



GF-TADs

GLOBAL FRAMEWORK FOR THE
PROGRESSIVE CONTROL OF
TRANSBOUNDARY ANIMAL DISEASES



Food and Agriculture
Organization of the
United Nations



World Organisation
for Animal Health

ASF Vaccine Development in South Korea: Collaboration Between Government and Private Sector

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Animal and Plant Quarantine Agency

Ministry of Agriculture, Food and Rural Affairs



Animal and Plant
Quarantine Agency

The ASF Vaccine Platform Bottleneck

Evaluating current platforms reveals the **urgent need for a scalable, stable LAV**

	Inactivated Vaccine	Subunit Vaccine	Live Attenuated Vaccine (LAV)
Safety	● High	● High	○ Variable - genetic instability
Efficacy	○ Failed - ADE phenomenon observed	○ Partial - protective antigens unresolved	● High - most promising
Productivity	○ Low - high production costs	● High	○ Critical Bottleneck

Core Conclusion: The field requires an LAV platform adapted to an immortalized cell line (Vero) without sacrificing genetic stability.

A Tri-Partite Strategy

Government support is categorized into three actionable pillars to solve domestic limitations and empower private enterprise.

R&D Support

Launching a joint industry-government overseas clinical task force (2027-2031) to conduct large-scale field trials.

Early Commercialization

Infrastructure Expansion

Expanding private access to existing public BL3/ABL3 facilities and constructing new dedicated biosafety infrastructure.

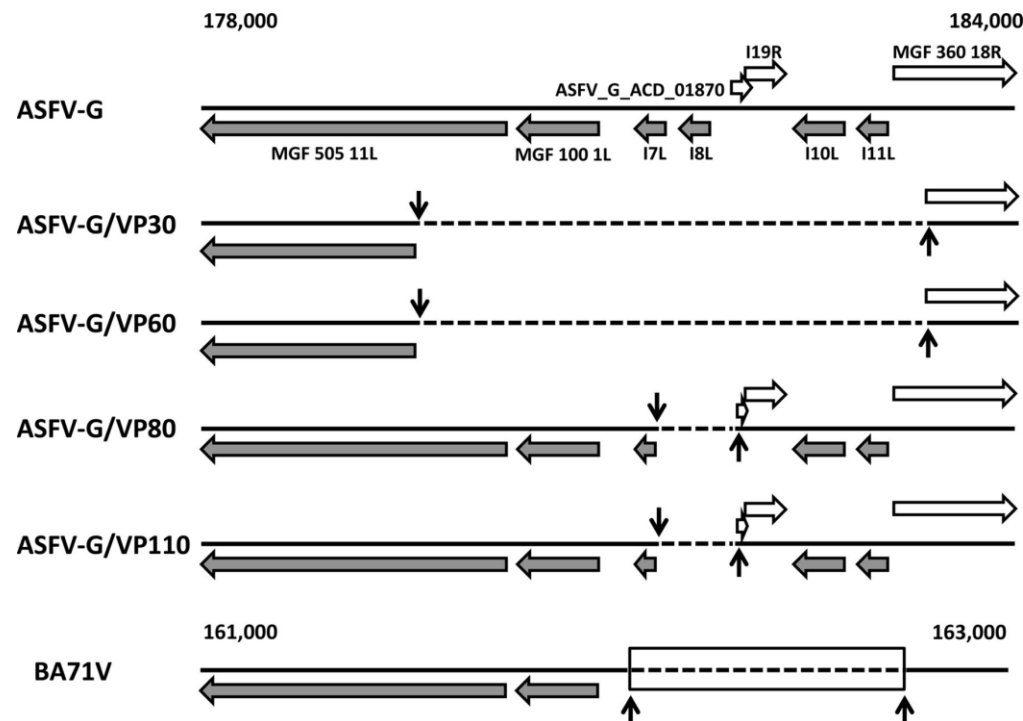
Fast-Track Regulation

Introducing expedited approvals

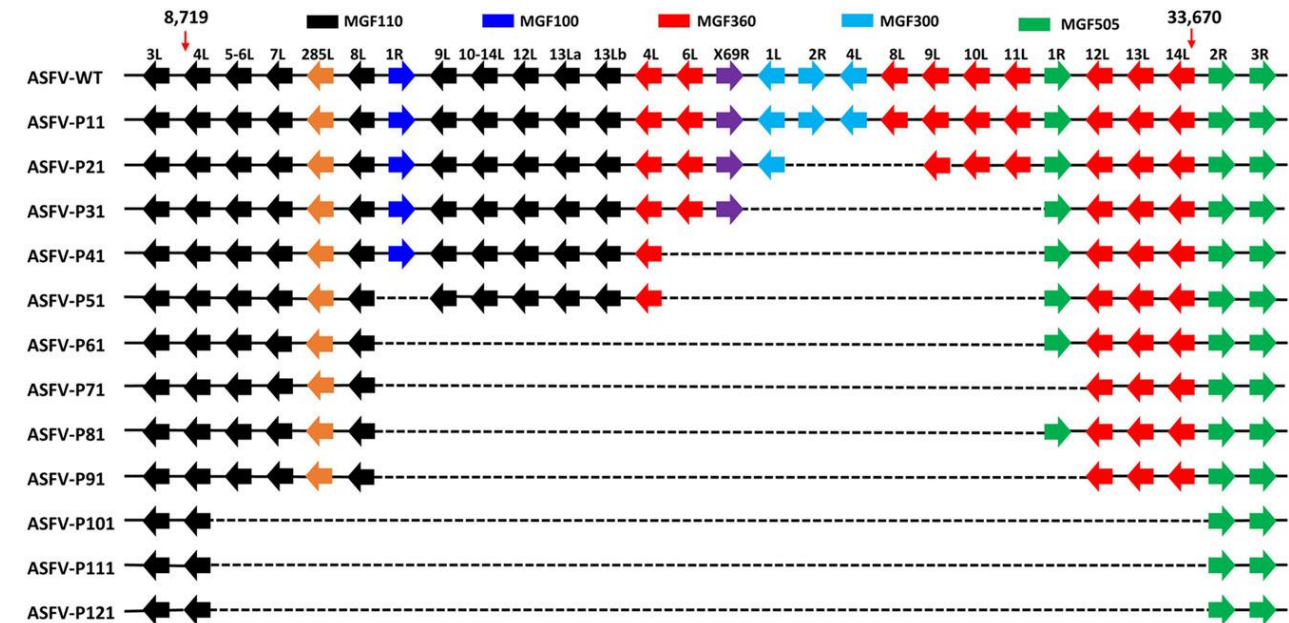
Deriving the Backbone: Vero-Adaptation of ASFV Paju1

Genetic instability of ASFV

■ ASFV passages in animal cell lines

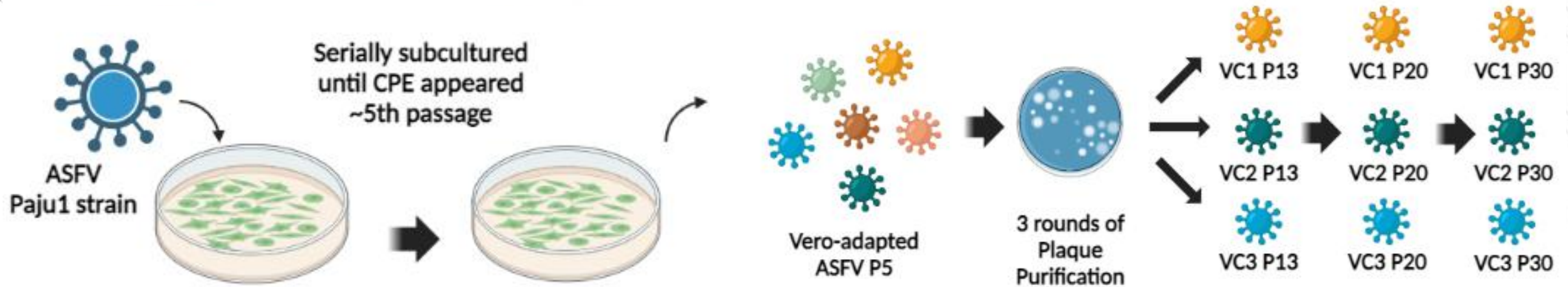


(Krug T.W. et al., *J Virol*, 2015)

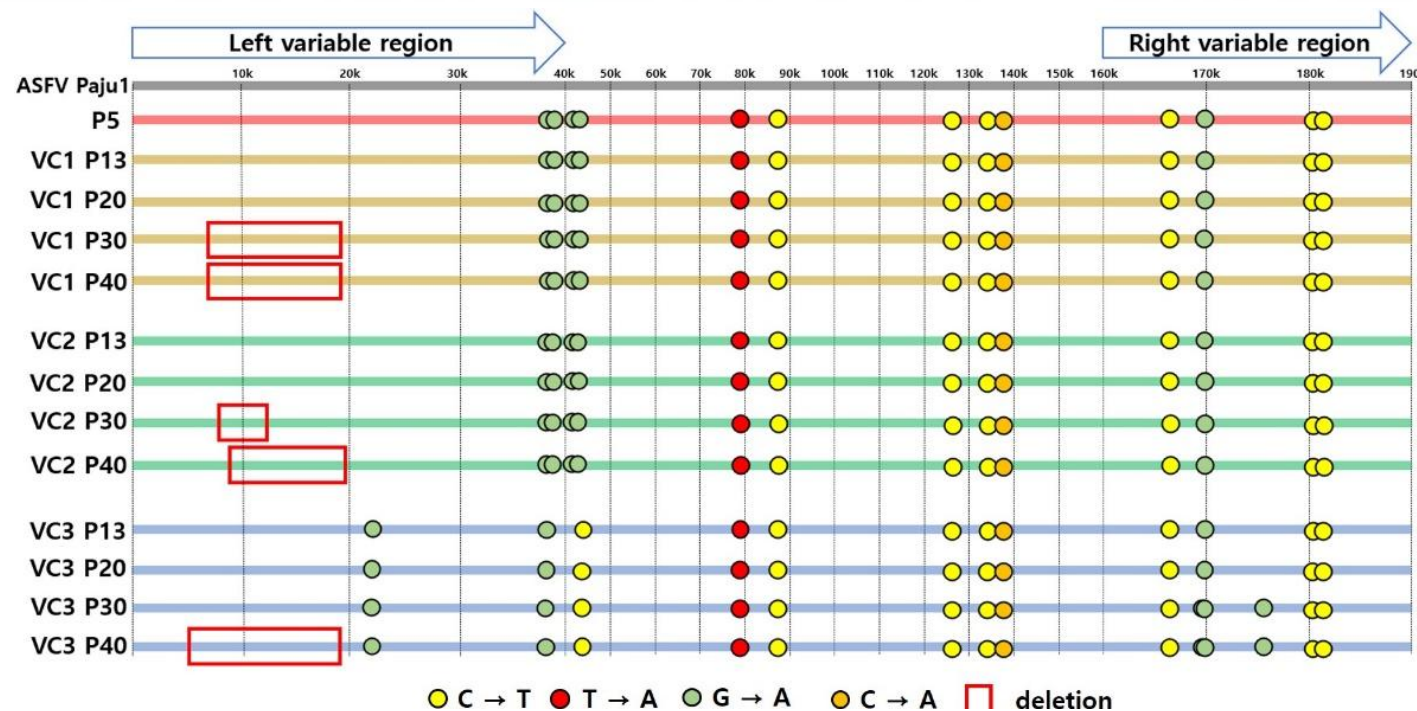
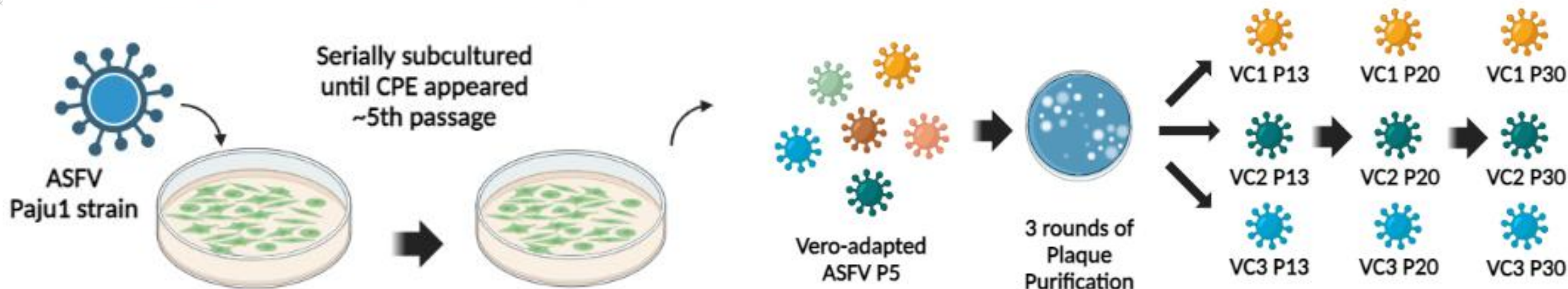


(Wang T. et al., *Transbound Emerg Dis*, 2021)

Deriving the Backbone: Vero-Adaptation of ASFV Paju1



Deriving the Backbone: Vero-Adaptation of ASFV Paju1



Baseline Efficacy: In Vivo Validation of VaCln3 (p13)

Animal experiment scheme

Group	Vaccination (ASFV-PJ_VaCln3 p13, TCID ₅₀ /ml)	No.	Challenge (HAD ₅₀ /ml)
1	10 ^{2.0}	5	10 ^{2.0}
2	10 ^{4.0}	5	10 ^{2.0}
3	10 ^{6.0}	5	10 ^{2.0}
Cont	-	5	10 ^{2.0}

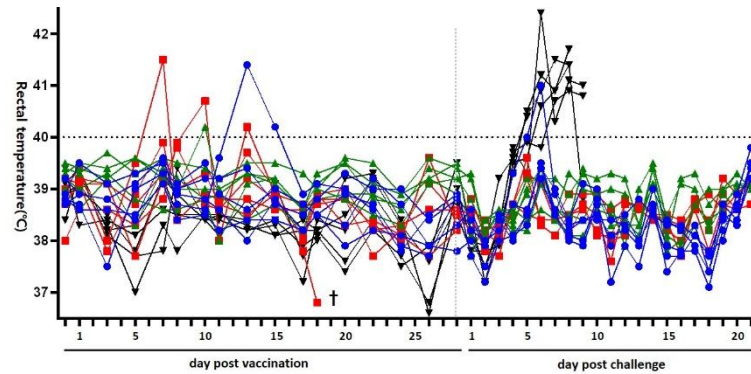


Challenge virus strain : Korea/Pig/Paju1/2019

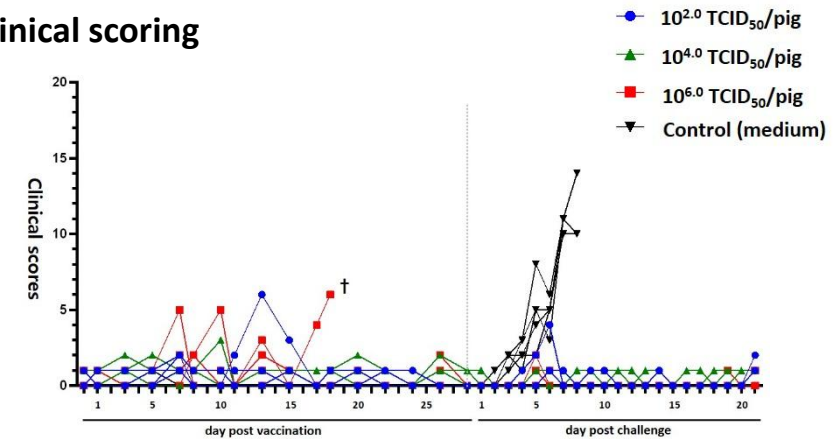
Baseline Efficacy: In Vivo Validation of VaCln3 (p13)

Safety and efficacy evaluation in pigs

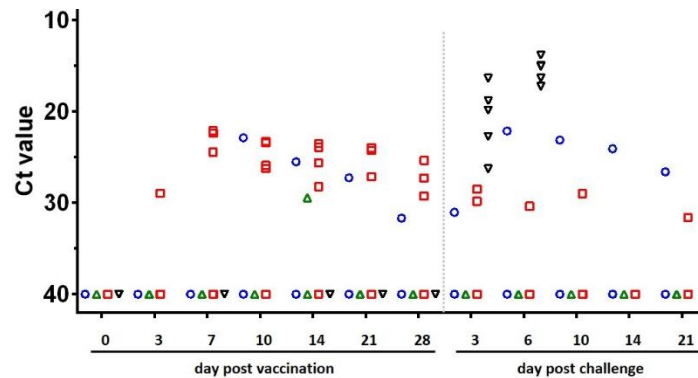
Body temp



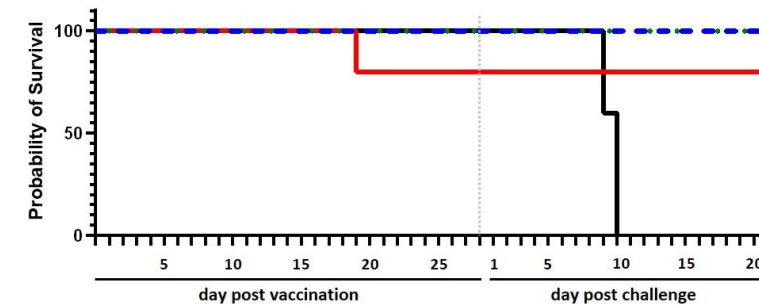
Clinical scoring



Viral load (whole blood)



Survival curve

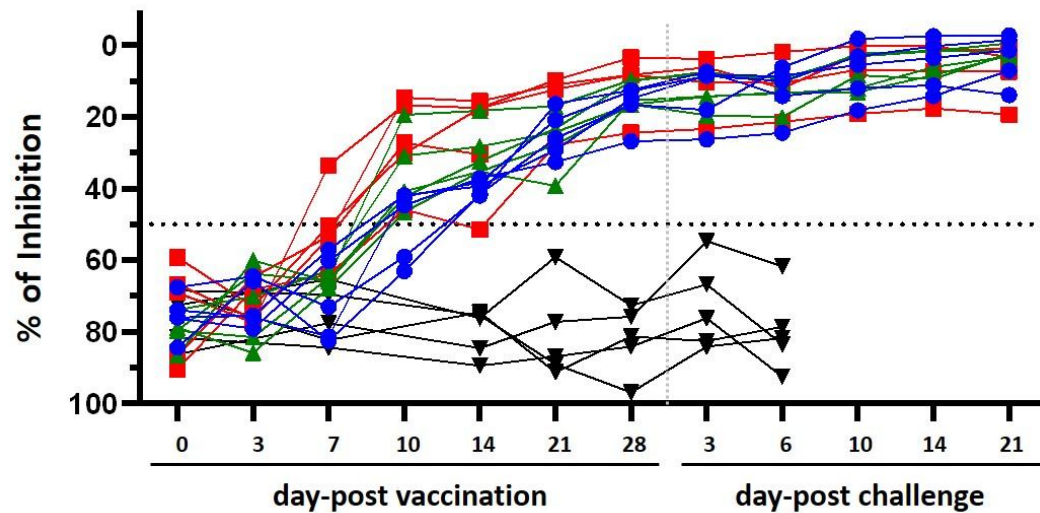


(Suh et al., *Vaccine*, 2025)

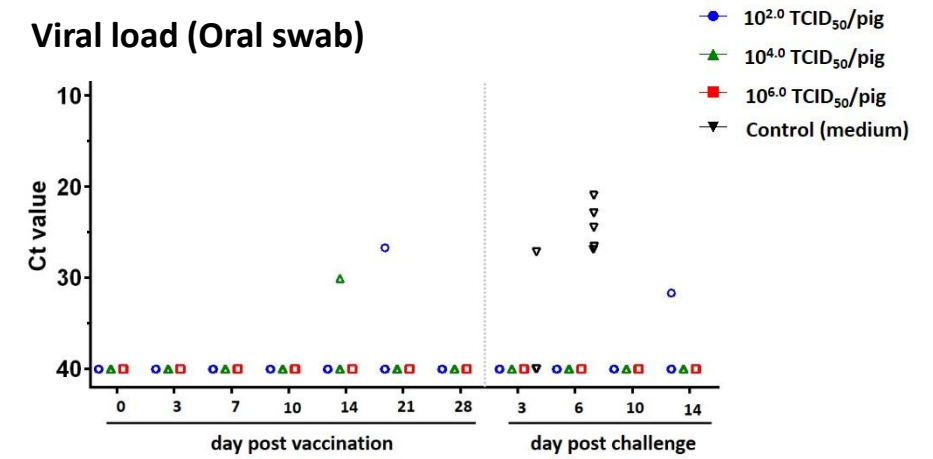
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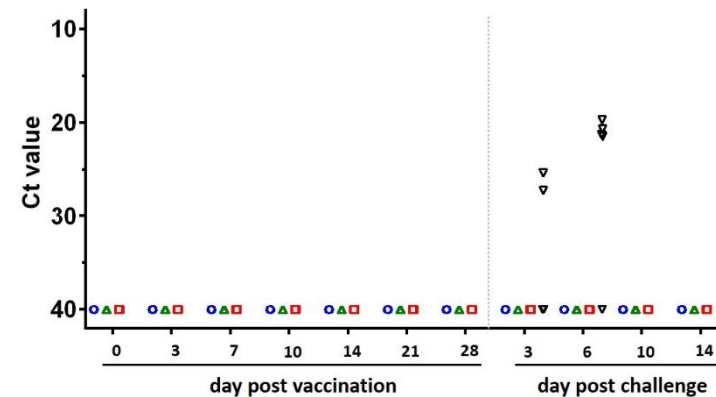
Immune response (Ab titer; cELISA)



Viral load (Oral swab)



Viral load (Rectal swab)



(Suh et al., *Vaccine*, 2025)

Precision Engineering: The DIVA Target Selection Funnel

Filter 1 (Top): High Immunogenicity:
Must elicit a strong, reliable antibody response
in infected animals for diagnostic sensitivity.

Filter 2 (Middle): Antigen Abundance:
Transcriptome & Intracellular Proteome data
guarantees high expression levels during viral
replication.

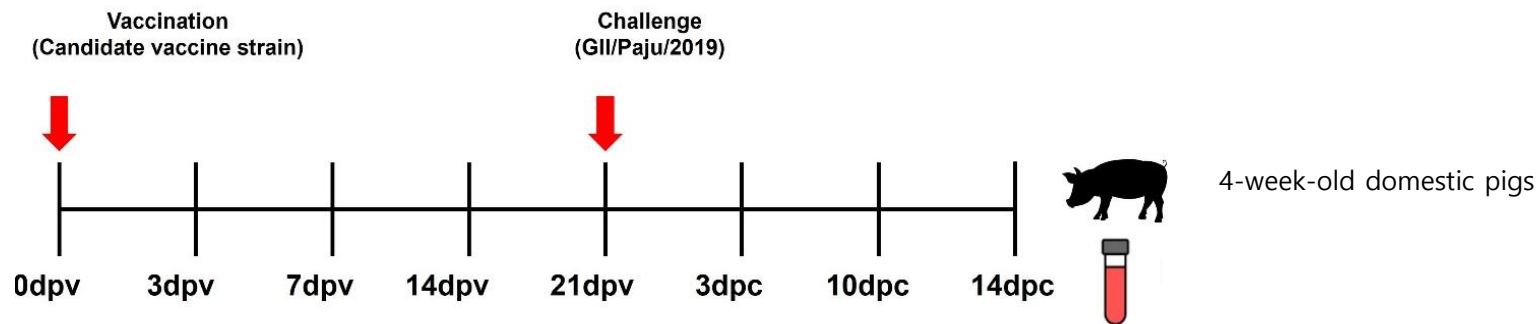
Filter 3 (Bottom): Non-Essentiality:
Genetic deletion must not compromise viral
replication kinetics in Vero cell culture.

4 Optimal Candidates Identified:

Development of DIVA LAV vaccine

■ Animal experiment with **VaCln3ΔDIVA1**, **VaCln3Δ DIVA2**

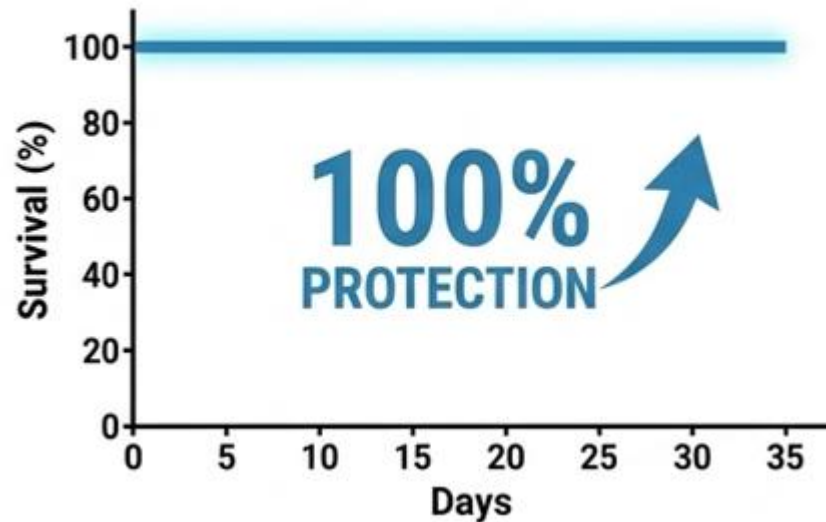
Group	Inoculated virus	Inoculation Titer (TCID ₅₀ /pig)	No.	Challenge (HAD ₅₀ /ml)
1	VaCln3	10 ^{6.0}	3	10 ^{2.0}
2	VaCln3ΔDIVA1	10 ^{6.0}	3	10 ^{2.0}
3	VaCln3ΔDIVA2	10 ^{6.0}	3	10 ^{2.0}
Cont	-	-	3	10 ^{2.0}



Definitive Proof: 100% Protection & Serological Differentiation Achieved

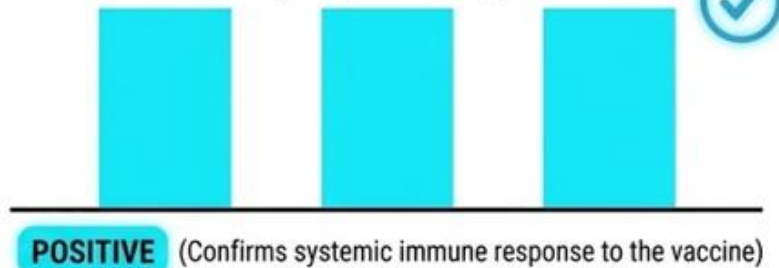


In Vivo Efficacy Maintained

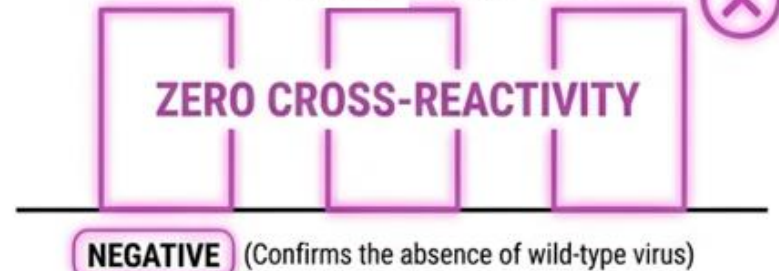


DIVA Capability Confirmed

ASFV p30/p22 Antigen Test



ASFV DIVA Antigen Test



A Tri-Partite Strategy

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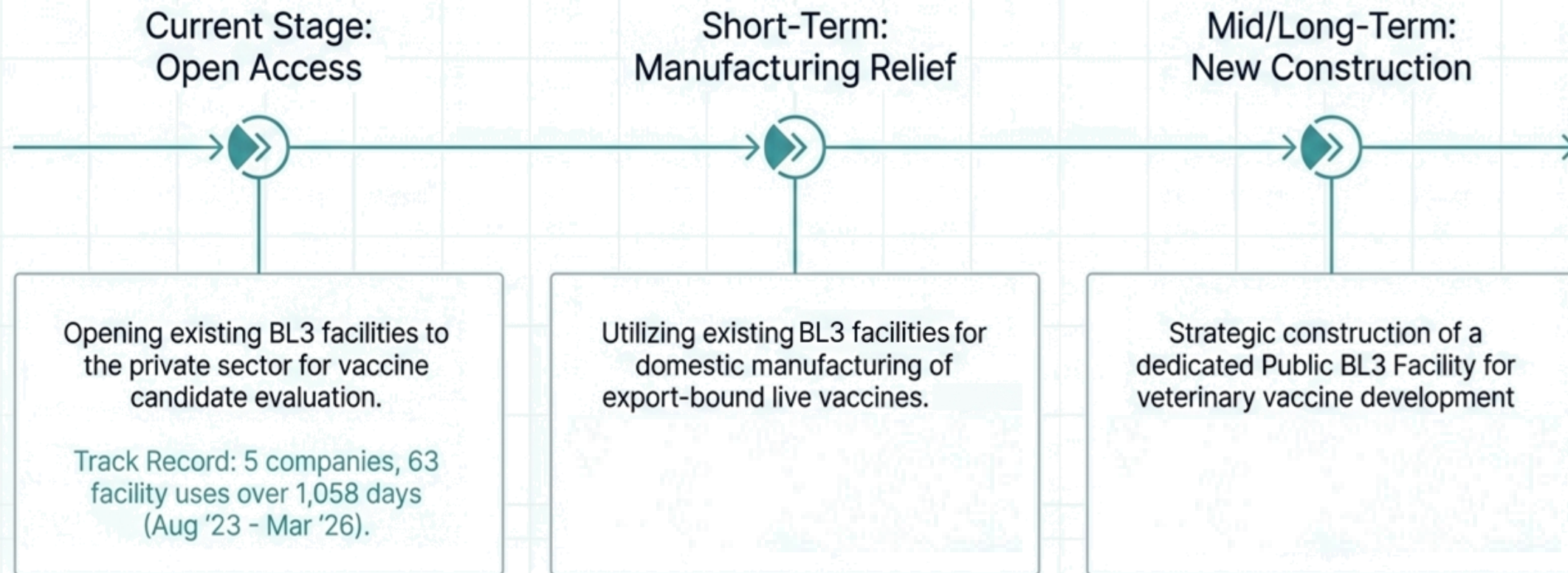
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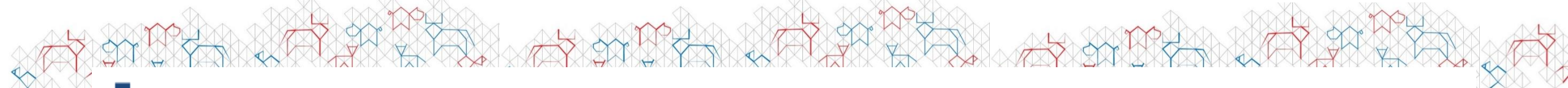
Fast-Track Regulation

Introducing expedited approvals

Scaling Biosafety Infrastructure

Phased support to provide essential BL3 facilities for vaccine R&D and manufacturing.





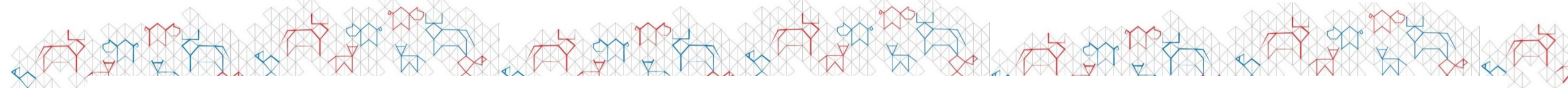
Considerations in developing ASF LAV vaccine

■ Addressing safety concerns

- **Persistent infection** and the risk of **reversion to virulence** under field conditions
- Evaluating transmissibility to unvaccinated or under-vaccinated animals, viral shedding, and environmental persistence
- Safety assessment in pigs across various physiological conditions (e.g., age, pregnancy status etc.)
- Suitability for **oral bait vaccines in wild boar populations**

■ Genetic stability and seed virus management

- Quality control of the vaccine seed virus
- Methods for maintaining the genetic and biological integrity of the seed virus
- Evaluation of genetic stability: Establishing protocols beyond NGS



Considerations in developing ASF LAV vaccine

■ Vaccine productivity

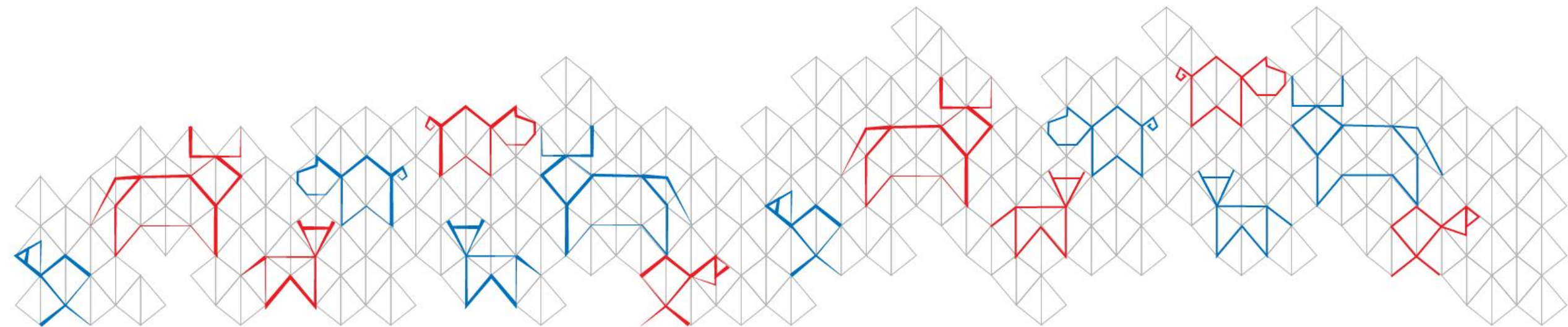
- Cell lines supporting stable, high-titer replication of the ASFV vaccine strain

■ DIVA strategy compatibility

- Essential for efficient disease control and the implementation of vaccination policies (not limited to LAVs)

■ Breadth of efficacy

- Challenges of strain-specific efficacy (homologous vs. heterologous protection)
- Strategies for achieving cross-protection against antigenically divergent strains



Thank you!!!