantigens include:

1-Staphylococcal enterotoxins (food poisoning)

2-Staphylococcal toxic shock toxin (toxic shock syndrome)

3-Staphylococcal exfoliating toxins (scalded skin syndrome) and

4-Streptococcal pyrogenic exotoxins (shock).

Although the bacterial superantigens are the best studied there are superantigens associated with viruses and other microorganisms as well. The diseases associated with exposure to superantigens are, in part, due to hyper activation of the immune system and subsequent release of biologically active cytokines by activated T cells.

Adjuvant

Adjuvant: The Latin "adjuvans" means to help, particularly to reach a goal.

- An adjuvant is a substance that helps and enhances the pharmacological effect of a drug or increases the ability of an antigen to stimulate the immune system.

Classification of Adjuvant

- Freund's adjuvant

A- Complete Freund's adjuvant(CFA)

B-Incomplete Freund's adjuvant(IFA)

- Liposome
- Inorganic compound

- Cytokine
- Biodegradable nanoparticles

Mechanisms of adjuvants

- Prolonged persistence of immunogen molecules at the site of injection.
- Enhancement of co-stimulatory signals.
- Induction of granuloma formation.
- Stimulation of lymphocyte proliferation in a non-specific manner.

Other antigens

Heterophilic antigen : A kind of common antigen, existing in human, animals, and microbes.

Xenogenic antigen

This antigen comes from different genus and generic. For example, pathogenic antigen.

Allogenic antigen

The specific antigen exists in different individuals. Blood type antigens

Autoantigen

A pathological term. BUT, sperm antigen