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Match Maker

Dairy and Poultry Health Solutions

Active Virosome and eSAME Technology Platform
Versatile platforms for animal vaccine development

Lead Inventor: Dr Vishwas Joshi
Organization: Seagull Biosolutions PVT LTD
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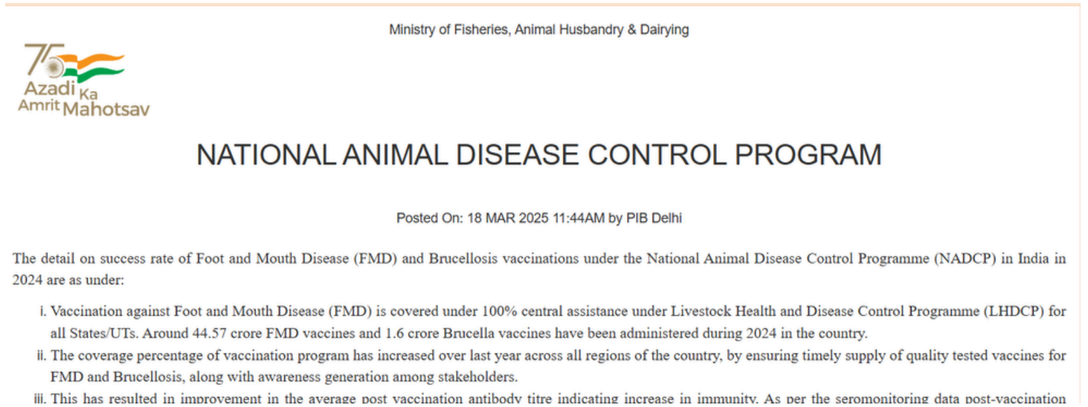
Background and Problem

- India’s veterinary vaccination programs are heavily dominated by conventional vaccine types:
  - Live attenuated vaccines (LAV)
  - Inactivated (killed) vaccines
- Government Programs Reinforce This Pattern:
  - India runs large-scale vaccination programs (e.g., FMD, Brucellosis)
  - Example: 44+ crore FMD doses administered in 2024
- Worldwide MNCs are moving toward new vaccine technologies
- The transition is motivated by the need for faster, safer, and more effective vaccines, especially in response to emerging disease outbreaks.



Ministry of Fisheries, Animal Husbandry & Dairying

Azadi Ka Amrit Mahotsav

NATIONAL ANIMAL DISEASE CONTROL PROGRAM

Posted On: 18 MAR 2025 11:44AM by PIB Delhi

The detail on success rate of Foot and Mouth Disease (FMD) and Brucellosis vaccinations under the National Animal Disease Control Programme (NADCP) in India in 2024 are as under:

i. Vaccination against Foot and Mouth Disease (FMD) is covered under 100% central assistance under Livestock Health and Disease Control Programme (LHDCP) for all States/UTs. Around 44.57 crore FMD vaccines and 1.6 crore Brucella vaccines have been administered during 2024 in the country.

ii. The coverage percentage of vaccination program has increased over last year across all regions of the country, by ensuring timely supply of quality tested vaccines for FMD and Brucellosis, along with awareness generation among stakeholders.

iii. This has resulted in improvement in the average post vaccination antibody titre indicating increase in immunity. As per the seromonitoring data post-vaccination

Market opportunities

India animal vaccines market size was estimated approx 575 USD Million in 2024. The India animal vaccines market is projected to grow from 620 USD Million in 2025 to 1300 USD Million by 2035. (Source: Market Research Future)

Factors driving the growth:

- Government initiatives like National Animal Disease Control program & Disease eradication goal(s)
- Wide prevalence
- Indian Immunologicals, Brilliant Bio, Boehringer, Ceva, Jinyu group, Zoetis, etc

Major Indian Players: Indian Immunologicals, Intas Animal Health, Zydus Animal Health & Investments, Venkys Ltd, BIBCOL, Alivira, etc

The Gap in India’s vaccine ecosystem

- Advanced technologies are not easily adoptable (platforms like VLPs, vectored and mRNA vaccines):
  - Require high capex and specialized infrastructure
  - Involve complex development and manufacturing processes
- Dependence on global players for advanced solutions
- Missed opportunity for Indian manufacturers

Solution

Seagull BioSolutions offers two next gen vaccine development platforms offering:

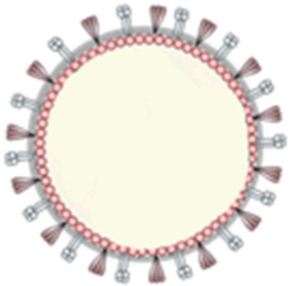
- Easy aadoptibility
- Affordability
- Quick turnaround time for production

Active Virosome Technology
eSAME technology
: for Reverse Genetics of Viruses

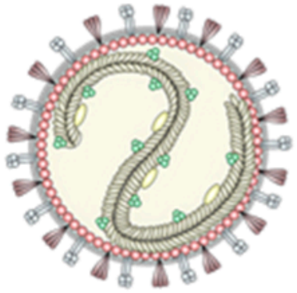
About the Technology - Seagull Technology 1

Active Virosome Technology

Membranous nanoparticles



Display any viral or non-viral Glycoprotein on their surface



Package RNA comprising of 7 tricistronic genes

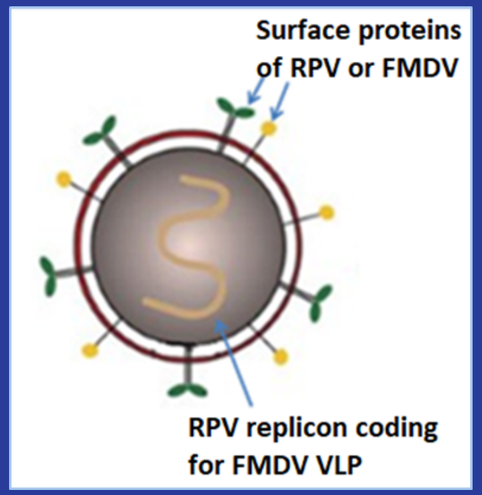
- Useful for producing
- Non-Replicating derivatives of
- Measles & other animal viral pathogens including :,
- NDV (Poultry), CDV (Dogs), Rinderpest (Cattle),
- PPRV (Sheep), Phocid DV (Pigs), etc.
- Mimic Attenuated Phenotype
- Immunize by themselves
- Cause limited infection & express viral proteins without causing disease
- Excellent Vectors for developing other Vaccines

Active Virosome agents producing Virus Like Particles, Protein antigens, RNA vaccines etc. in situ
 Can be useful as simpler, easier to manufacture, cost effective & less capex intensive

Use Case

Foot Mouth Disease Vaccine

Active Virosome Vaccine for FMD



Advantages

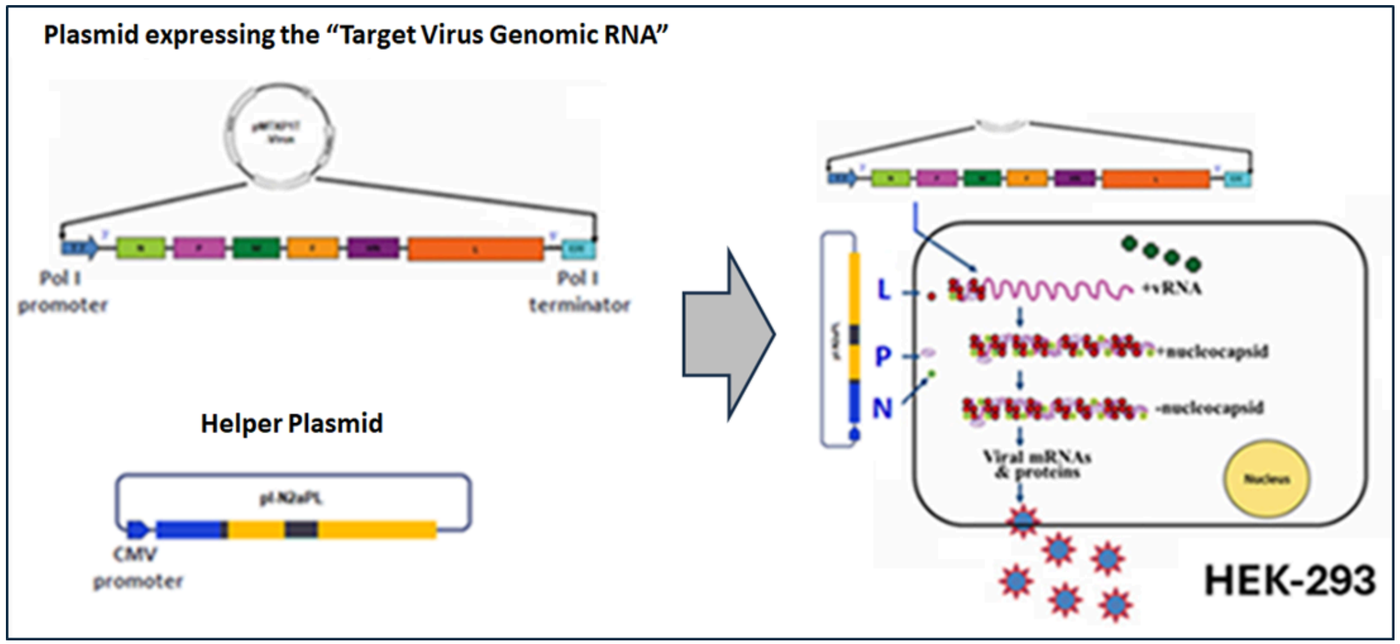
- Easy & hazard free production
- Minimal downstream processing
- Not requiring Virus Inactivation
- Agent mimicking Attenuated phenotype
- Easy-to-formulate into multivalent vaccines

- Current Practice
- Inactivated Vaccine
- Multivalent
- Problems faced
- Inadequacy of inactivation leading to disease outbreaks
- Individual cultivation of different FMD serotypes & their inactivation increases cost & efforts in Production of Multivalent vaccines
- Vaccines under development
- Attenuated virus, VLP & virus vectored vaccines

Seagull offers to help Industrial partners to develop these AV vaccine agents

Seagull Technology – 2

eSAME technology (episomal self amplifying mammalian self expression technology): for Reverse Genetics of Viruses



- Virus Seeds from "Paper Sequence"
- Technology for producing
- Viruses from cDNA
- In situ production of rec. proteins
- Useful for Seed stocks of :
- Measles Virus; Newcastle Disease virus
- Rinderpest Virus; Canine Dystemper Virus
- Peste des petits Ruminants virus;
- Phocid Dystemper Virus, etc.

Used For

- Producing Measles Virus (Edmonston Zagreb) strain Seed for a leading Indian Vaccines Company
- Experience useful for similar development of "Paper Sequence to Vaccine Seed" for other vaccines as well

Use case: PPRV vaccine

Current Practice

- Live Attenuated Virus Vaccines
- Sungri 96, Arasur 87 & Coimbtore 97
- Other strains based on Geographical requirement(s)
- Neigeria 75/1 (Africa, Middle east & Asia)
- Sungri 96 (Bhutan, parts of South Asia)
- Problems faced
- Differentiation between Vaccinated & Exposed Sheep

Attenuated, marked PPRV agent rescued using Reverse Genetics

- Virus recovered from published sequence of attenuated viruses (as per client requirement)
- Artificially marked with appropriate “Marker” for differentiating between vaccinated & exposed sheep

We offer to generate attenuated & marked virus strains for use in vaccine development for clients

Chicken Anemia Virus Vaccine

Current Practice

- Live Attenuated Virus Vaccine
- Other vaccines under development
- Subunit, Virus vectored vaccines
- Problems with new format vaccines
- Short lived immunity
- Late administration needed

Market size:

Global : $ 2.4 B (‘24) growing @7.6%
CAGR to $ 3.7 B (‘30)
Indian : CAGR=10%⊠ $ 123.8 M (‘30)

Factors driving the growth:

- High seroprevalence in flocks (esp Northern India)
- Hester, Venkys
- Newer technologies introduced by International players (Boehringer, Zoetis, Hester)

SBPL’s offers to work with Industry partners to produce the Seed Stock for this vaccine

- Our experience with producing cDNA for Reverse Genetics of MVSS will help
- We do not have technology but developing technology is relatively easy

Value Proposition

New strategy for rapidly building vaccines as new serotypes emerge.

-- The key value proposition compared to attenuated/ inactivated vaccines will be the ability to respond quickly as new serotypes emerge, no risk of poor inactivation and cost effectiveness in production (due to reduced need for production/ purification/ mixing steps) while achieving the effectiveness comparable to attenuated vaccines.

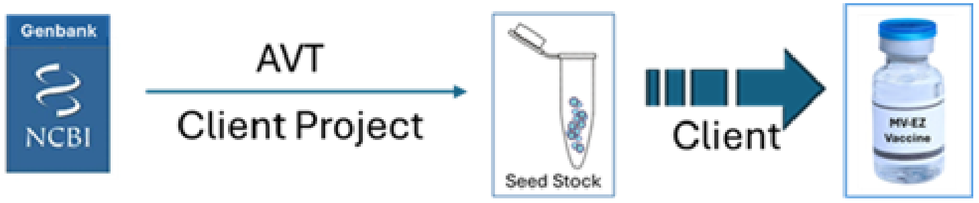
Status

1. Active Virosome Vaccines

• Chickengunya, Zika & Ebola Vaccine Agents	Activirosome UK Ltd Technology Collaboration & IP partnership
• Technology Licensing for Vaccine Use • Influenza Vaccine	Sagitta Biotech, Belgium R&D service Contract & Licensing Agreement

2. cDNA to Vaccine Virus Seed Stock Generation

Measles Virus Seed Stock



Import substitution
Enabled Cost Reduction (50 – 80%)
Broadened access

Company Snapshot

2 Proprietary Technology Platforms

- eSAME (episomal self amplifying eukaryotic expression technology)
- AVT (Active Virosome Technology)

Active Virosome Immunotherapy & Vaccines – Primary PoC complete

- Oncolytic Virus Therapy for Cancer
- Preventive vaccines for – Dengue, Chikungunya, Ebola & SARS-CoV-2

Commercialized Products

- Measles Virus Seed Stock (MVSS): Developed by Client into a vaccine & undergoing Clinical Trials in India
- Active Virosome Antigens: being used by Client as Reagents for Drug Discovery Applications
- Vaccines for prevention of infectious diseases
- Vaccine Development
- Technology licensed to Sagitta Biotech, Belgium
- Presented by Sagitta to BARDA, USA

Team & Organization

Vishwas D Joshi

CSO/ CTO

- Molecular Virologist
- Founder & MD of Seagull BioSolutions
- 30+ yrs drug discovery R&D

Mokshada Joshi

Intellectual Property

- Patent agent (AM Leagl Associates) 3+yrs
- MSC Microbiology
- Law degree ongoing

Mukesh Meshram, PhD

Bioprocess & Production

- Cell Biologist with 10+
- Yrs Industrial experience in Process Development

Abhay H. Patki, PhD, MBA

Clinical Development Specialist

- 10+yrs in Clinical Development of Biological Therapies including Cancer
- Daratumumab (M. Myeloma), Ofatumumab (CLL), Elacestrant (Her2-ve Breast Cancer), etc

Next Steps

Seagull has developed expertise in Reverse Genetics of Viruses & also produced a versatile Technology Platform for producing Innovative Viral Vaccines for Disease Prevention

We offer our R&D services to interested Veterinary Vaccines

Open to licensing

Seeking

Industry interested in tapping scientist capabilities as an R&D expert/ consultant.

Industrial partners interested in sponsoring further technology Development & Vaccine

Investors:
Strategic investment for Vaccine R&D & Platform Exploitation

For more information, contact:

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