# IMMUNIZATION AND IMMUNOPROPHYLAXIS


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# IMMUNISATION

- Immunization is the process of artificially inducing immunity or providing protection from disease.

Active immunization is the process of stimulating the body to produce antibody and other immune responses through administration of a vaccine or toxoid.

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## Passive vs. Active Immunization

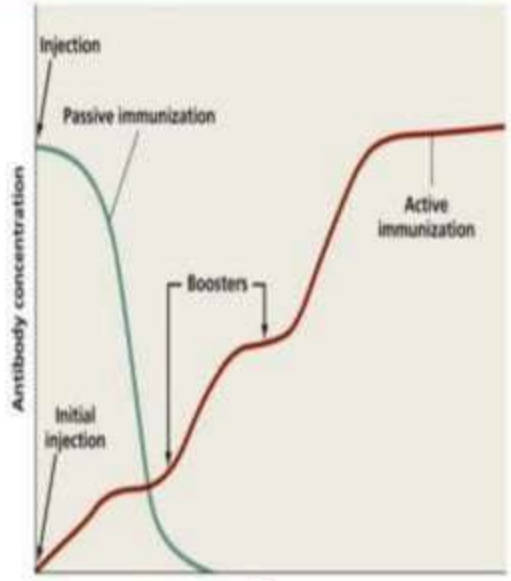


Figure 17.5

Passive immunization is provision of temporary immunity by administration of preformed antibodies derived from humans or animals

## Passive vs. Active Immunization

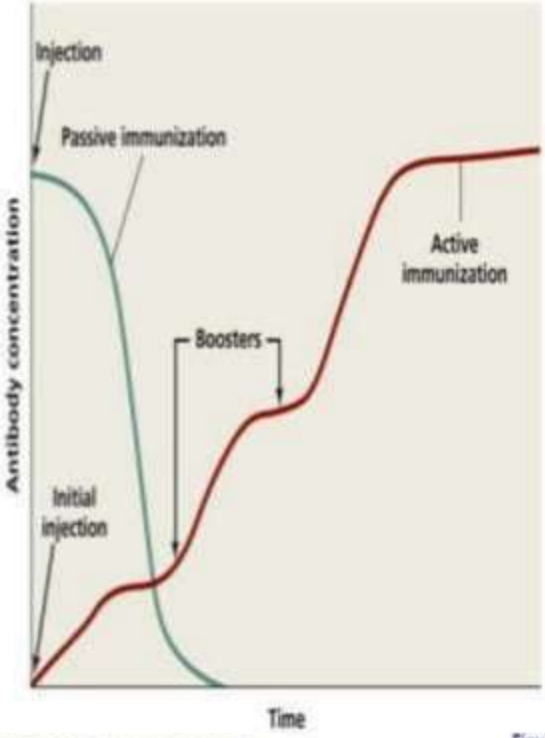


Figure 17.5

# 1. ACTIVE IMMUNIZATION

Active immunization is done by use of vaccines.

# Vaccine

Term derive from "vaccae=cow".

So immunization agent is known as vaccine.

Vaccine is a immuno-biological substance designed to produce specific protection against a given disease.

# Types of Vaccines

- Live Attenuated vaccines
- Killed vaccines
- Toxoids
- Subunit vaccines

# A. LIVE ATTENUATED VACCINES

- A single dose of live vaccine is sufficient for immunization.
- The attenuated organism can multiply in the body to provide a continuous antigenic stimulus and thus serves both as primary and booster dose.
- The attenuated organisms are the suspensions of living organisms with reduced virulence.

- The mimic natural infection with antibody production but without symptoms.
- **Eg. BCG vaccine, Oral polio vaccine, Measles Mumps and Rubella (MMR) vaccine, varicella vaccine, yellow fever vaccine.**

# B. KILLED (INACTIVATED) VACCINES

- Organisms are killed or inactivated by heat or chemicals but remain antigenic.
- Vaccines are stable
- Immunity induced is not permanent
- Booster doses are required

**Eg: Typhoid, Cholera, rabies, hepatitis B, influenza, pertussis, pneumococcal vaccines.**

# C. TOXOIDS

- Toxoids are modified toxins which have lost toxigenicity but retained the antigenicity.
- This are usually prepared by treating the toxins with formalin (formol toxoids).
- Toxoids are used for prophylaxis against those infections in which pathogenesis is attributable to a toxin.
- Booster doses are required to sustain the protection.
- **Eg: Tetanus Toxoid, diphtheria- pertussis and tetanus (DPT) vaccine,**

# D. SUBUNIT VACCINES

- Contains bacterial capsular polysaccharide
- **Eg: Hib, meningococcal, pneumococcal, S.typhi(Vi)**
- Or contains viral surface antigens **Eg: Hep B**
- Produce only IgM antibodies.

# ROUTE OF IMMUNIZATION

- **Intradermal** - BCG
- **Subcutaneous** - Measles, MMR, Meningococcal, Varicella
- **Intramuscular** -DTP, Hep A, HepB, Hib

**SITE OF ADMINISTRATION**

- *Deltoid*- BCG
- *Triceps(Posterior skin fold)*-Measles, MMR, Meningococcal,

  Varicella
- *Vastus lateralis(Anterolateral aspect of thigh in*

# PRINCIPLES OF IMMUNIZATION

- A minimum interval of 4wks is essential between administration of 2 live vaccines.
- 2 or more killed antigens can be administered simultaneously or at any interval
- If any relapse in administration occurs, the missed can be given to resume the course
- If immunization status of child is unknown he may be given age appropriate vaccines
- Do not mix vaccines in the same syringe

# CONTRAINDICATIONS

- Congenital immunodeficiency, therapy with high dose steroids, illness with immunosuppression, severe allergic reaction to vaccines etc.

# IMMUNIZATION SCHEDULE

## Indian-National immunization schedule

| VACCINE | WHEN TO GIVE | DOSE | ROUTE/SITE |
|---|---|---|---|
| | FOR INFANTS | | |
| BCG | At birth or ASAP till 1 year | 0.1 ml (0.05 ml in less then 1 month age ) | ID/Left upper Arm |
| OPV | OPV-0 at birth or ASAP within first 15 days<br>OPV1- @ 6 weeks<br>OPV2- @10 weeks<br>OPV3- @14 weeks | 2 drops | PO |
| D.P.T. | DPT1- @6weeks<br>DPT2 - @10 weeks<br>DPT3- @14 weeks | 0.5ml | IM/Antero-lateral side of mid thigh |
| Hepatitis B | HB-0 @ birth<br>HB1 - @ 6 weeks<br>HB2- @ 10 weeks<br>HB3- @14 weeks | 0.5ml | IM/Antero-lateral side of mid thigh |
| Measles | @ 9 months | 0.5ml | SC/Right upper arm |
| Vitamin A (1st Dose) | @9 months with measles | 1ml (1 lakh IU) | PO |
| | FOR CHILDREN | | |
| DPT Booster | 16-24 months<br>5-6 years | 0.5ml | IM/Antero-lateral side of mid thigh<br>IM/Upper Arm |
| OPV Booster | 16-24 months | 2 drops | PO |
| Vitamin- A (2nd to 9th dose ) | 16 months<br>Then one dose/month upto 5 years | 2ml (2lakh IU) | PO |
| TT | 10 and 16 years | 0.5 ml | IM/Upper Arm |
| Japanese Encephalitis | 16-24 months | 0.5ml | SC/Left upper Arm |
| | FOR PREGNANT WOMEN | | |
| TT1 | Early Pregnancy | 0.5 ml | IM/Upper arm |
| TT2 | 4 weeks after TT1 | 0.5 ml | IM/Upper arm |
| TT-Booster | If received 2 TTdoses in a pregnancy within last 3 years* | 0.5 ml | IM/Upper arm |

- PO- Per Oral
- IM –Intra Muscular
- ID- Intra Dermal
- ASAP- As soon as Possible
- Japanese Encephalitis is only in endemic areas

# 2. PASSIVE IMMUNIZATION

- Passive immunization is used when it is considered necessary to give immediate protection to an anticipated infection.
- Immunity produced is short lasting.
- TYPES:

❑ Human Sera

❑ Animal sera

are used for passive immunization

# A. HUMAN SERA

Two types of normal human immunoglobulins are available-

- Pooled immunoglobulins
- Specific (hyperimmune ) immunoglobulins


Human
Serum
Normal
0.1um filtered
Store -5C to -20C
For In Vitro Research Use Only
Human
Serum
Type AB
0.1um filtered
Store -5C to -20C
For In Vitro Research Use Only

# i. POOLED IMMUNOGLOBULINS

- It is prepared from pooled normal human serum containing high levels of appropriate antibody.
- Human normal immunoglobulin is used for short term prophylaxis of hepatitis A and measles after contact with a case.

# ii. SPECIFIC (HYPERIMMUNE) IMMUNOGLOBULIN

❑ It is prepared from serum of patients who are recovering from infection (convalescent sera) or from persons who have been actively immunized against a specific infection.

❑ Specific immunoglobulins are available for passive immunization against:

1. Tetanus (human tetanus immunoglobulin)
2. Hepatitis B (Hepatitis B immunoglobulin)
3. Rabies


sinosource
Human Tetanus Immunoglobulin
250 IU / 2.5 ml
Sinosource Biopharmaceutical Inc.
sinosource


SAVA
200 IU/Vial
℞
Human Hepatitis B
Immunoglobulin
SAVABIG 200
सावाबिग 200
200 IU/Vial
Human Hepatitis B
Immunoglobulin
SAVABIG 200
Schedule H Drug- Warning:
Only for Clinical and Hospital use.


Human Rabies
Immunoglobulin
200IU / 2ml
Human Rabi
Immunoglobu
200IU /2ml

## ❖ ADMINISTRATION OF HUMAN SERA:

- ❑ Human sera are administered by intramuscular injection.
- ❑ However, in case of rabies, half dose is given around the bite wound and the other half is administered intramuscularly

# B. ANIMAL SERA

- The term antiserum is applied to antibodies prepared in animals.
- These sera are raised in horses by active immunization.
- The animal sera were previously used widely but current trend is in favour of using human sera as far as possible.


BIOLOGOS
HORSE SERUM
Store at: -10°C
Catalog No: HSSXXX
Lot No: XXX
500 mL

# 3. COMBINED ACTIVE AND PASSIVE IMMUIZATION

- In some diseases (tetanus, diphtheria, rabies) passive immunization is often undertaken in conjunction with inactivated vaccines to provide both immediate but short lasting passive immunity and slowly developing active immunity.
- Both injections should be administered at separate sites.

# 4. INDIVIDUAL IMMUNIZATION

- Vaccines offered under national immunization schedule are limited by economic considerations.
- Some important vaccines are omitted.
- These may be supplemented by individual initiative, whenever possible.

# A. VARICELLA VACCINE

- Live attenuated vaccine.
- The vaccine is given as a single subcutaneous dose in children 9 months to 12 years of age and as 2 doses at an interval of at least 6 weeks, in those older.
- Dose 0.5ml s/c
- Contraindicated in pregnancy


VARIVAX®
Refrigerated
VARICELLA VIRUS VACCINE LIVE (OKA/MERCK)
FOR SUBCUTANEOUS INJECTION
1350 PFU/0.5 mL
Each 0.5 mL of vaccine contains a minimum of 1350 PFU varicella virus vaccine Oka/Merck strain
1 Single Dose 0.5 mL Vial
MSD
VARIVAX®
Refrigerated
1350 PFU/0.5 mL
1 Single Dose 0.5 mL Vial
STERILE DILU
LIVE VIRUS VACCIN
(Sterile water

# B. TYPHOID VACCINE

Two recent typhoid vaccines,

- The live oral Gal –E mutant vaccine.
- The injectable purified Vi polysaccharide vaccine

both are recommended for immunization of those 5 years old and above.


0.5 mL
Typbar TCV
BHARAT
BIOTECH
टाईपाईड विआई कंजूगेट वैक्सीन आईपी
Typhoid Vi Conjugate
Vaccine IP
Typbar TCV
टाईपबार टीसीवी
For Intramuscular use only
Single Dose
0.5 mL PFS
BHARAT
BIOTECH
Typbar TCV


Thank
you