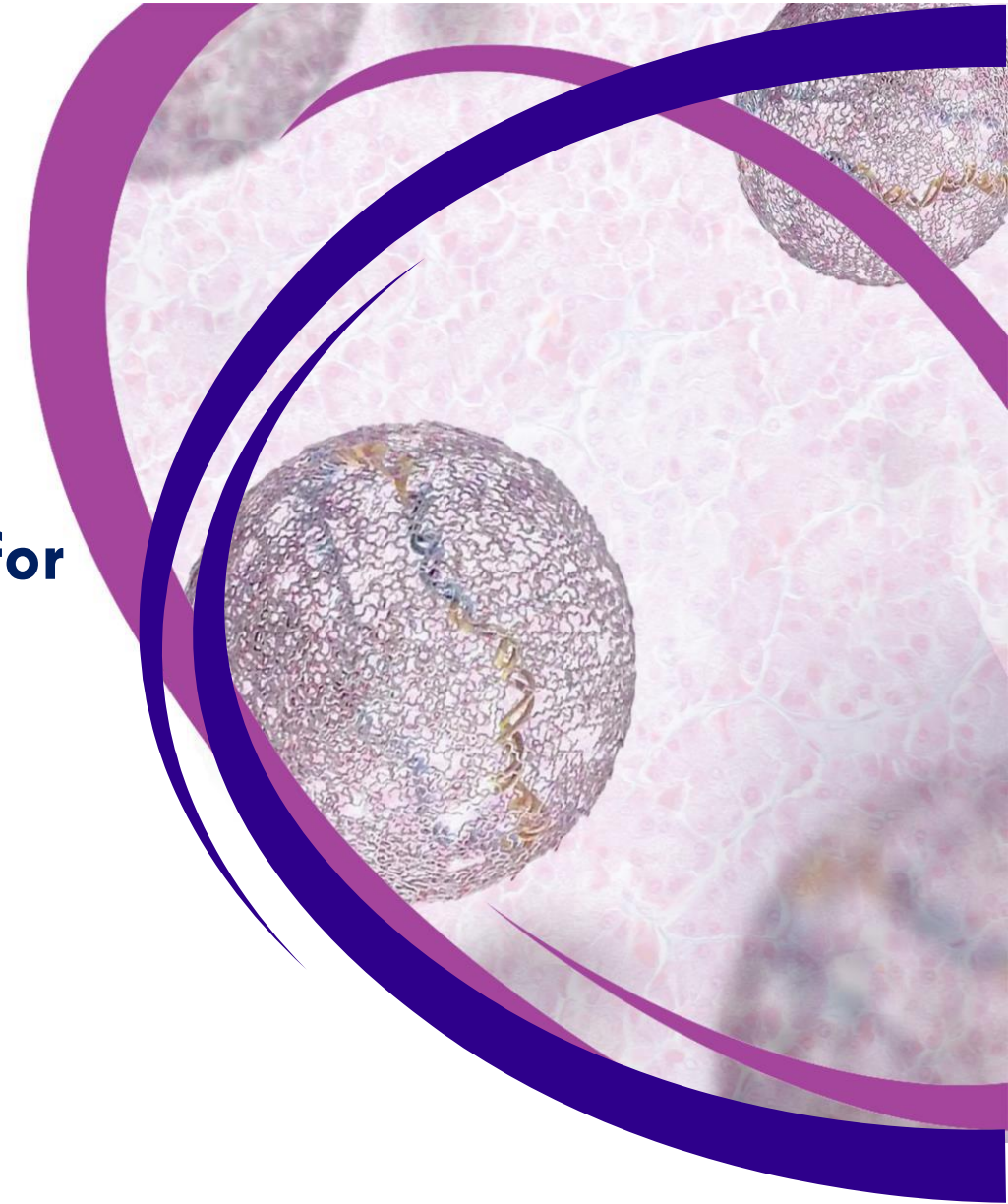


# Development of a PlaCCine DNA Technology for Safe, Effective and Durable Vaccines

Vaccine Summit 2025  
November 6, 2025  
Boston, Massachusetts, USA



# DNA Vaccines are Well-Suited to Overcome the Limitations of Current mRNA and Protein Vaccines

## Current Vaccines & their Limitations

### mRNA

- Short duration of antigen expression & immune responses
- Reactogenicity & other safety concerns
- Poor stability at working temperatures

### Protein

- Challenges in manufacturing & subunit mixtures
- Weak cytotoxic T-cell responses

## Advantages of DNA Vaccines

- Longer duration of antigen expression/exposure
- Strong T-cell responses (compared to protein vaccines)
- Stability at  $\geq 4^{\circ}$  C
- Flexible manufacturing
- Rapid turnaround for rapidly-mutating viruses

# DNA Vaccines Require a DNA Delivery System

## Current Delivery Systems Warrant Alternate Approaches

### Viral Vectors

- Biological in nature
- High delivery efficiency
- Poor repeatability
- Safety limitations

### Electroporation devices

- User compliance
- Tissue damage
- Additional cost

### Jet devices

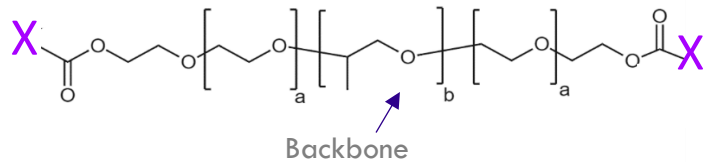
- Injection site reaction
- Cross-contamination risk
- Additional cost
- Training requirement
- Incompatibility with certain vaccines

# PlaCCine – A Novel DNA Vaccine Platform Technology

## Relies on Synthetic Vectors for DNA Delivery

PlaCCine Vaccines do not Require Virus or Device:

**A PlaCCine Synthetic Delivery Systems: covalently-functionalized amphiphilic polymer**



X- functional group: same or different



# PlaCCine Immunogenicity Demonstrated Against Various Pathogens in Multiple Species

## Pathogens

- SARS CoV-2 (multiple variants)
- Influenza
- Marburg
- Lassa
- Monkeypox

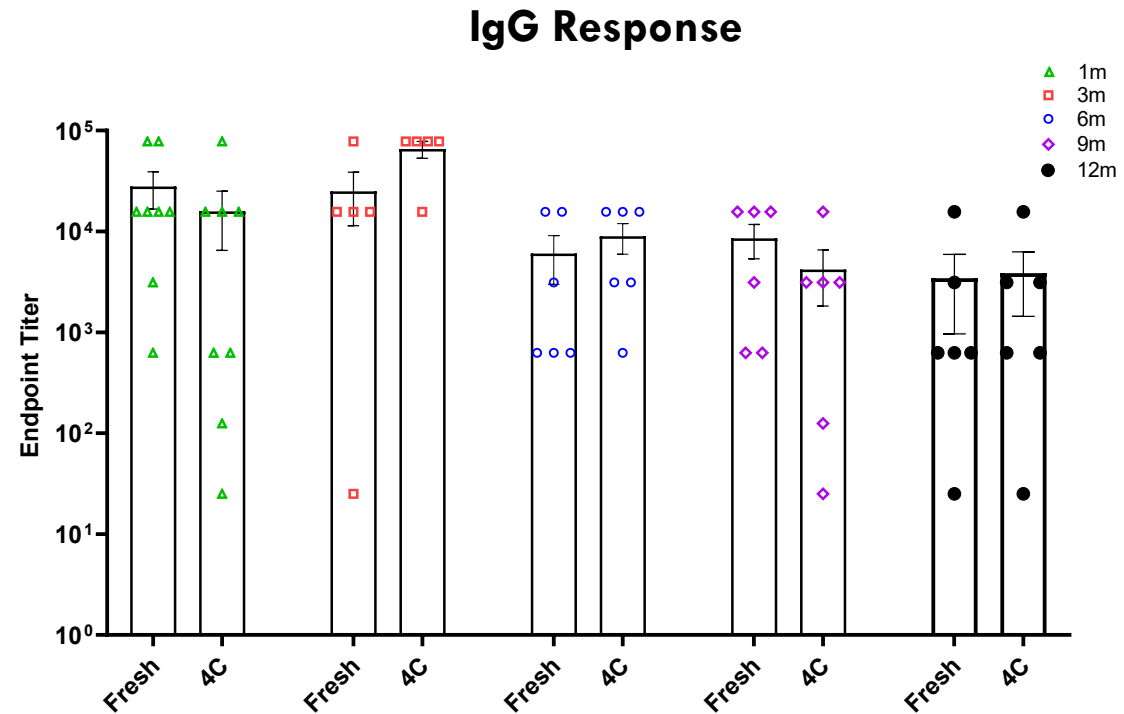
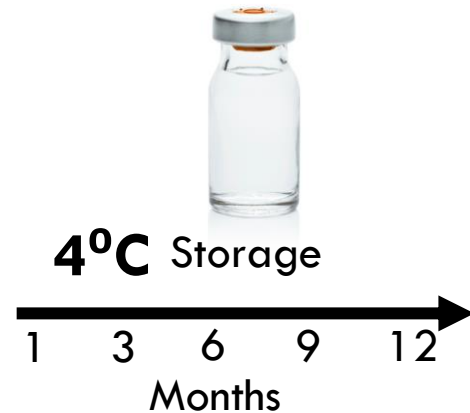
## Species

- Mouse
- Rabbit
- Monkey
- Human

# Commercial Advantages of PlaCCine over mRNA Vaccines

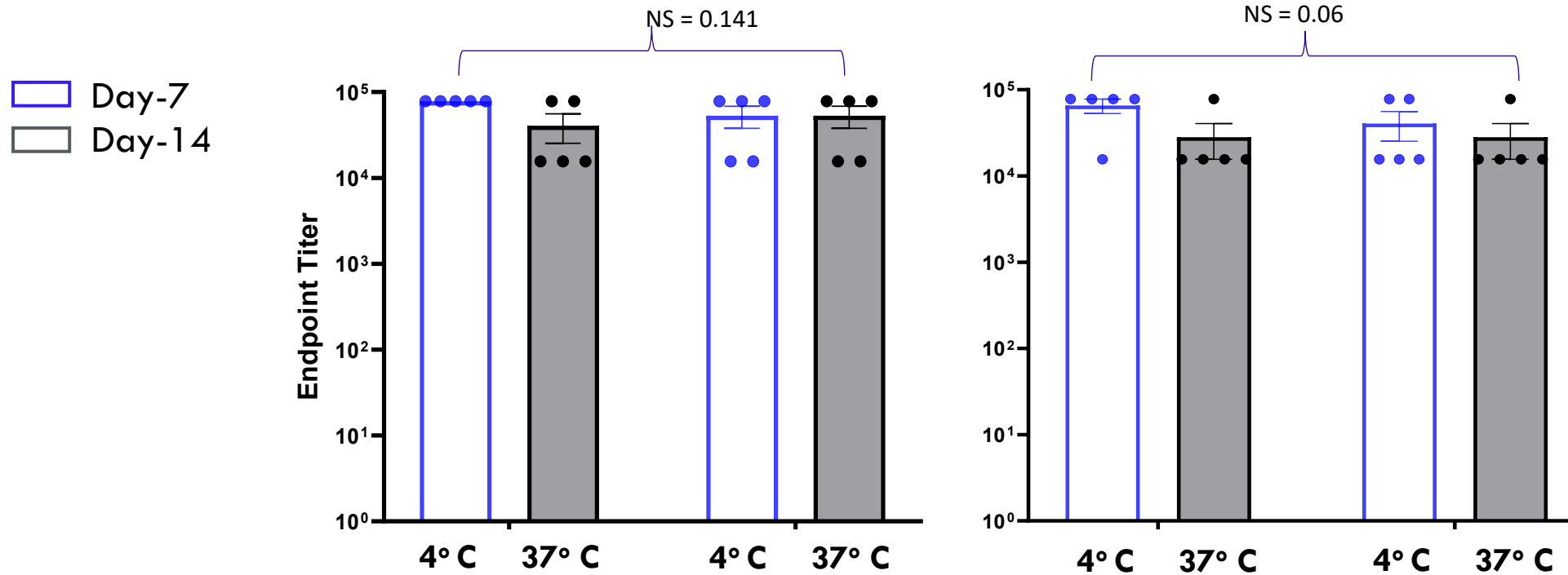
## Stable at 4°C for at Least 12 Months

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



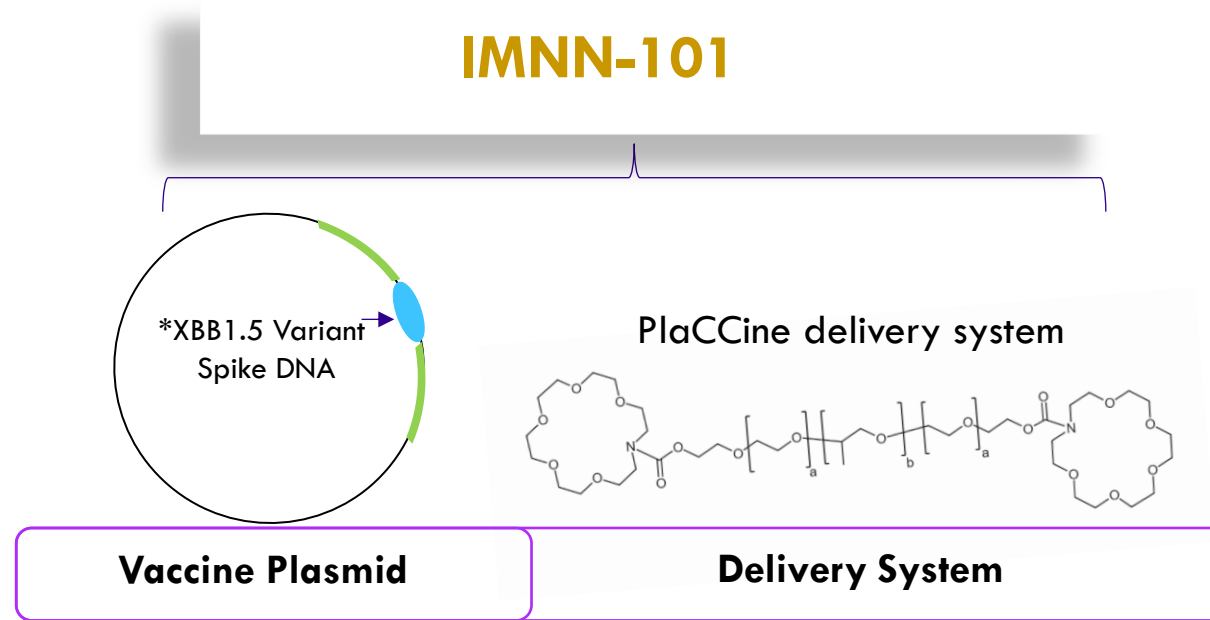
# Commercial Advantages of PlaCCine over mRNA Vaccines

## Stable at 37°C for at Least 14 Days

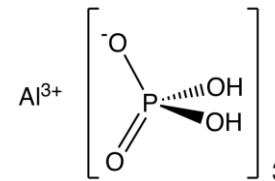


# IMNN-101 - A COVID-19 Vaccine

## First-in-Human PlaCCine Vaccine



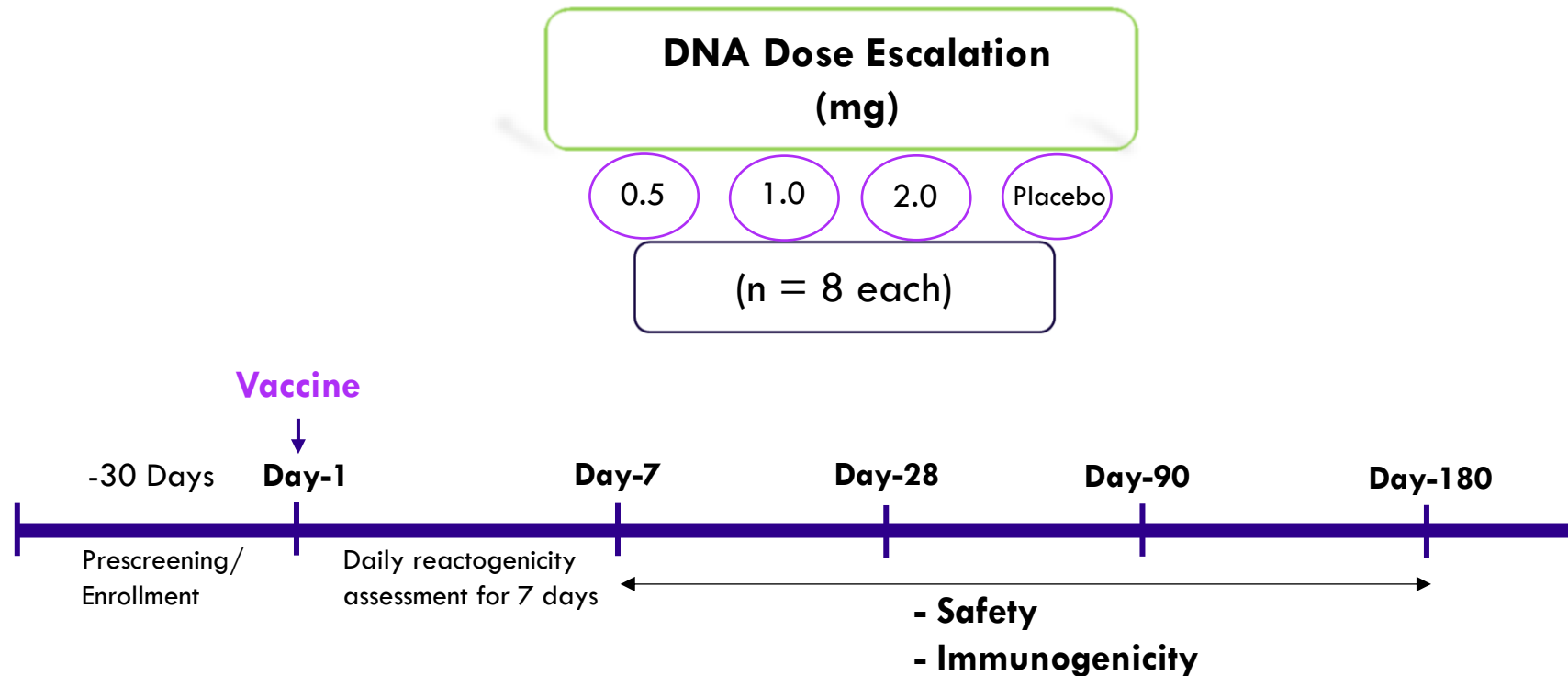
\* Variant of Concern  
(FDA: VRBPAC 2023)



Adjuvant Alum PO4

# IMNN-101 - Single Dose, Placebo Controlled Phase 1 Trial in Healthy Subjects NCT06283459

## Rapid Dose Escalation for Speedy Completion



# Demographic Characteristics of the Study Patients

Baseline Characteristics		All Participants (n = 24)	Dose Group 1 (n = 8)	Dose Group 2 (n = 8)	Dose Group 3 (n = 8)
<b>Age (years)</b>	Mean	47.7	47.9	44.7	50.5
<b>Sex</b>	Male	9 (37.5%)	3 (37.5%)	4 (50%)	2 (25%)
	Female	15 (62.5%)	5 (62.5%)	4 (50%)	6 (75%)
<b>Ethnicity</b>	Hispanic or Latino	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Not Hispanic or Latino	24 (100%)	8 (100%)	8 (100%)	8 (100%)
<b>Race</b>	American Indian or Alaska Native	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Asian	1 (4.2%)	1 (12.5%)	0 (0%)	0 (0%)
	Black or African American	11 (45.8%)	2 (25%)	5 (62.5%)	4 (50%)
	Native Hawaiian or Other Pacific Islander	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	White	12 (50%)	5 (62.5%)	3 (37.5%)	4 (50%)

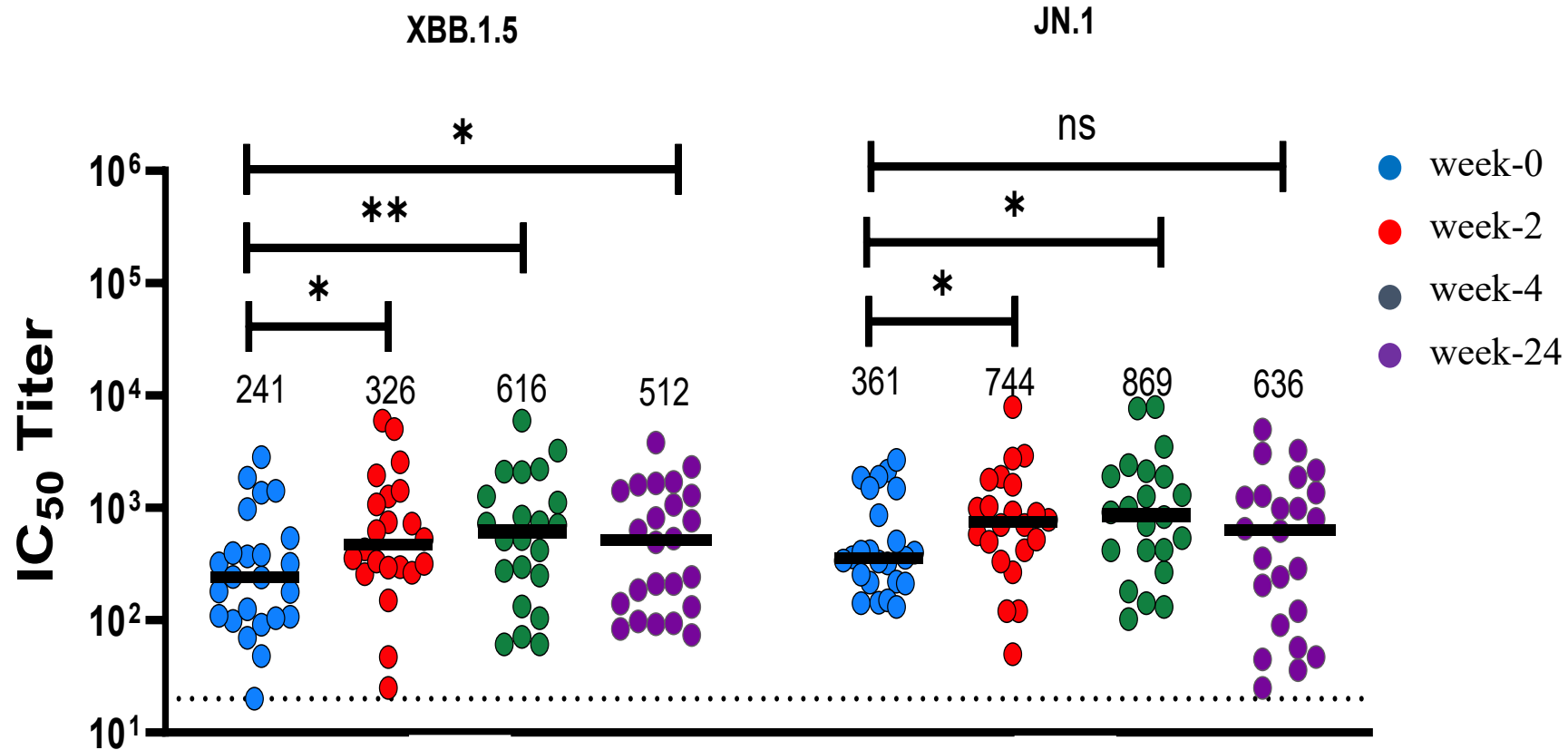
# Safety Profile of IMNN-101

## Treatment-emergent Adverse Events During 6 Month Follow Up

Body System/Class	TEAE Preferred Term	n (%) (n = 24)	Grade 1	Grade 2	Grades 3 – 5
<b>Ear and labyrinth disorders</b>	Vertigo	1 (4.2%)	1 (4.2%)	0 (0%)	0 (0%)
<b>Infections and infestations</b>	Bronchitis	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
	COVID-19 *	3 (12.5%)	0 (0%)	3 (12.5%)	0 (0%)
	Viral pharyngitis	1 (4.2%)	1 (4.2%)	0 (0%)	0 (0%)
	Vulvovaginal candidiasis	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
<b>Injury, poisoning and procedural complications</b>	Arthropod bite	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
	Joint dislocation	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
<b>Metabolism and nutrition disorders</b>	Hyperlipidemia	1 (4.2%)	1 (4.2%)	0 (0%)	0 (0%)
<b>Musculoskeletal and connective tissue disorders</b>	Torticollis	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
<b>Psychiatric disorders</b>	Attention deficit hyperactivity disorder	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
	Depression	1 (4.2%)	0 (0%)	1 (4.2%)	0 (0%)
	Panic attack	1 (4.2%)	1 (4.2%)	0 (0%)	0 (0%)

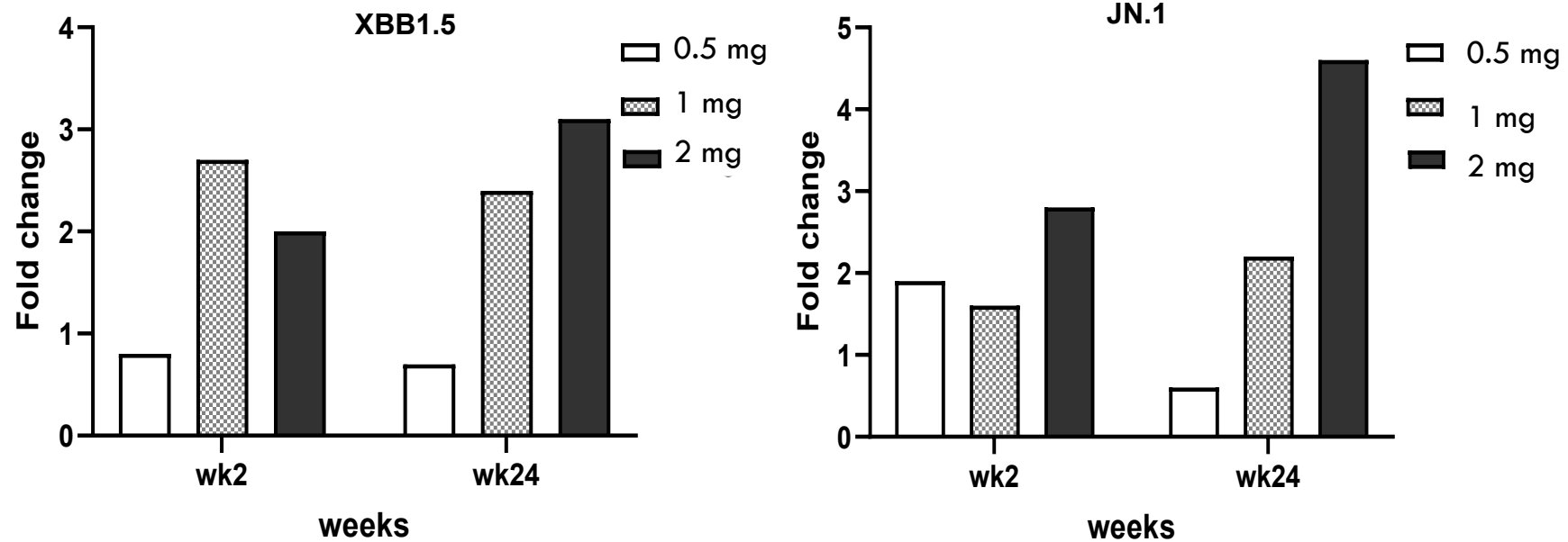
# NAb Responses to XBB.1.5/JN.1 Variant following a Single Dose of IMNN-101

## Subjects Previously Infected/Vaccinated Multiple Times



The statistical significance between pre-treatment group (week-0) and each of the post-treatment groups (Week-2, -4, -24) was assessed using Wilcoxon sign rank test \*p<0.05, \*\*p<0.01, ns= not significant.

# Dose-dependence of the Neutralizing Antibody Responses to XBB.1.5 and JN.1 Variant



Fold changes in median NAb titers at different vaccine doses following a single injection of IMNN-101.

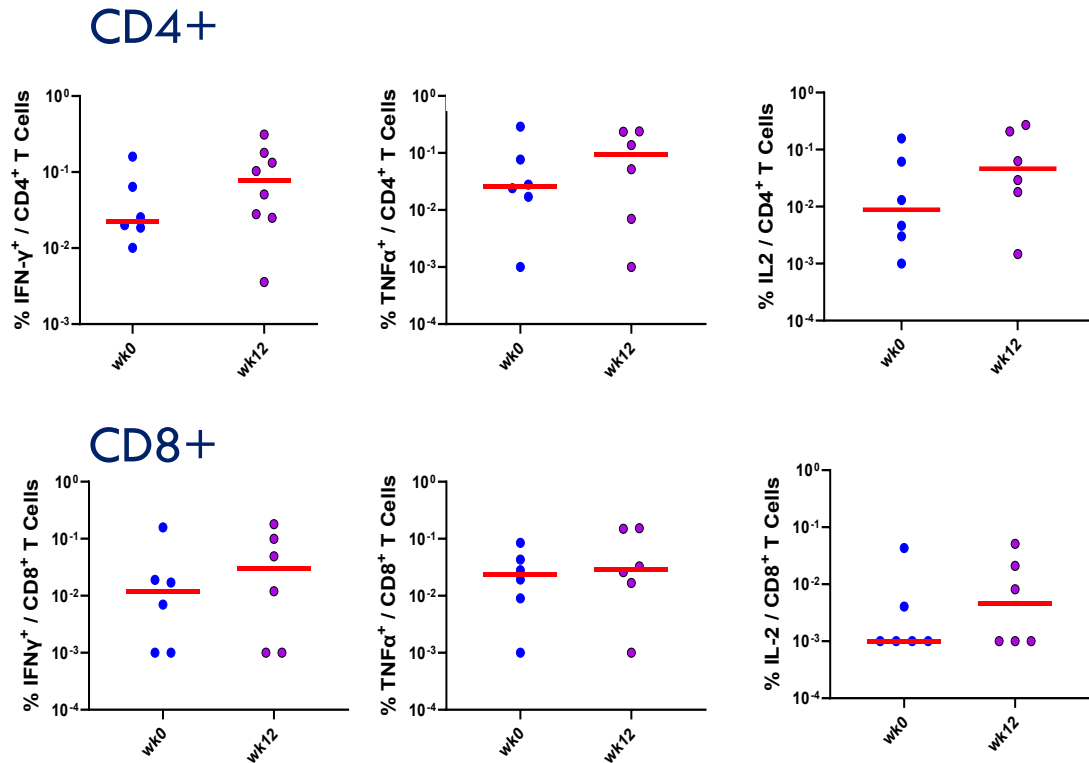
# Cellular Immune Responses to XBB.1.5 & JN.1 Following IMNN-101

## Subjects Previously Infected/Vaccinated Multiple Times

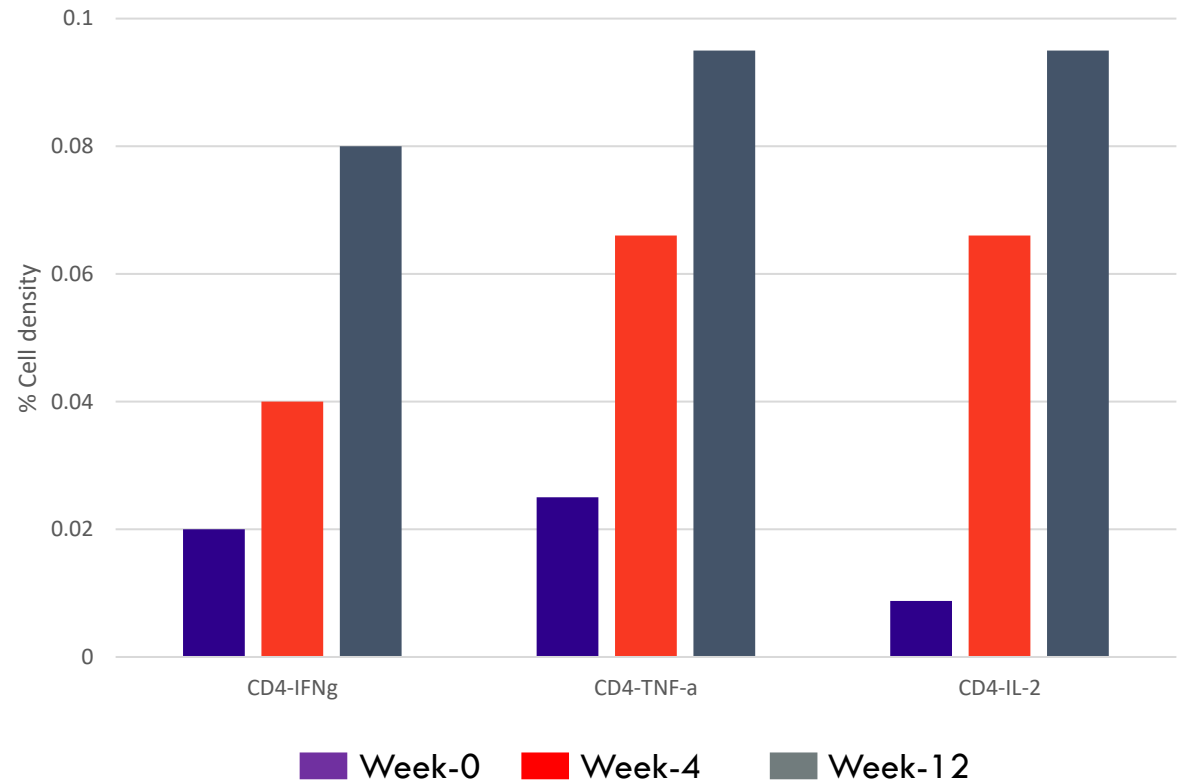
	CD4+ T-cells			CD8+ T-cells		
	% Responders					
	IFN-g	TNF- $\alpha$	IL-2	IFN-g	TNF- $\alpha$	IL-2
<b>XBB1.5</b>	53%	47%	68%	63%	63%	32%
<b>JN.1</b>	56%	61%	61%	50%	63%	50%
	Highest Fold-increase from Baseline & Dose					
<b>XBB1.5</b>	6.5	7.4	10.7	49	33	7
<b>Dose</b>	2 mg	2 mg	2 mg	2 mg	1 mg	2 mg
<b>JN.1</b>	4.9	20	20	15	18	21
<b>Dose</b>	2 mg	2 mg	2 mg	2 mg	1mg	2 mg

# T-cell Responses to JN.1 Following a Single Dose of IMNN-101

## Subjects Previously Infected/Vaccinated Multiple Times



Prominent Increases in CD4+ T-cells over Time



# PlaCCine Summary-

- A novel platform for prophylactic vaccines that leverages DNA advantages on:
  - Durability of antigen expression, temperature stability, flexible manufacturing, rapid development
- Safety and immunogenicity demonstrated in healthy human subjects after a single injection.
  - NAb responses lasted for at least 6 months
  - Evidence of cellular immune responses
- IMNN-101 data supports further development of PlaCCine in:
  - Infection-naïve population - would allow for an optimal magnitude of effect
  - Prime and boost vaccinations - for optimal benefit
- Examples of preferred disease targets for future development of PlaCCine vaccines:
  - HIV, Influenza, Zika, Ebola, Hepatitis B & C, Rabies