

THE IMMUNE SYSTEM & VACCINES

Vaccines are highly regulated, complex biologic products designed to induce a protective immune response. The immunogen is the part of a vaccine that stimulates an immune response. There are two types of immunity:

- Active - protection produced by person's own immune system and usually long lasting. Can be obtained either by acquiring natural disease or receiving a vaccine.
- Passive - transfer of antibodies produced by a human or animal to another; provides temporary protection against some infections. Most common form is from mother to infant. Can also be in the form of vaccination with immune globulin.

Vaccine types are as follows:

- Live attenuated – whole, living bacteria or viruses that actively replicate within host. Most closely resembles natural infection leading to longer immunity. Contraindicated in pregnancy, immunocompromised. Examples – MMR, Varicella
- Inactivated – killed bacteria or virus within vaccine. Broad immunity related to multiple antigens present. Disadvantage is need for multiple doses because response may be weaker than live viruses. Pose no risk for immunocompromised. Examples – DaPTP, influenza.
- Subunit – purified products from bacteria or virus; cause natural infection but may be synthesized in lab. Vaccines include proteins, polysaccharides and protein-poly conjugates. Excellent safety profiles, but produce lower immunogenicity; may necessitate presence of adjuvant and/or multiple doses. Examples – Hepatitis B, Meng C.

Other vaccine components:

- Adjuvant – enhances immune response by degree or duration, making it possible to reduce amount of antigen or number of doses needed. Example -aluminum salts
- Preservatives – chemicals added to multidose, killed or subunit vaccines to prevent vaccine contamination. Examples – thimerosal, phenol.
- Additives – to support growth, purification and stability of immunogens. Examples – glycerol, yeast