



## New Brucellosis Vaccine by ICAR

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### Why in News

“*Brucella abortus* S19 $\Delta$  per vaccine” is developed by the **Indian Council of Agricultural Research’s -Indian Veterinary Research Institute (ICAR-IVRI)** for **brucellosis** prevention in the **dairy sector**.

### Key Points

- **Brucellosis:** It is a **bacterial disease** caused by various **Brucella species**, which mainly infect cattle, swine, goats, sheep and dogs.
  - It is also known as **Malta fever or Mediterranean fever**.
  - **Brucellosis** is a **zoonotic disease** and **endemic in India** causing **huge economic losses to dairy industry** due to:
    - Infertility
    - Abortion
    - Birth of weak off springs
    - Reduced productivity
- **Old Vaccine:**
  - **B. abortus S19 strain:** In India, calf-hood vaccination is practiced using live attenuated **Brucella abortus S19 strain** for control of the disease.
  - B. abortus S19 strain is a very strong **immunogen and provides lifelong immunity**.

An immunogen refers to a molecule that is capable of eliciting an immune response by an organism's immune system.
  - **Drawbacks:**
    - Residual virulence to humans and animals.
    - Not suitable for vaccination in adult animals.
    - Causes abortion when used in pregnant animals.
    - Interferes with sero-diagnosis of clinical infection.

- **New Vaccine: To overcome some of these drawbacks**, a modified strain of *B. abortus* S19 has been developed at ICAR-IVRI. The newly developed strain is named as ***B. abortus* S19Δ per.**
  - It is developed under the **Department of Biotechnology (DBT)** funded “**Brucellosis network program**”.
    - The programme **aims at** studying the epidemiological status of *Brucella* infections in India and to develop novel diagnostics and vaccines.
  - In the process of modifying the S19 strain, **lipopolysaccharide (LPS) structure** of the organism was altered through **deletion mutation**.
    - **Lipopolysaccharide** is the major component of the outer membrane of **Gram-negative bacteria**.
    - A **deletion mutation** occurs when part of a DNA molecule is not copied during DNA replication.
  - Vaccine potential of S19Δ per has been evaluated in experimental small animal models and also in buffalo calves.
  - The vaccine has **great demand in India** and will be of immense help in the national control programme on brucellosis.
  - The vaccine has **DIVA capability**.
    - DIVA means** differentiating infected from **vaccinated** animals. These **vaccines**, also termed as marker **vaccines**, can differentiate between naturally infected and vaccinated animals.

## Infection to Humans

- Brucellosis has infected over 3000 people in China.
- Humans generally acquire the disease through:
  - **Direct contact with infected animals or**
  - Eating, drinking **contaminated** animal products, unpasteurized milk or
  - **Inhaling airborne agents.**
- The US Centers for Disease Control and Prevention states that person-to-person transmission of brucellosis is “**extremely rare**” but some symptoms may reoccur or never go away.
- **Symptoms** of Brucellosis include **fever, sweats, malaise, anorexia** (psychological disorder in which one eats less due to fear of weight gain), **headache** and **muscle pain**.
- **Treatment and prevention:**
  - It is usually treated with **antibiotics**, including **rifampin and doxycycline**.
  - Avoiding unpasteurised dairy products and taking safety precautions such as wearing rubber gloves, gowns or aprons, when handling animals or working in a laboratory can help prevent or reduce the risk of getting brucellosis.
  - Other preventive measures include cooking meat properly, vaccinating domestic animals, etc.

**Source PIB**