VACCINE

❖**Suspension of live attenuated and/or inactivated or killed microorganism or its products “Toxoid” given to animal routinely for prevention and control of infectious diseases.**

Vaccine vs Antiserum

Items	Vaccine	Antiserum
Component	Antigen	Antibodies
Use	Prophylaxis	Treatment & Prophylaxis
Type of immunity	Active	Passive
Period of immunity	6 Months or more	Not exceed 3 weeks
Mode of action	Stimulate Antibodies production	Ready made antibodies

Types

1) **Live attenuated.**
2) **In-activated or killed.**
3) **Toxoid.**
4) **Sero-vaccination.**
5) **Auto-vaccination.**
6) **Subunit vaccine**
7) **Recombinant vaccine**

1. Live attenuated vaccine

❖**Definition:** **Vaccine prepared from live m.o with attenuation to loss their virulence but retained its ability to induce protective immunity.**

❖**Duration and repetition: 1 y and repeated annually.**

❖**Advantages: Long term immunity**

❖**Disadvantages:**

- **Used in endemic area only not in free or exotic.**
- **Not used in insect born diseases (virulence reversion).**
- **Sever post-vaccinal reaction.**

2. Inactivated or killed

❖**Definition:** **Vaccine prepared from inactivated viris or killed bact. with attenuation to loss their virulence but retained its ability to induce protective immunity.**

❖**Duration and repetition:** **6 months – every 6 m.**

❖**Advantages:**

- **Used in endemic and free or exotic area.**
- **Used in insect born diseases.**
- **No sever post-vaccinal reaction.**

❖ **Disadvantages:** **Short term immunity**

3. Toxoid

❖**Definition:** **Vaccine prepared from toxins of bacteria treated by heat or chemical to loss their toxogenisity but retained its ability to induce protective immunity.**

4. Sero-vaccination

❖**Definition:** **Using both antisera and vaccine together in the same time by 2 separate syringes (rapid protection).**

5. Auto-vaccination

❖**Definition:** **Vaccine prepared from m.o isolated from the lesion of the animal to vaccinate healthy in-contact animal (or the same animal in emergency).**

6. Sub-unit vaccine

❖**Definition:** **Vaccine prepared from the protein.**

7. Recombinant vaccine

❖**Definition:** **Vaccine prepared from nucleic acid coding the antigen.**

- **Vaccination by inactivated vaccine should be followed by booster dose after 1 month.**
- **Incase of insect born diseases, the susceptible animals should be vaccinated 2 months before insect breeding season.**
- **Calves from vaccinated dam 3-4 m of age (lamb & kid 2-3) while from non vaccinated at first days of life**

Failure of vaccination

1) **Host factors.**
2) **Human factors.**
3) **Vaccinal factors.**

1. Host factors

1. **Very young animal (Incomplete developed immune system)**
2. **Very old animal (exhausted immune system).**
3. **Maternal antibody interference (neutralization)**
4. **Exposure to stress factor (cold, hot, transport …)**
5. **Vaccination during the I.P of the disease (overload on immune system).**

2. Human factors

1. **Improper handling or bad storage of the vaccine**

   4– 8 C.

2. **Improper mixing the vaccine before using.**

3. **Exposure the vaccine to direct sunlight.**

4. **Too frequent administration of the vaccine with**

   short interval (exhausted immune system).

5. **Use tap water in dissolving the vaccine (chlorine)**

3. vaccinal factors

1. **Vaccine prepared from wrong m.o.**
2. **Excessive attenuation of the m.o.**
3. **Vaccine contain insufficient amount or volume of antigen.**
4. **unsatisfactory route and dose of the vaccine**

Foot and mouth disease

Type	Inactivated trivalent (o, A, SAT2)
Animal	Cattle, buffaloes, sheep and goats
Age of vaccination	3-4 months in calve 2-3 months in lamb
Site of injection	S/c in neck
Dose	Cattle and buffalo; 2 ml Sheep and goats; 1 ml
Duration& repetition	6 months and every 6 months

Rift Valley fever

Type	Live attenuated	In activated
Animal	Cattle, buffaloes, sheep, goats and camels	
Age of vaccination	3-4 months in calve 2-3 months in lamb	
Site of injection	S/c in neck	
Dose	Cattle, buffalo and camel 2 ml Sheep and goats; 1 ml	
Duration & repetition	1 year & annually	6 months & every 6 months

N.B

- **Governmental vaccination program in Egypt for FMD and RVF occurred two times per year (April, May, June) and (October and November).**
- **Two vaccine can be given simultaneous at same time and each vaccine at one side of the neck.**

BEF vaccine (3 d sickness)

Type	Inactivated
Animal	Cattle.
Age of vaccination	Start from: 3-4 months in calve
Site of injection	S/c in neck
Dose	2 ml
Duration& repetition	6 months and every 6 months

Rinderpest vaccine

Type	Tissue culture live attenuated (kabet O strain)
Animal	Cattle.
Age of vaccination	Start from: 3-4 months in calve
Site of injection	S/c in neck
Dose	2 ml
Duration& repetition	1 year and every year

N.B about rinderpest vaccine

- **Safe and gives immunity from third day**
- **Long term immunity.**
- **Cheap, easily handled and manufactured.**
- **The virus strain is not shedding in secretion or excretion of vaccinated cattle**

Cattle master 4	Pneumo 3 & 4	Scour gaurd
Live attenuated **IBR, PI3, BVD & BRS**	In activated **IBR, PI3, BVD & (BRS)**	Inactivated **(killed) (Rota, corona & E-coli)**
Pregnant cow in tow doses 2 weeks interval (1st dose 1 month before parturition and second one 2 weeks before parturition.		
2 ml	**5 ml**	**2 ml**
I/M	**I/M or S/C**	**I/M or S/C**
1 year	**6 months**	
Every 1 year	**6 months**	

Hemorrhagic septicemia vaccine (HS)

Type	Killed (Pasteurella multocida **P 52**)
Animal	Cattle, buffaloes sheep and goat).
Age of vaccination	6 months in calve 3 months in sheep and goat Booster after 6 months
Site of injection	S/c in neck
Dose	Cattle, buffalo and camel 2 ml Sheep and goats; 1 ml
Duration& repetition	1 year and every year

	PPR	Sheep pox
Type	Live attenuated	
Animal	Sheep	
Age of vaccination	2-3 months	
Site of injection	S/c in neck	I/D in fatty tail
Dose	0.5 ml	
Duration & repetition	1 year & annually	

Clostridia vaccine (poly valent & Ultrachoice 8)

Type	Poly valent killed vaccine (cl. Perfringenes B-C-D, Cl chauvei, Cl. Novyei, Cl. Septicum, Cl hemolyticum and tetanus toxoid)	
Animal	Cattle & baffaloes	Sheep
Age of vaccination	6 months	3 months
Site of injection	S/c in neck	S/c in neck
Dose	1st 5 ml 2nd (6 w) 3 ml	3 ml 2 ml
Duration & repetition	6 months and every 6 months	

	Black leg & gas gangrene	Lamb dysentery & pulpy kidney
Type	Bi valent killed vaccine from (Cl. Chauvei and septicum)	Bi valent killed vaccine from (Cl. Perfringense B&D)
Animal	Cattle & baffaloes	Sheep
Age of vaccination	6 months	3 months
Site of injection	S/c in neck	S/c in neck
Dose	1st 5 ml 2nd (6 w) 3 ml	3 ml 2 ml
Duration & repetition	6 months and every 6 months	

Vaccination of Brucellosis

- **vaccination cannot eradicate the disease but it can reduce the incidence.**
- **Vaccinated females should be tested before breeding and animals give positive results should not be used in breeding.**

1. Br. abortus strain 19 (Calfhood vaccine)

Type	Live attenuated
Animal	Female calf only
Age of vaccination	4-8 months in calve
Site of injection	S/c in neck
Dose	5 cm (5-8 x1010)
Duration& repetition	1-5y and repetition not required

❖**Advantages:** **long term immunity.**

❖**Disadvantages:**

- **It can be used in vaccination of female calves only**
- **In bulls causes orchitis with multiple abscess formation**
- **In human causes natural infection.**
- **Sever post-vaccinal reaction.**
- **Causes persistent agglutinin formation that interfere with serological tests.**
- **Brucella strain is secreted in milk**
- **Not used in sheep and goat**

2. Br. abortus strain 45/20 (abortex = K 45/20)

Type	killed
Animal	Adult male and female (cattle, buffaloes, sheep and goat)
Age of vaccination	Over 6 months
Site of injection	S/c or I/M
Dose	3 cm in cattle and 1.5 cm in sheep and goat with booster dose after 1 m.
Duration& repetition	6 m and every 6 months

❖**Disadvantages:** **short term immunity.**

❖**Advantages:**

- **Used in vaccination of male and female bovine and ovine**
- **In human not causes natural infection.**
- **No sever post-vaccinal reaction.**
- **Not causes persistent agglutinin formation that interfere with serological tests.**
- **Detect latent and carrier animals as when injected in them, signs appear then culling (Anamnestic test)**

3. Rev 1 vaccine

Type	Live attenuated (br. Melitensis)
Animal	Sheep, goat, cattle and buffaloes
Age of vaccination	4-8 m of age
Site of injection	S/c or conjunctival instillation
Dose	2 cm in cattle and 1 cm in sheep and goat
Duration& repetition	4-5 years and repetition not required

4. RB51	
Type	Live attenuated (br. Abortus strain RB51)
Animal	Sheep, goat, cattle and buffaloes
Age of vaccination	4-12 m of age
Site of injection	S/c
Dose	2 cm in cattle and 1 cm in sheep and goat
Duration& repetition	1years and repetition annually.