IMUNON

A Novel DNA Vaccine Approach for Prophylactic & Therapeutic Vaccines

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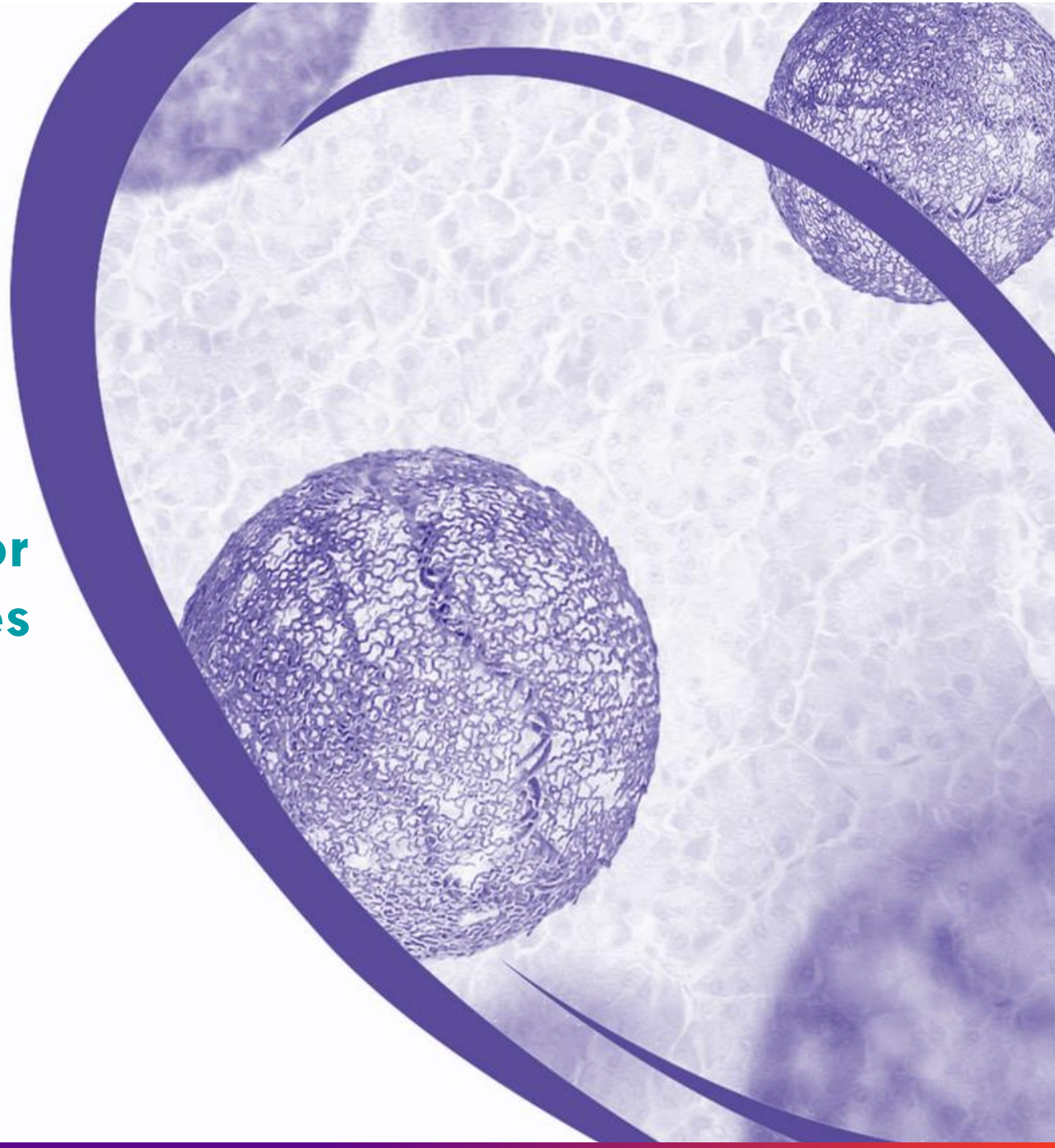


Viruses and Cells - Gordon Research Conference
May 21-26, Barcelona, Spain

PlaCCine- Next Generation Covid Vaccine Technology

Well-Suited to Address the Needs of Future Vaccines

Known Limitations of Current Covid Vaccines

- Short-lived responses (4-6 months) requiring frequent boosts
- Low cross-reactivity to new variants
- Poor stability at workable temperatures
- Poor cytolytic T-cell responses limiting clearance
- Antigenicity causing adverse events
- Challenges in manufacturing & subunit mixtures

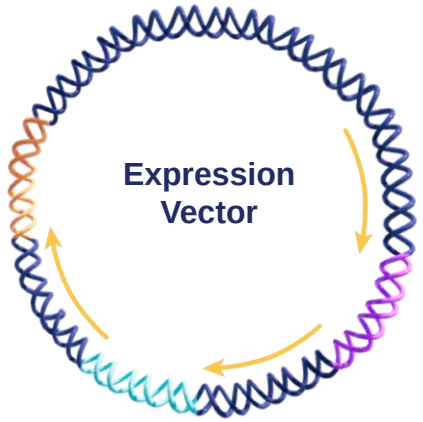
PlaCCine – A Novel DNA Vaccine Platform
Key Attributes

Multi-valent	• Multiple antigens from a single plasmid • Breadth of Immune Responses
Durable Responses	• Durable antigen expression/exposure
Novel Formulation	• Independent of virus, device, or LNPs
Flexible Manufacturing	• "Plug & Play"
Stable at ≥4°C	• > 9 months

Durable and broad-spectrum immunity and immune quality, longer shelf-life at workable temperature and flexible manufacturing warrants PLACCINE as an alternative to current vaccine approaches

PlaCCine Technology Platform

Multicistronic or Single Antigen Vector Formulations Independent of Virus or Device



Up to 4 genes have been successfully incorporated and expressed

PlaCCine pDNA Constructs

PlaCCine Delivery Systems

-Synthetic Delivery Systems

- **Non-viral**
- **Non-device**

Numerous vectors and delivery systems tested for optimization studies

Nanoparticles/Complexes

PlaCCine Vaccines

Intramuscular (IM) Administration

Humoral & Cell Mediated Immune Response

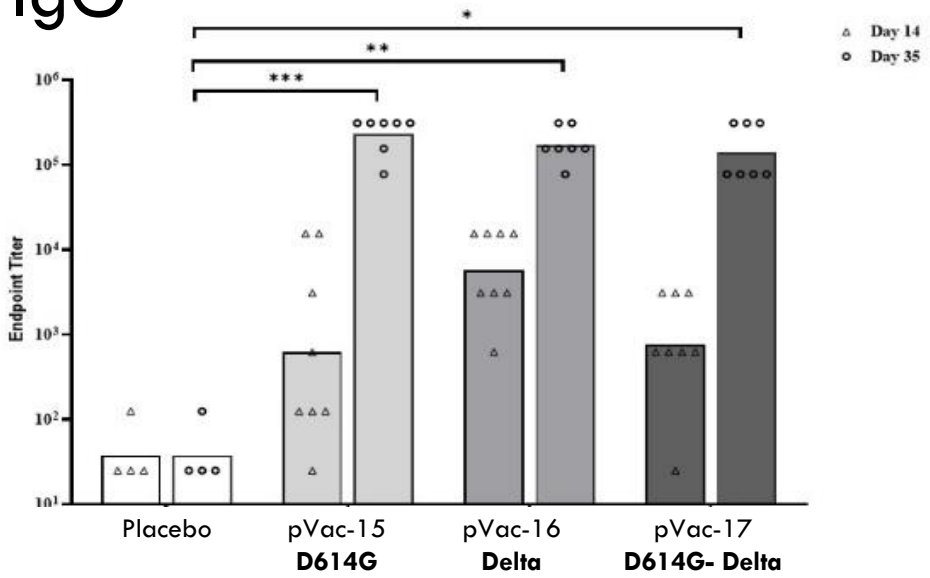
Potential Administration Routes

- Subcutaneous (SC)
- Intradermal (ID)
- Intranasal (IN)

Evidence of Immunogenicity of Prototype PlaCCine Vaccines in Mice

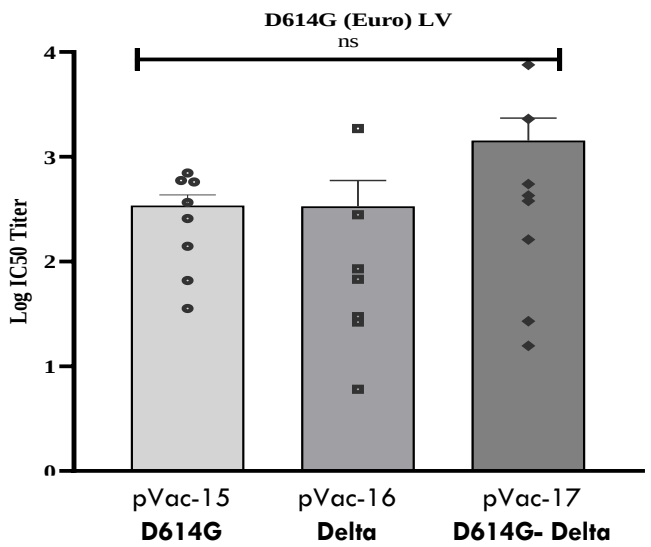
Monovalent & Bivalent Spike Vaccines against Different SARS-CoV-2 Variants

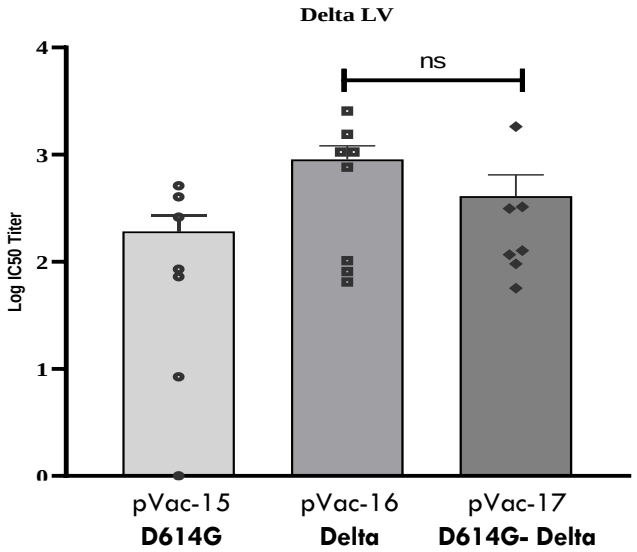
IgG



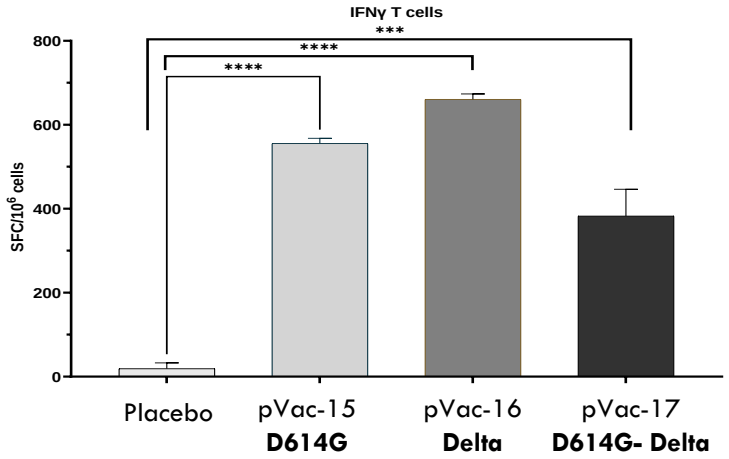
*P< 0.05, **P < 0.01, **** P<0.0001

nAB





T-cell



Peptide pools were 15 mers overlapping by 11 aa that encompassed the S1 protein from Wuhan Strain.

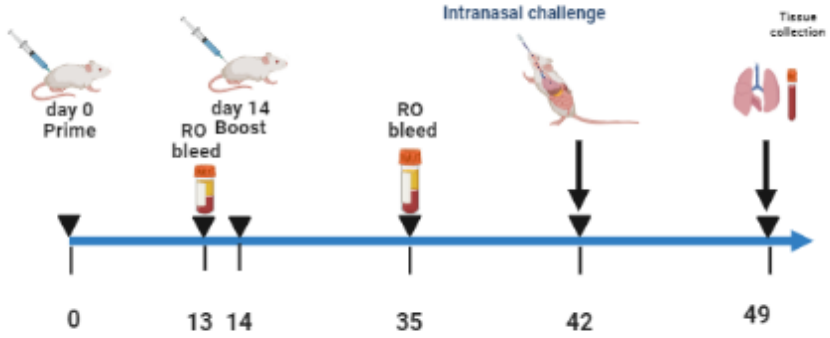
*P< 0.05, **P < 0.01, **** P<0.0001

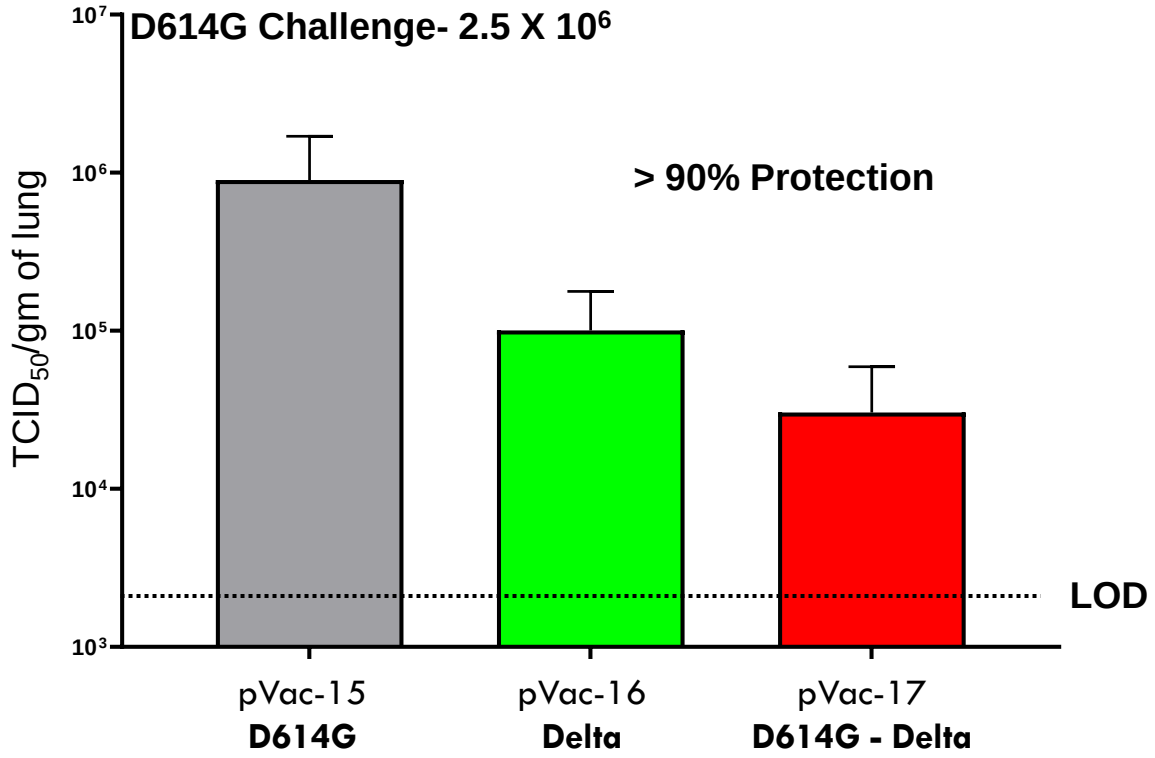
Protection Against Viral Challenge in PlaCCine-Vaccinated hACE2:K16 Mice

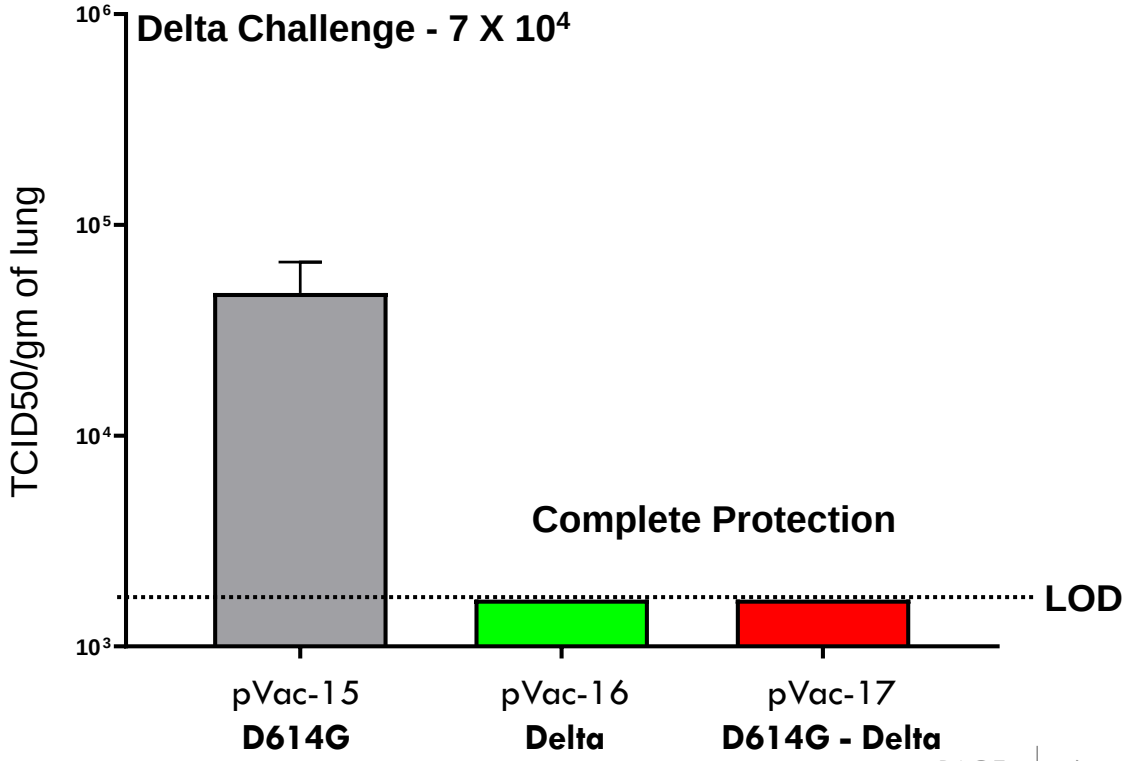
A Bivalent Vaccine Effective Against Multiple Spike Antigen Variants

- Formulation: PlaCCine including an adjuvant
- Dose - 125 µg DNA

7 days post challenge

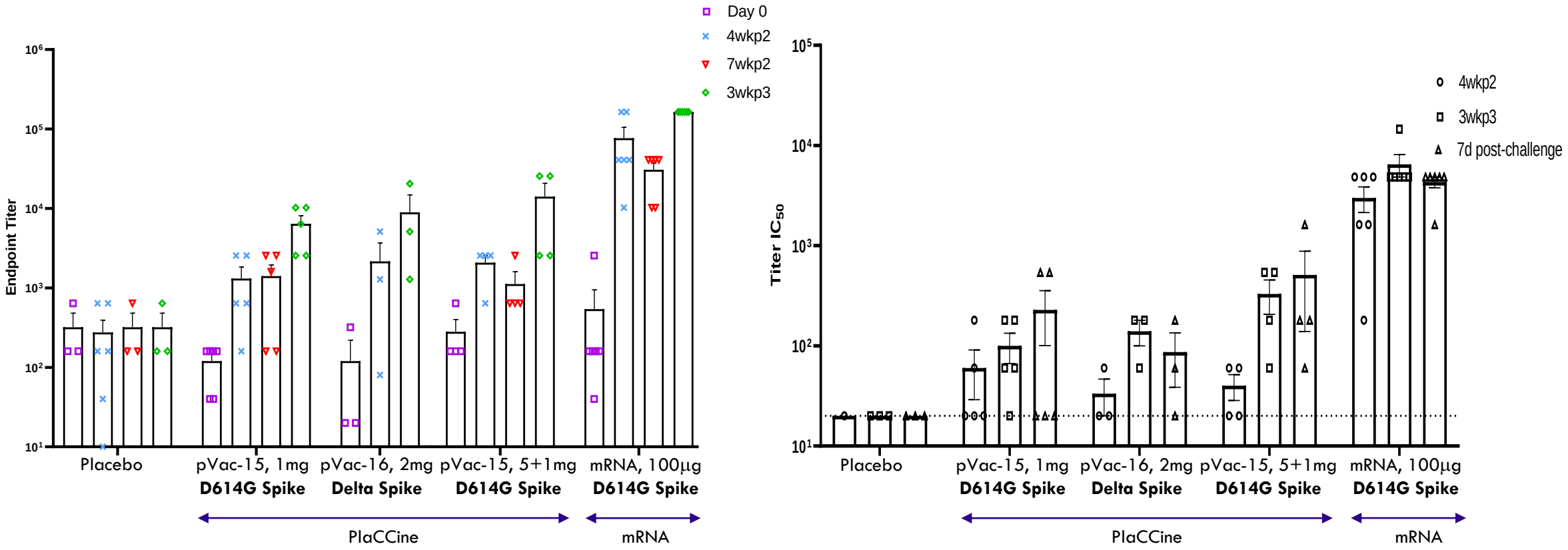






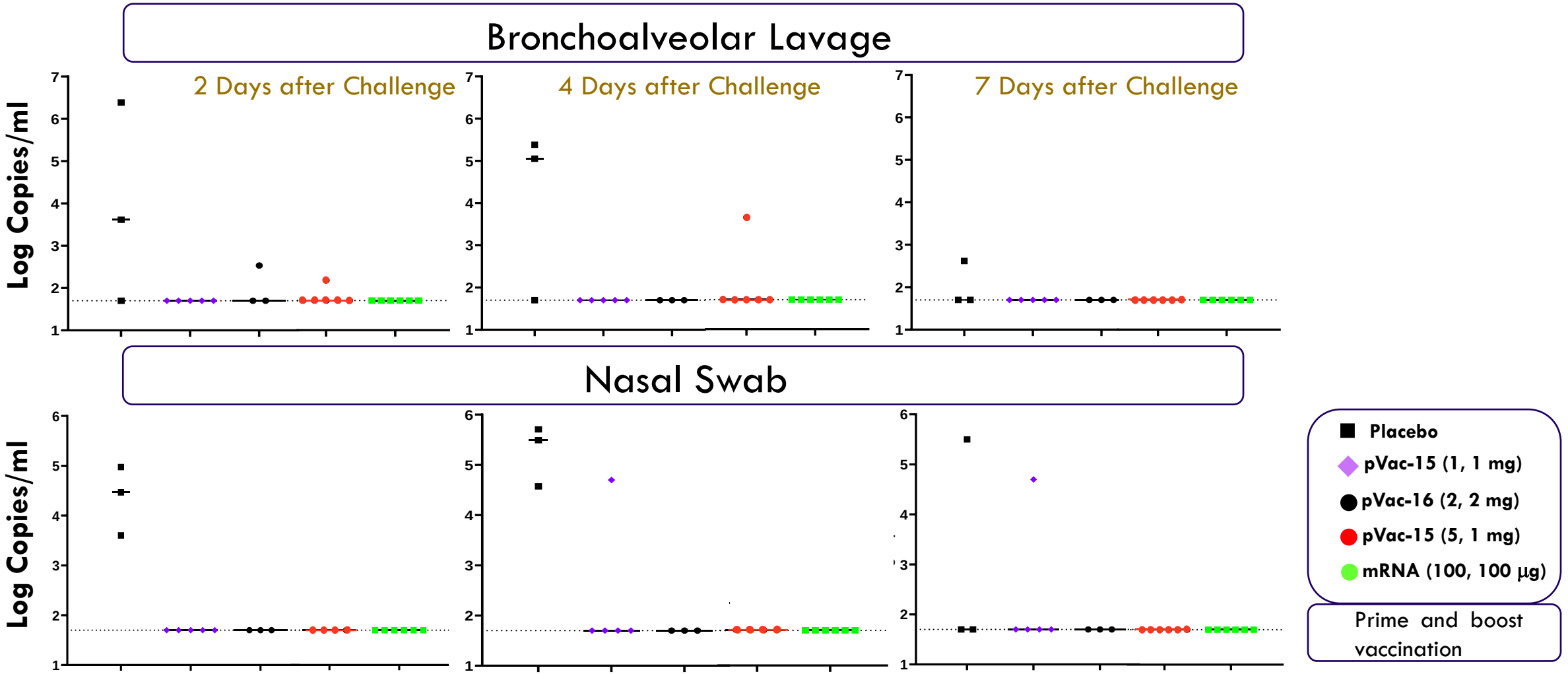
Robust IgG and Neutralizing Antibody Responses to PlaCCine Vaccines in NHP

Monovalent Vaccines against Different Spike Antigen Variants



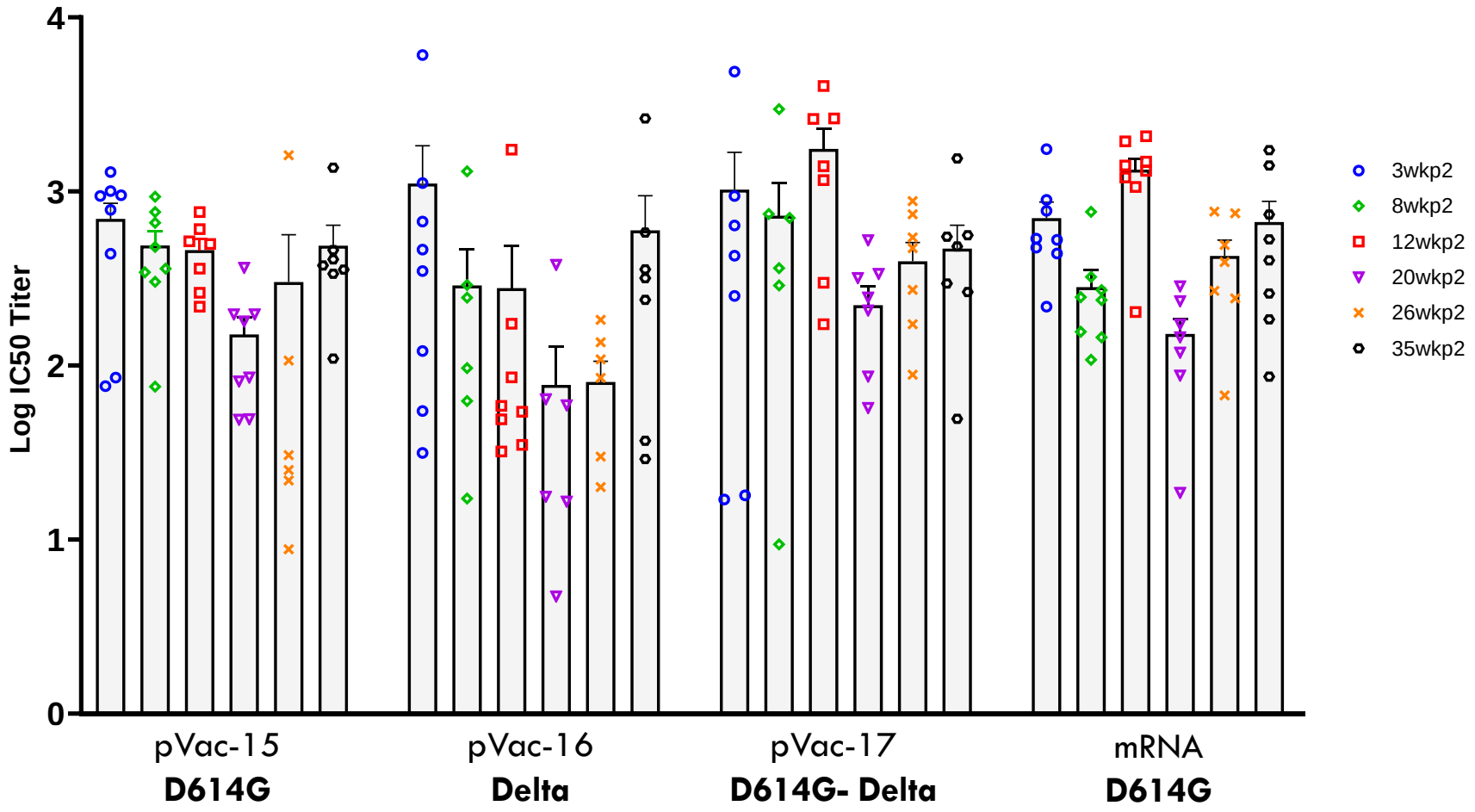
Complete Protection Against Viral Challenge is Comparable to mRNA Vaccine

NHP data Challenge dose: 1 x 10^6 $TCID_{50}$



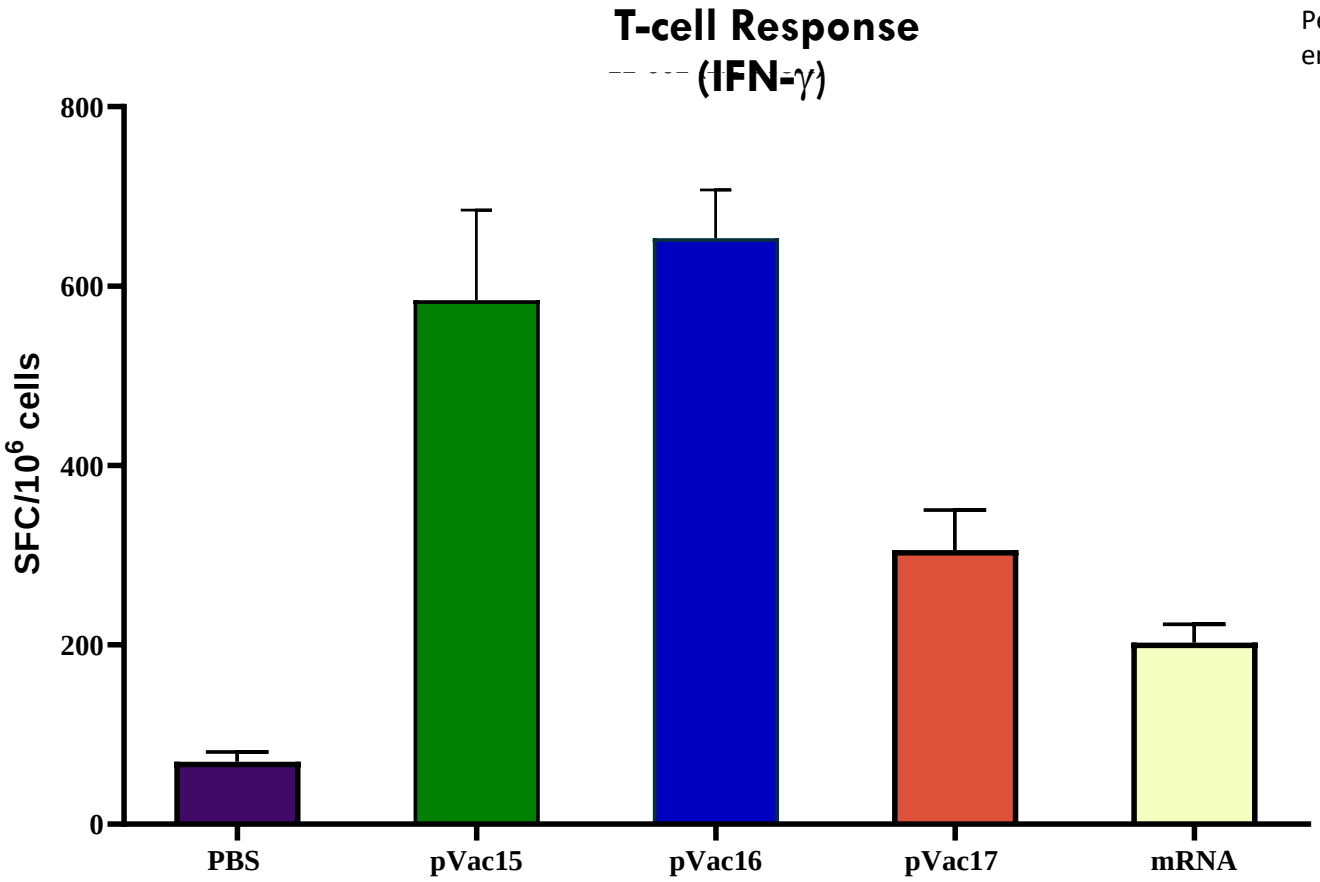
Persistent nAB Titers for >14 months after a PlaCCine Covid Vaccine in Mice

Key Feature Required in a Next Generation Vaccine



Cytotoxic T-cell Response Detectable for >14-months in Mice

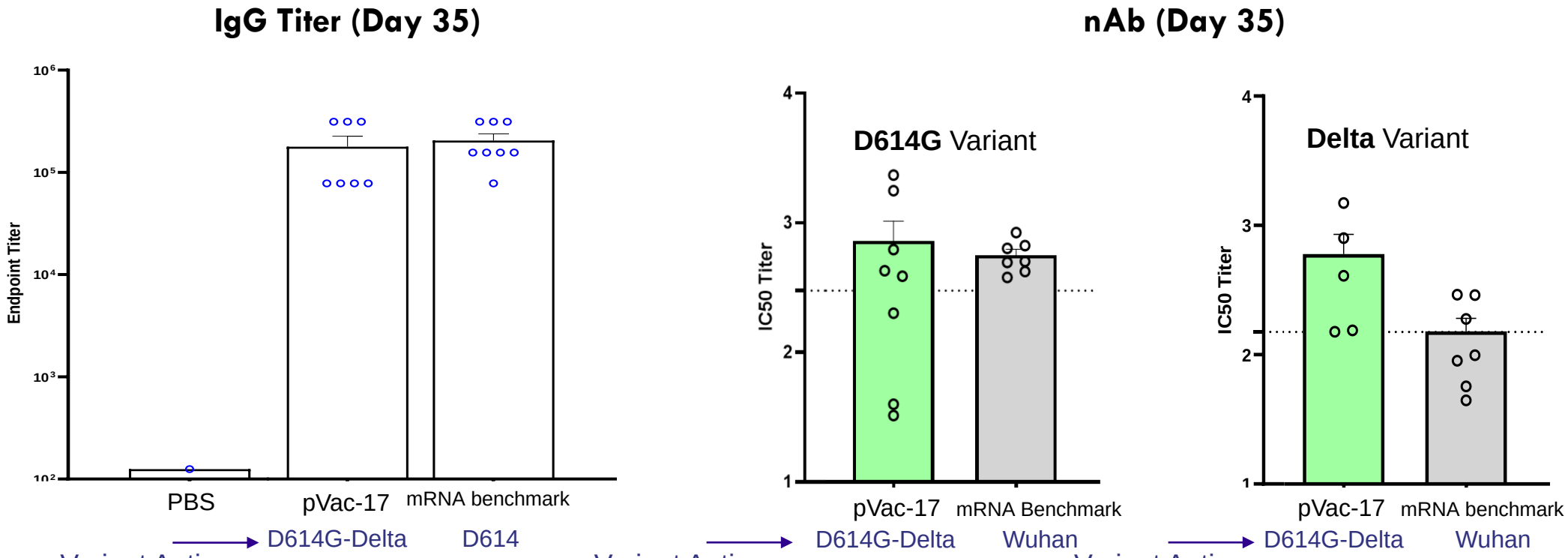
Potentially Durable Protection from Infection, Mice were immunized at days 0 and 14. Mice were sacrificed at week 60 to assess cellular immune responses.



Peptide pools were 15 mers overlapping by 11 aa that encompassed the S1 protein from ancestral strain

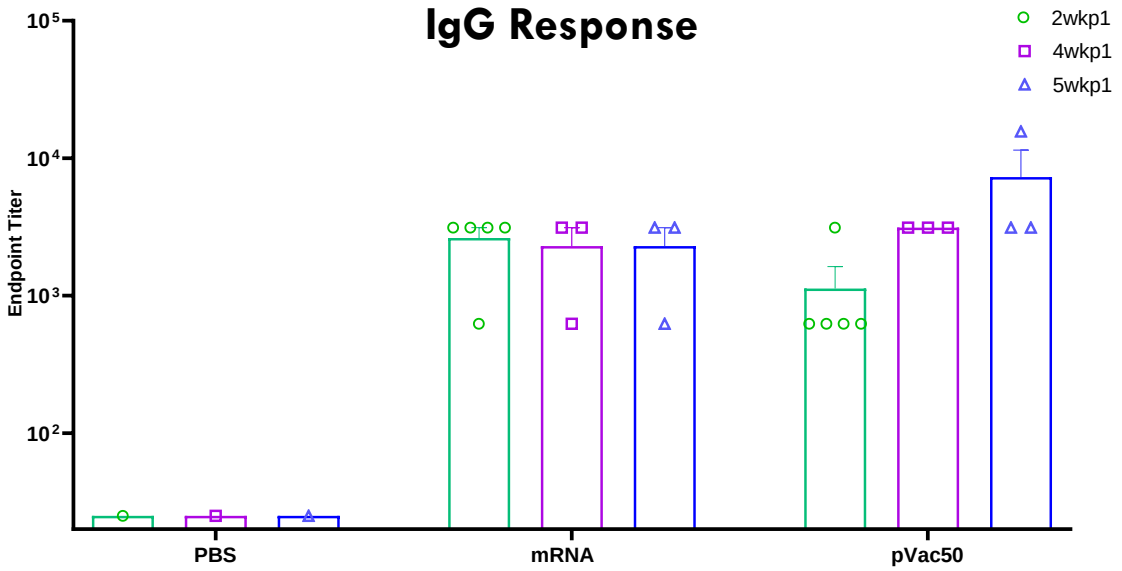
Potent Cross-reactivity with Emerging Variant Following PlaCCine Vaccination

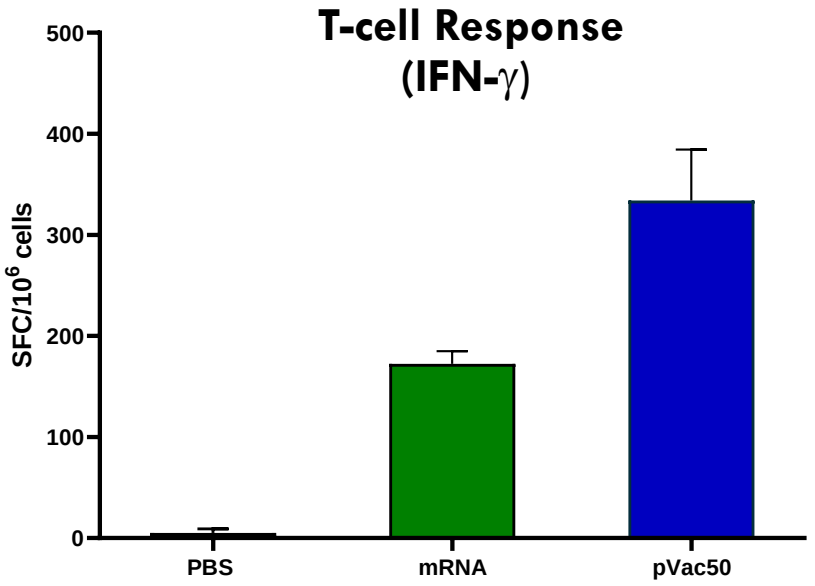
Key Feature Required in a Next Generation Covid Vaccine



Durable IgG & T-cell Responses after a Single Injection

Favorable comparison to an approved mRNA Vaccine





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Additional Studies on Immune Quality Comparison are in Progress

> 9-month Shelf-life at 4^0C; One-month at Room Temperature

Addressing Key Limitation of mRNA Vaccine Especially in Developing Countries

- Vector: pVac-17 (D614G-Delta)
- Formulation: PlaCCine

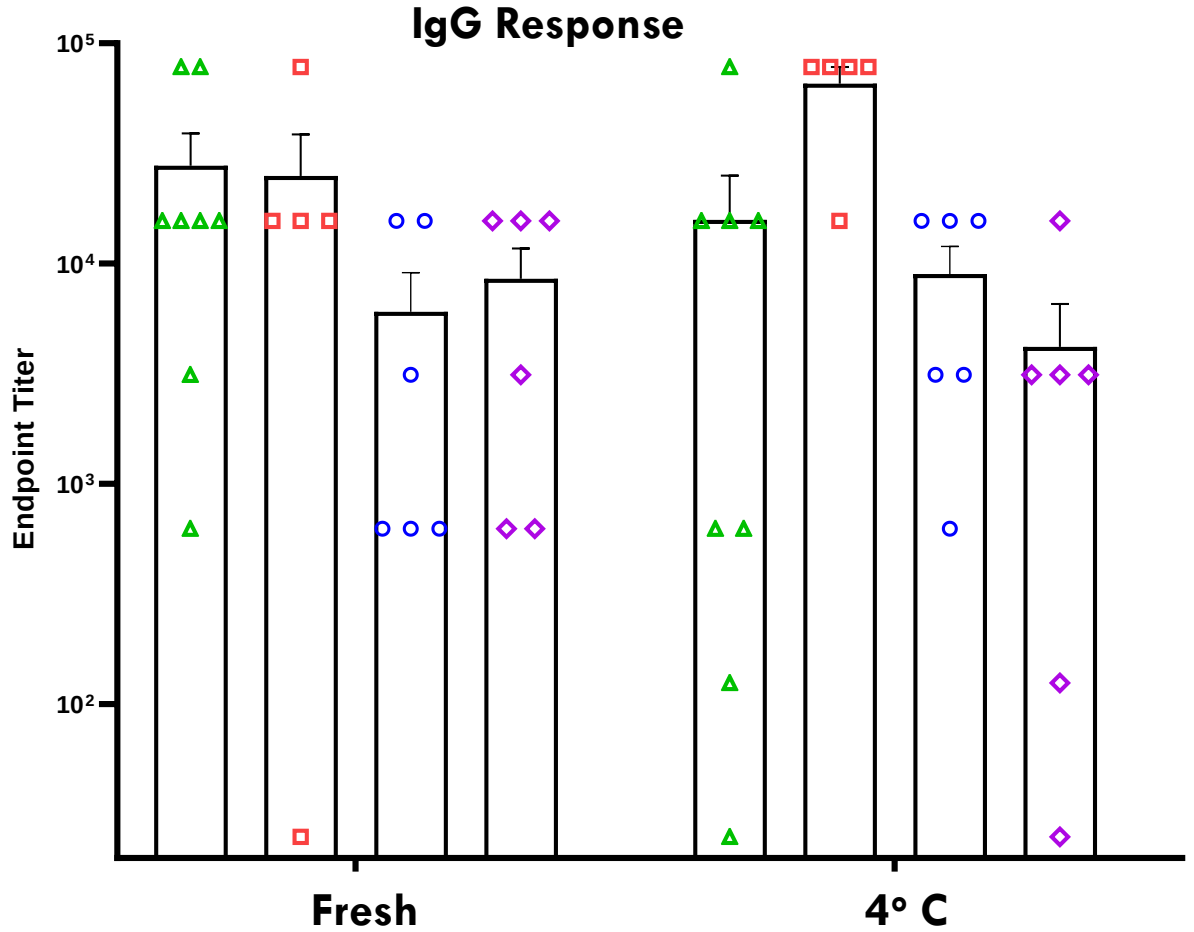
PLACCINE

4^0C Storage

1 3 6 9 12

Months

Immunogenicity Studies in Mice



PlaCCine: Next Generation Covid Vaccine Technology

Well-Suited to Address the Needs of Future Vaccines

- Rapid design & development of vaccines to new variants or targets (3-months from receipt of new antigen sequence(s))
- DNA-based vaccines independent of virus, device or LNPs
- Robust humoral and cellular responses in NHP and mice
- Bivalent vaccines equally protective against multiple strains
- Long-lasting nAB responses and T-cell responses lasting >14 months in mice
- Stable at $4^{o}C$ for >9 months
- Simple, rapid, and scalable manufacturing
- IND enabling studies in progress, IND in 4Q 2023
- First in-human clinical trial in 1Q 2024