CSF and Sheep Pox Vaccine

Why in News

The ICAR-Indian Veterinary Research Institute (IVRI) has transferred the technology for Classical Swine Fever (CSF) & Sheep Pox Vaccines to an animal healthcare company Hester Biosciences.

- The technology was transferred through state-owned Agrinnovate India (AgIn), which aims to work on the strengths of the Indian Council of Agricultural Research (ICAR).
  - AgIn promotes the development and spread of R&D outcomes through IPR (Intellectual Property Right) protection, commercialization and forging partnerships both in the country and outside for the public benefit.

Key Points

- Classical Swine Fever (CSF):
  - About the Disease:
    - CSF, also known as hog cholera, is an important disease of pigs.
    - It is one of the most economically-damaging pandemic viral diseases of pigs in the world.
      - It is caused by a virus of the genus Pestivirus of the family Flaviviridae, which is closely related to the viruses that cause bovine viral diarrhoea in cattle and border disease in sheep.
    - Mortality is 100%.
  - About the Vaccine Developed in India:
    - In India, the disease is controlled by a lapinized CSF vaccine (Weybridge Strain, UK) produced by killing large numbers of rabbits.
      - Lapinization means serial passage of a virus or vaccine through rabbits to modify its characteristics.
      - To avoid this, the ICAR-IVRI developed a Cell Culture CSF Vaccine (live attenuated) using the Lapinized Vaccine Virus from foreign strain.
      - The new vaccine has been found to induce protective immunity from day 14 of the Vaccination till 18 Months.

- Sheep Pox:
  - About the Disease:
    - It is a severe viral disease in Sheep and its virus is closely related to the Goat (capripoxviruses).
    - The virus is also related to the virus of lumpy skin disease.
    - The disease is very serious, often fatal, characterized by widespread skin eruption.
- It is confined to parts of southeastern Europe, Africa, and Asia.
- **About the Vaccine Developed in India:**
  - A live attenuated Sheep Pox Vaccine using indigenous strain was developed by the ICAR-IVRI for preventive vaccination in the sheep population.
  - The developed Vaccine uses indigenous Sheep Pox Virus Strain (SPPV Srin 38/00) and is adapted to grow in the Vero cell line which makes the Vaccine production to be easily scalable.
  - It is potent and immunogenic for sheep aged more than 6 months of age. It protects the Vaccinated animals for a period of 40 months.

### Cell Culture
- Cell culture is the process by which cells are grown under controlled conditions, generally outside their natural environment in especially designed conditions and precise conditions of temperature, humidity, nutrition, and freedom for contamination.
- Cultured cells are excellent hosts for the propagation of many types of viruses. The ability of cell culture systems to produce large quantities of attenuated viral particles has served as the basis for the production of both human and veterinary vaccines.

### Vero Cell
- **Vero cells** are lineages of cells used in cell cultures. The Vero lineage was isolated from kidney epithelial cells extracted from an African green monkey.
- Vero cells are used for many purposes, including,
  - Screening for the toxin of Escherichia coli, first named "Vero toxin".
  - As host cells for growing viruses.
- The Vero cell lineage is continuous and aneuploid.
  - A continuous cell lineage can be replicated through many cycles of division and not become senescent (i.e. not deteriorates with age).
  - Aneuploidy is the characteristic of having an abnormal number of chromosomes.

### Live-attenuated Vaccines
- **Live vaccines use a weakened (or attenuated) form of the germ that causes a disease.**
- Because these vaccines are so similar to the natural infection that they help prevent, they create a strong and long-lasting immune response.
  - Just one or two doses of most live vaccines can give one a lifetime of protection against a germ and the disease it causes.
- The limitation of this approach is that these vaccines usually cannot be given to people with weakened immune systems.
- Live vaccines are used against: Measles, mumps, rubella (MMR combined vaccine), Rotavirus, Smallpox among others.

**Source: PIB**

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