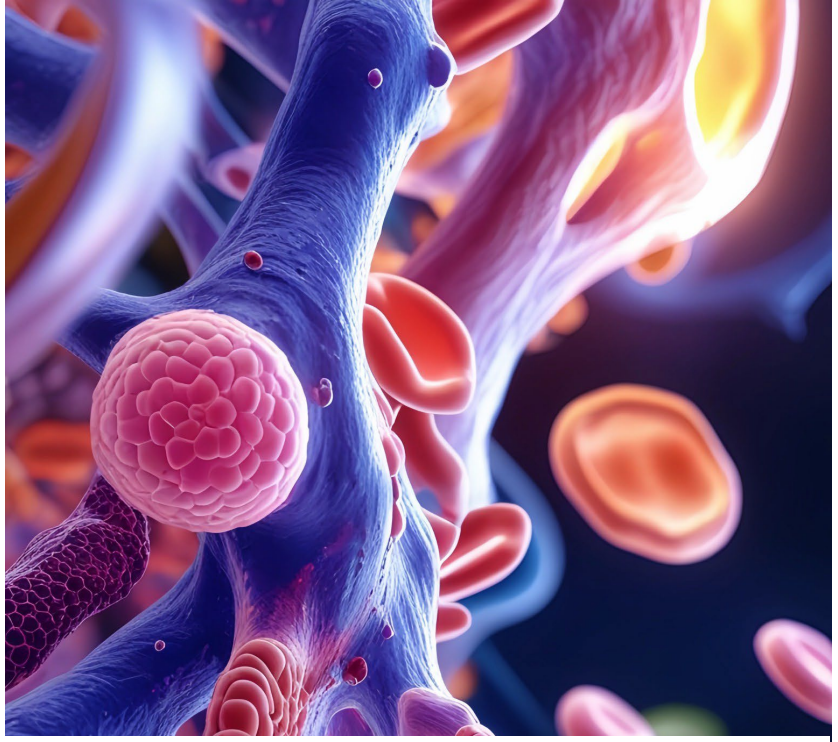
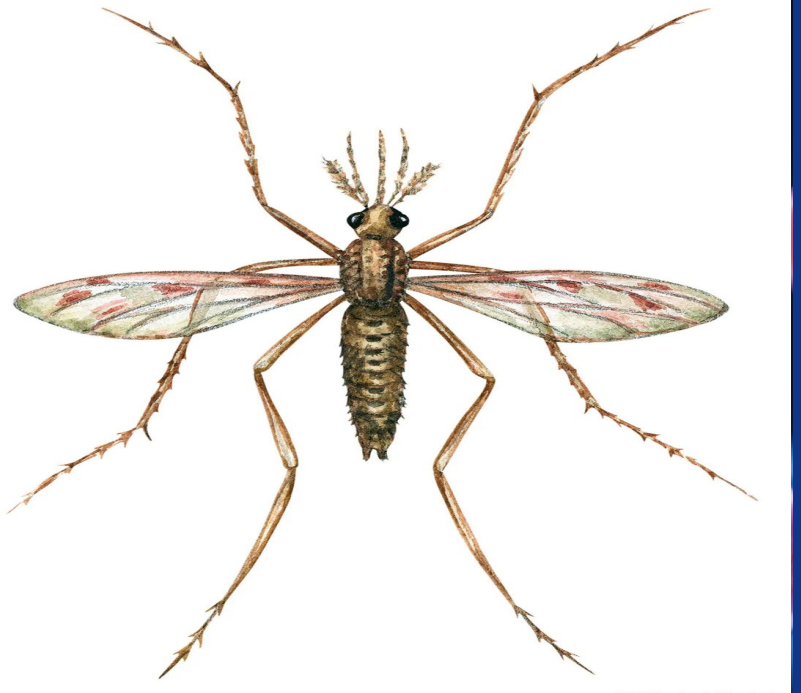


June 11, 2026

VERSATOPE

Delivering Immunity



Recombinant Outer Membrane Vesicles as a Novel Adjuvant for CSP and Pfs230

Versatope: Christopher Locher, PI, Kevin Weyant, Project Leader, Jessica L. Lee, CDO, Col. (Ret) Anza Mammen, MD CMO, Ning Li, VP Discovery, Pritha Shah and Nils Pasquero, Scientists

Company Overview

01

Broad-strain vaccines using a bacterial nano-vesicle technology platform licensed from Cornell University

- Delaware C-corp, Founded 2017
- 11 employees in Lowell Mass.
- Phase 1 ready with VT-105

02

Malaria vaccine candidate, VT-201, Supported by SBIR NIAID # 5R44AI181242-03

- CSP target antigen
- Expression or conjugation of Pfs230
- Single dose (IM), lyophilized RT stable form is under development
- May be available for clinical development

03

Phase 1 clinical study

- Not placebo controlled
- Two or three immunizations
- Safety and immunogenicity

04

Single Dose Formulation is under optimization

- Comparing adjuvants
- Room temperature stable
- Bridging studies could be performed prior to initiation of a Phase 2 clinical study

Long-Lasting Vaccines Remain Unsolved

Current Technologies Produce Vaccines That Are:

Limited

Immunity has limited efficacy against **diverse strains** not always long-lasting.

Less effective in certain groups *(like the elderly, immunocompromised, and infants)*.

Hassle

Injectable vaccines are unpleasant, and annual or multiple shots are often a deterrent to developing proper immunity.

Expensive

Manufacturing process lacks scalability.

High cost of goods, due to specialty reagents.

Cold-chain dependency.

Complication

Can cause adverse events of lipid formulations and allergies in some people.

We've Developed a Universal Immunity Solution using Nanovesicle Delivery

INITIAL PROGRAM

INFLUENZA A

$9B Global market opportunity

7.58% CAGR

$17.7B Projected by 2030

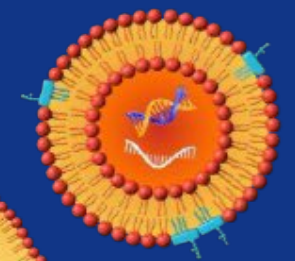
Designed by Nature, *Customized by Versatope*

Derived from **microbial membranes**

Genetically engineered for superior versatility, potency and thermostability

Captures the genetic diversity of influenza using a conserved and validated drug target

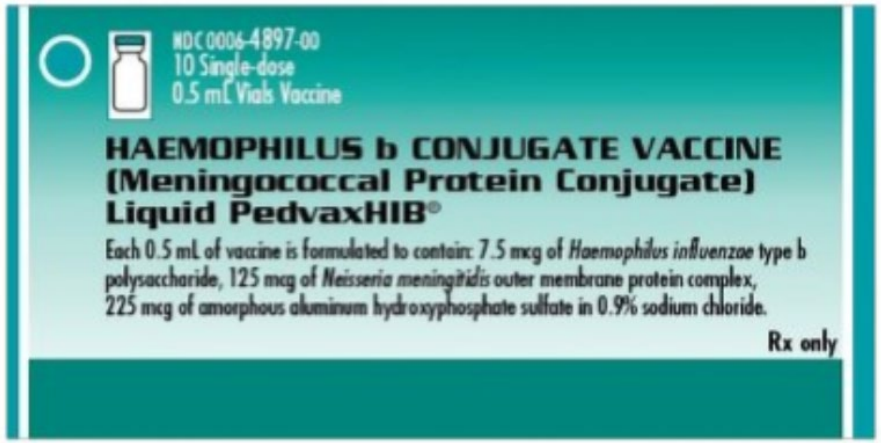
Protects against all variants of influenza A viruses with a single dose



Versatope's Optimized Cell Lines

Low Cost	Engineered for up to 500x higher yield
Safe	1,000,000x less pyrogenic than wild-type (WT)
Versatile	Simple conjugation to any biomolecule
Potent	High density display with up to 1000 antigens/bEV
Thermostable	Defined process for stability >6 months at 25°C
Single Dose	Sustained-release and immunogenicity with PLGA
Clinic Ready	FDA-approved cGMP process and analytics

Clinically Approved OMV-based vaccines



- Contains detergent-extracted protein-enriched *N meningitidis* vesicles conjugated to PRP polysaccharide
- Protective immunity 6-12 years after vaccination in infancy (Perrett et al. Clin Infect Dis. 2014)

- Contains *N meningitidis* OMVs and three protein antigens adsorbed on alum adjuvant
- OMVs provide adjuvant properties to protein antigens, but immunity to OMV-specific membrane antigen wanes in 1-2 years (Argante et al. npj Vaccines. 2024)

Nano-Vesicle Advantages Over Other Adjuvants

Qualities	Versatope's bEVs	MPL	Alum	QS-21	Liposomes
TLR PAMPs	✓	X	X	X	X
Thermostable	✓	X	X	X	X
Lymphatic targeting	✓	X	X	X	✓
Reduced reactogenicity	✓	X	✓	X	X
Mucosal and dermal delivery	✓	X	X	X	X

Advantages of Versatope Vesicles - 1

Synthetic Liposomes/Particles	Versatope Vesicles
Physicochemical surface properties limit functionality	Physicochemical surface is tunable by genetic engineering
Chemically modified to achieve positive cellular interactions	Natural Selection/Evolution achieved host cell interactions
Drug release through "popping" mechanism; large concern with the FDA	Better resistance to osmotic gradients conferred by bacterial cell membrane composition
Size (100 - > 800 nm) and Physicochemical properties causes poor penetration of tissues resulting in accumulation	Size (30 – 200 nm) and Physicochemical properties cause high penetration of tissues

Advantages of Versatope Vesicles -2

Synthetic Liposomes/Particles	Versatope Vesicles
Size, mechanical, and Physicochemical properties limited to parenteral administration (e.g., intramuscular, intravenous)	Multiple routes of administration including parenteral, sublingual, oral, nasal, transdermal
Labile in serum; requires high doses	Increased stability in serum; permits lower doses
High cost; expensive raw materials	Low cost; inexpensive raw materials
Manufacturing is challenging	Manufacturing is an established, approved, scalable process
Difficult to lyophilize and spray dry; necessitates suspension products requiring cold-chain storage	Easily lyophilized increased stability options for dosage form and packaging

Key Personnel

CEO / Founder

Christopher Locher, PhD
ex-Vertex Sr. Director with 25+ yrs in biotechnology and pharmaceutical R&D

Chief Medical Officer

M. P. Anza Mammen, MD
ex-U.S. Army Colonel with extensive global clinical trial leadership

Chief Financial Officer

Alan Barber MBA
20+ yrs in biotech finance and strategy; supported multiple exits

VP of Discovery

Ning Li, PhD
Biotech R&D leader with 13+ years in drug discovery and platform innovation

Scientific Advisor

Drew Weissman, MD, PhD Nobel Laureate, mRNA vaccine co-inventor

Chief Development Officer

Jessica Lee, MPH
25+ years in drug development, leading Phase 1–3 global clinical trials

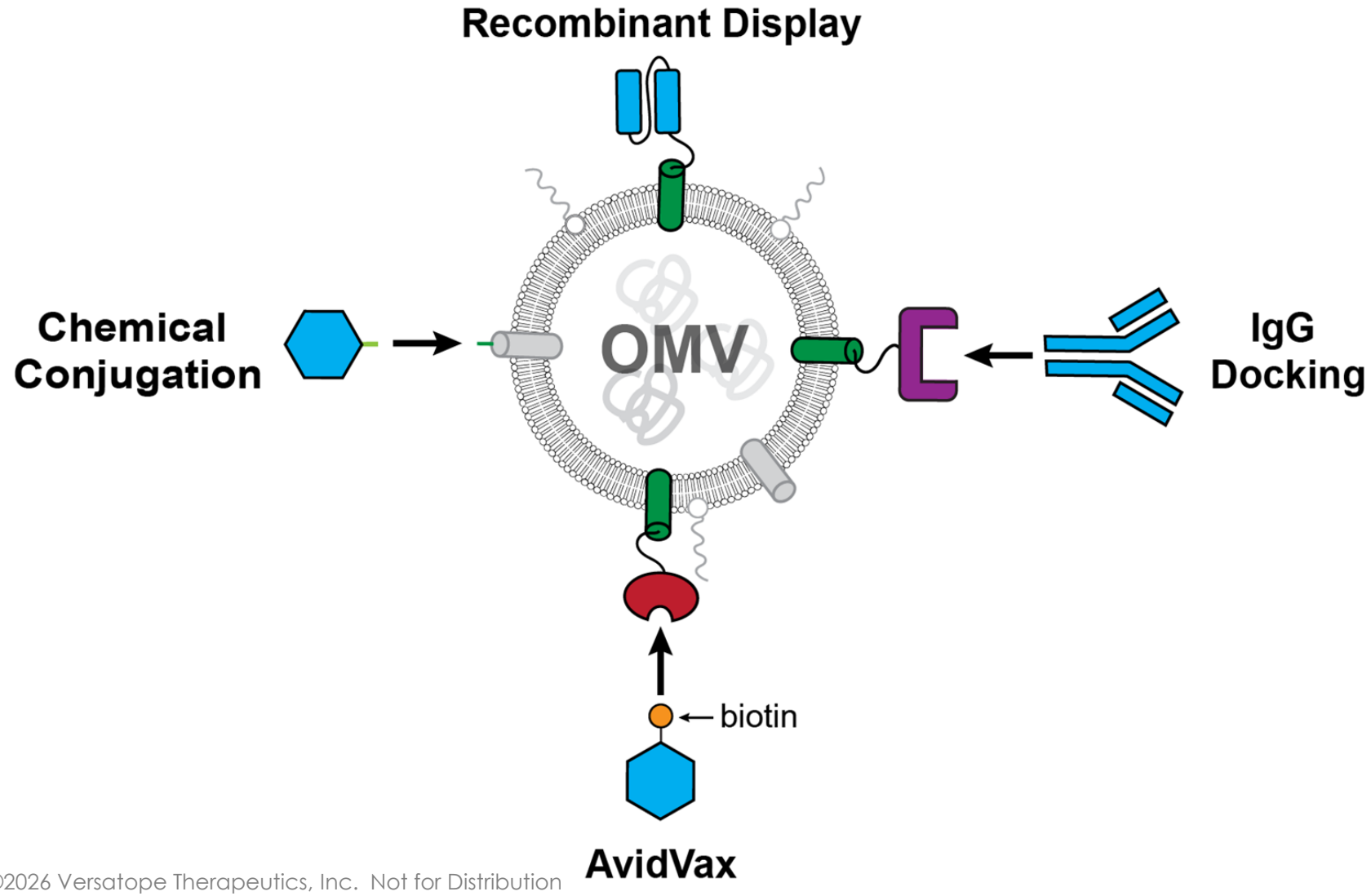
Scientist III

Kevin Bruce Weyant, PhD
Project leader malaria, Group A Strep mol biol, gene cloning and expression

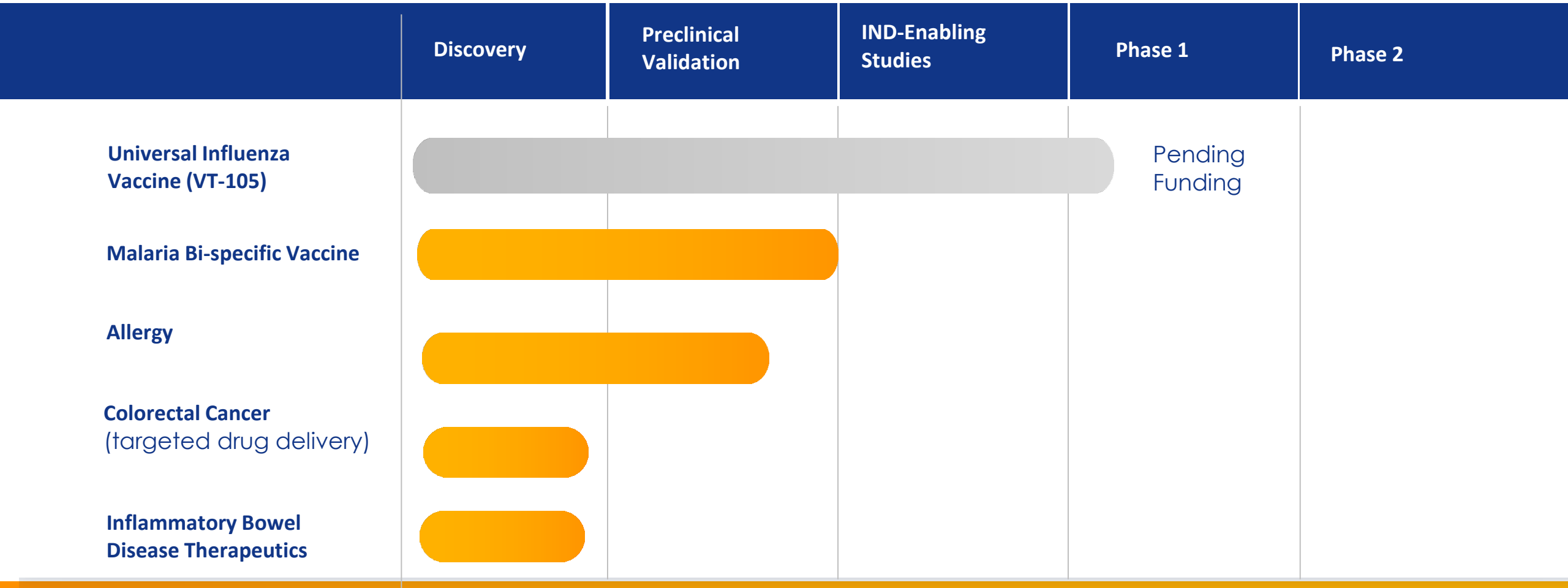
Director of Business Operations

Anna Li, PhD
15+ years of experience leading life science R&D, operational excellence

Versatope's Strengths: Multiple Methods of Macromolecule Display



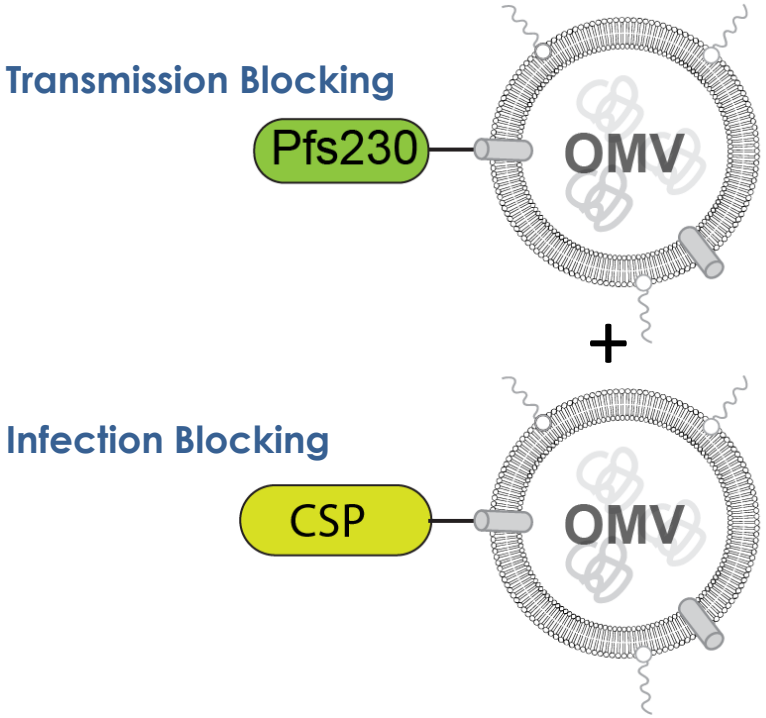
Versatope Product Pipeline

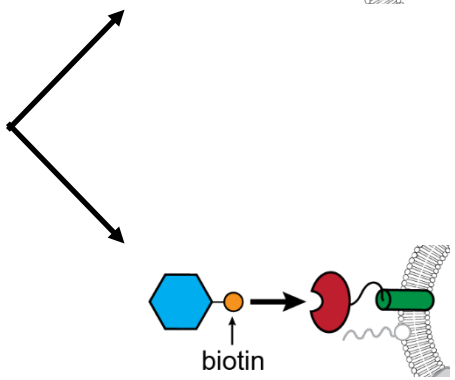


Bi-Specific Malaria Vaccine to Block Infection and Transmission

Aim 1 design strategy: conjugate purified Pfs230 and CSP to OMVs

- Optimize conjugation process for improved efficiency and scale-up capability
- Compare Chemical conjugation and AvidVax





Method 1: Chemical conjugation

- Potent transmission-blocking antibodies with Pfs230
- High complexity and cost
- Non-specific conjugation

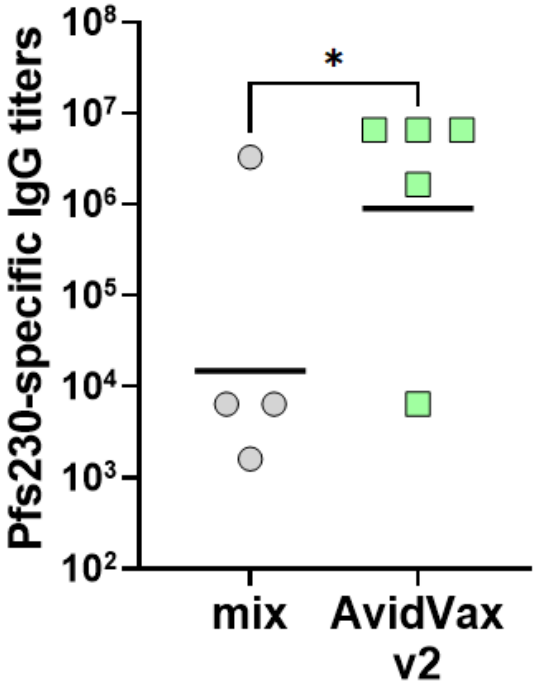
Method 2: AvidVax

- Lower complexity and cost
- Specific conjugation to biotin-binding domains

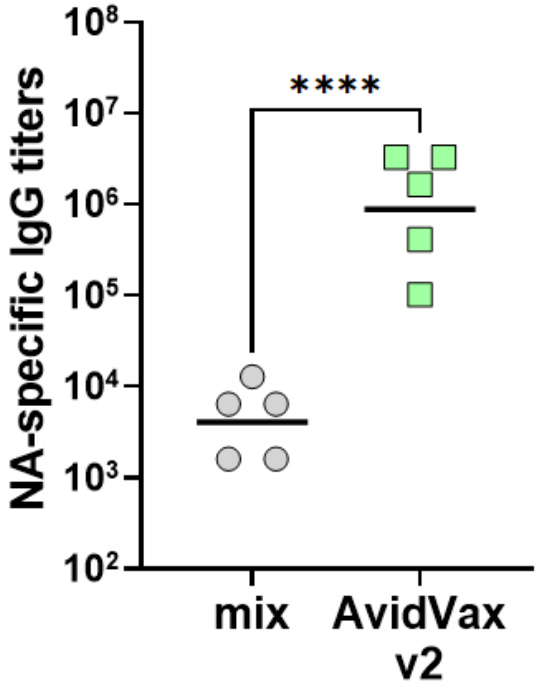
Weyant et al. *Nat Comm*. 2023.

AvidVax Induces Strong IgG against Malaria and Influenza

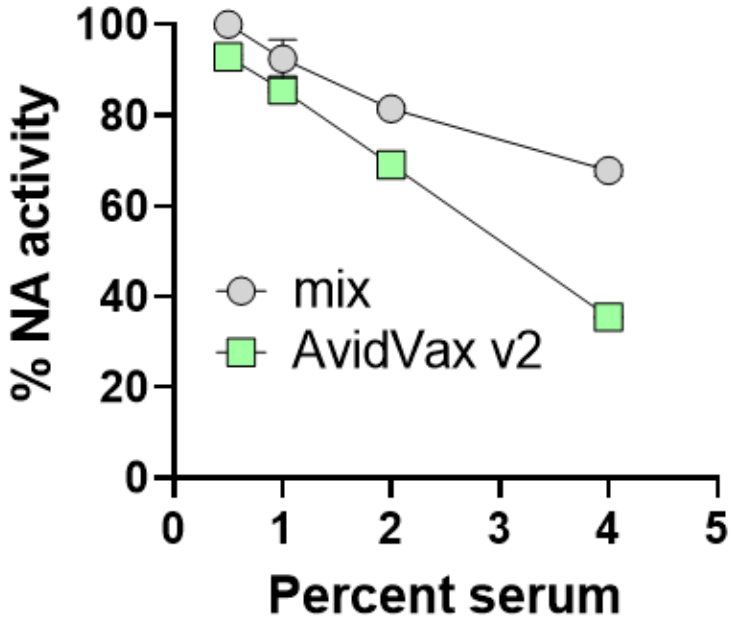
Malaria antigen
Pfs230



Influenza antigen
neuraminidase (NA)

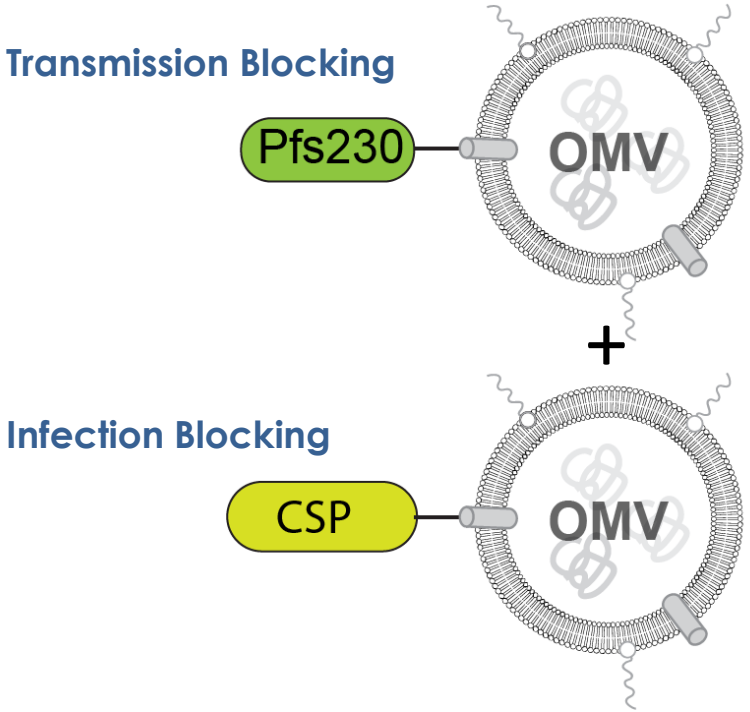


NA anti-sera blocks enzymatic activity



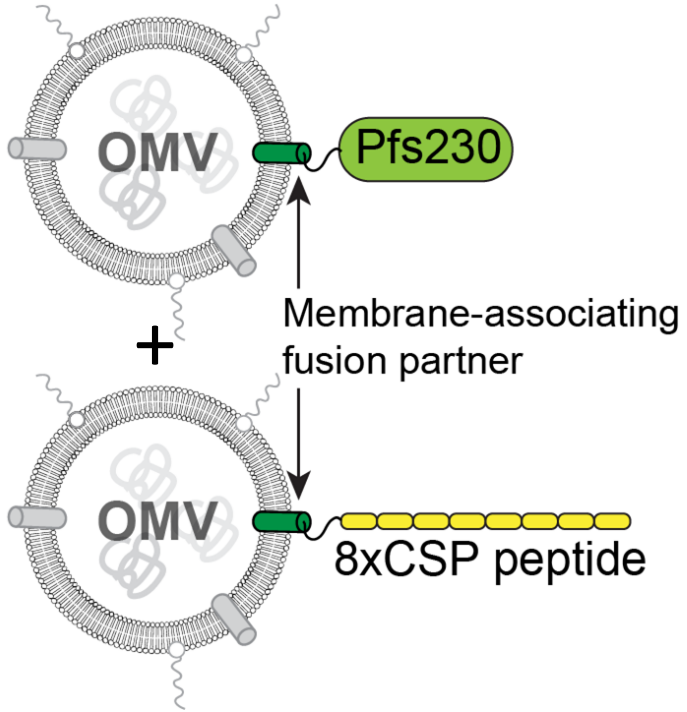
Bi-Specific Malaria Vaccine to Block Infection and Transmission

First strategy
Chemical conjugation of Pfs230 and CSP



- High-cost, high-complexity production
- Limited control of antigen display

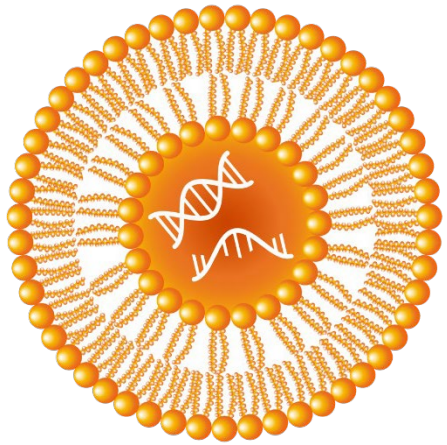
New Strategy
Recombinant display of Pfs230 and CSP peptides



- Targeted immune response for CSP
- Low-cost, low-complexity production
- Production process nearly identical to Versatope's influenza vaccine clinical candidate, VT-105

Surface Display of Influenza M2 Ectodomain Variants

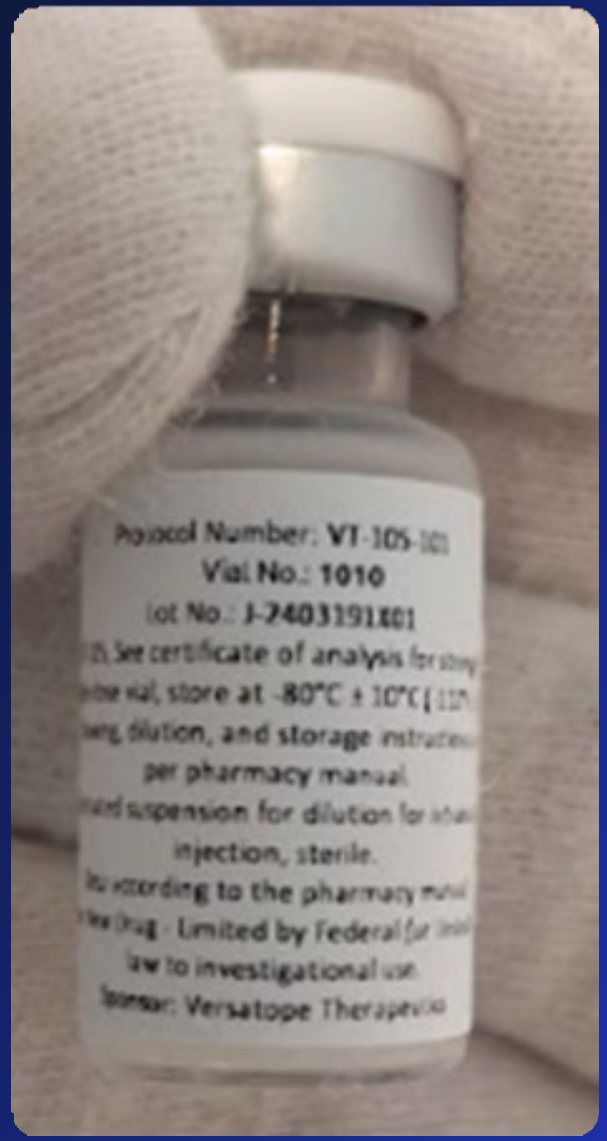
Anchored into the membrane as a fusion polypeptide



Representative Variants in One Construct

M2e Fusion Protein

Targeting all genetic groups of influenza A strains and may provide long-term protection



bEV High Density Display® Amplifies Vaccine Efficacy

Safe

Versatope's bEVs are **derived from Nissle 1917, a common probiotic** used for gut health

No eggs/feathers allergens

bEV vaccines have been safely used in millions of people worldwide.
E.g. Bexsero® for meningococcal disease

Robust

Up to 2000 copies of M2 protein are displayed per vesicle

High-density antigen display = **Amplified immune responses**

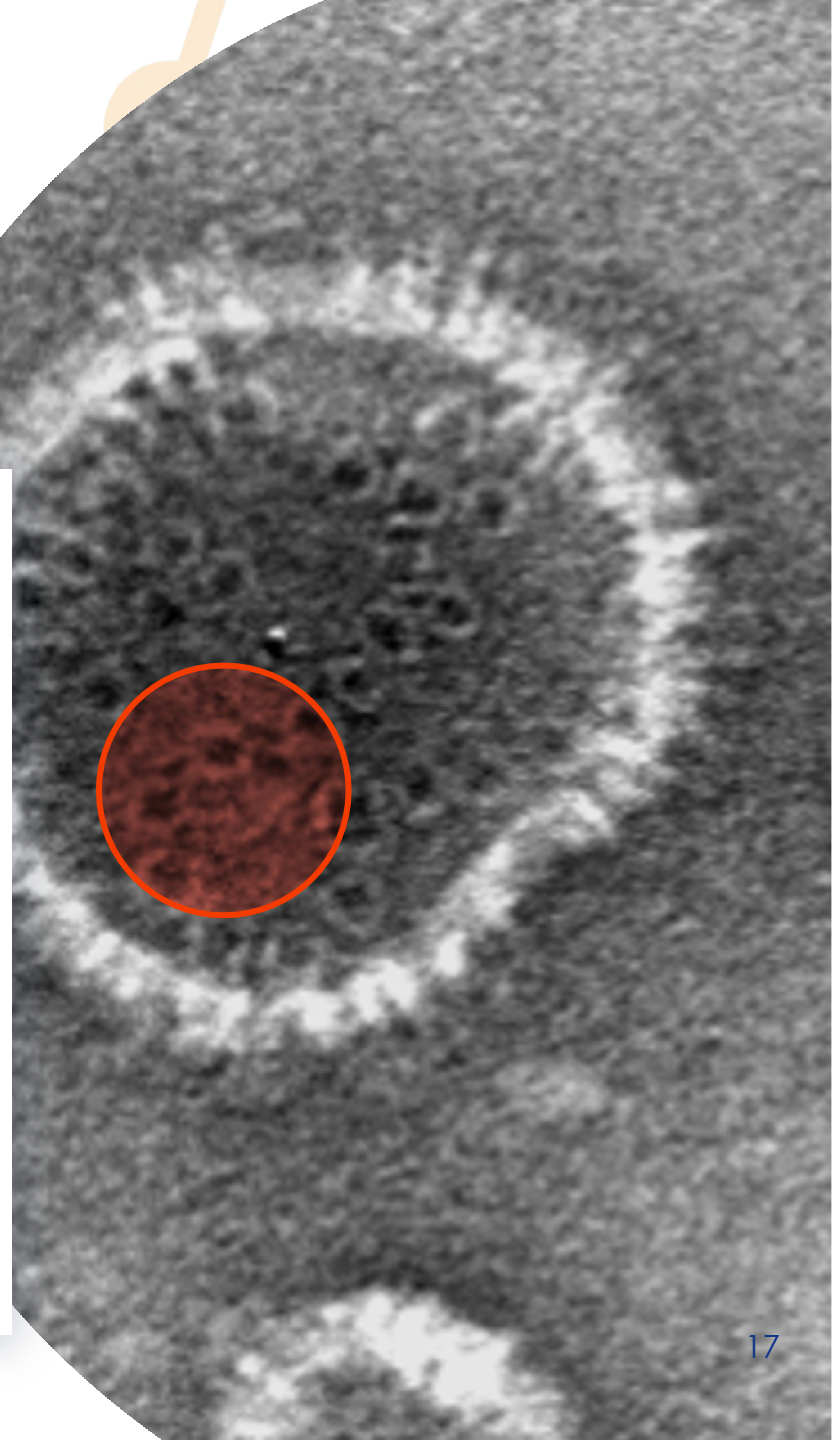
No annual reformulation

Room-temperature stable

Universal

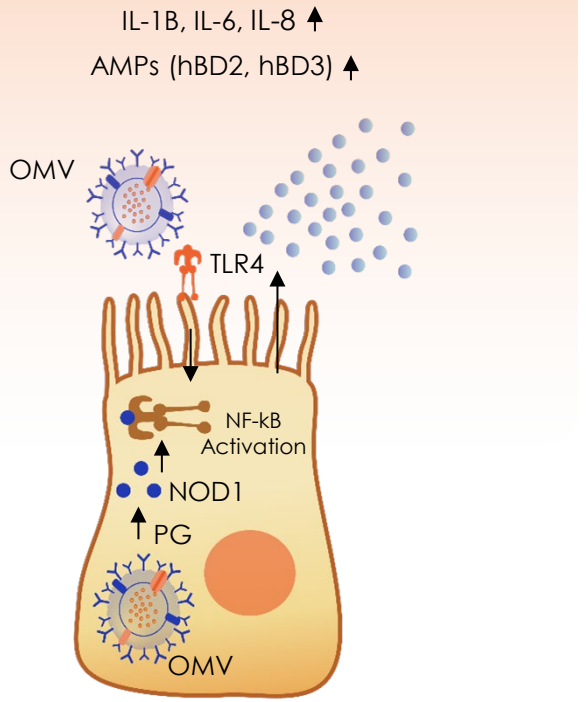
Broad **protection against ALL existing influenza A types** and new variants

10e5~10e6 M2
Antibody titers were observed across all 14 preclinical studies in multiple labs

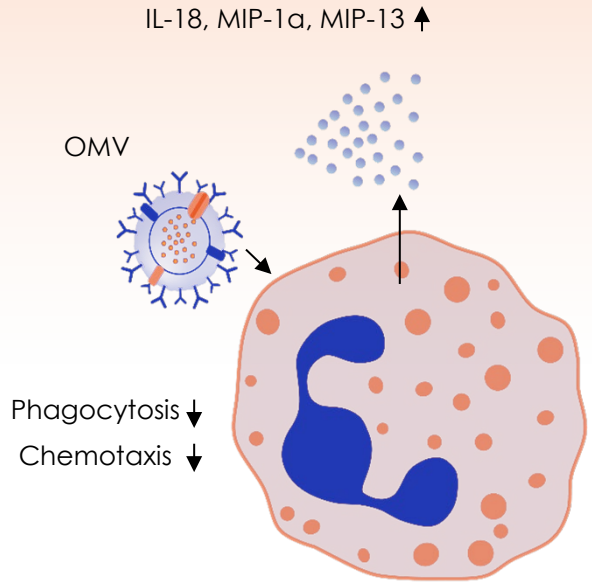


Innate Immune Responses to R-ETVs/OMVs by WT LPS Vesicles

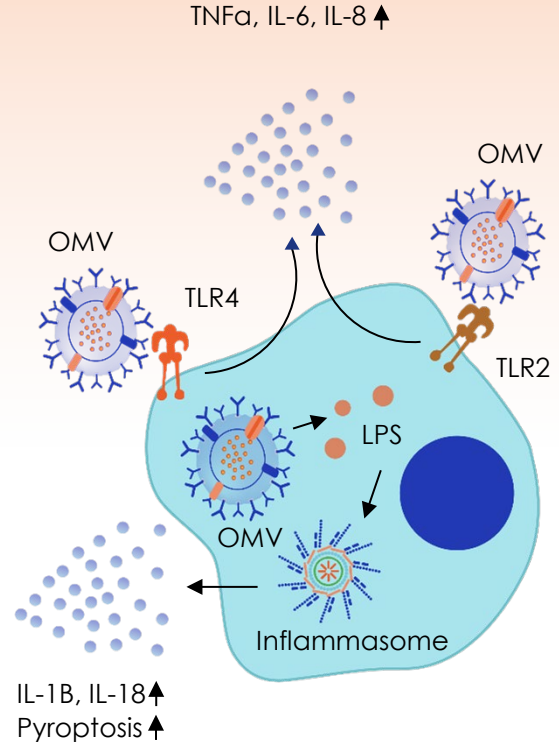
Epithelial Cells



Neutrophils



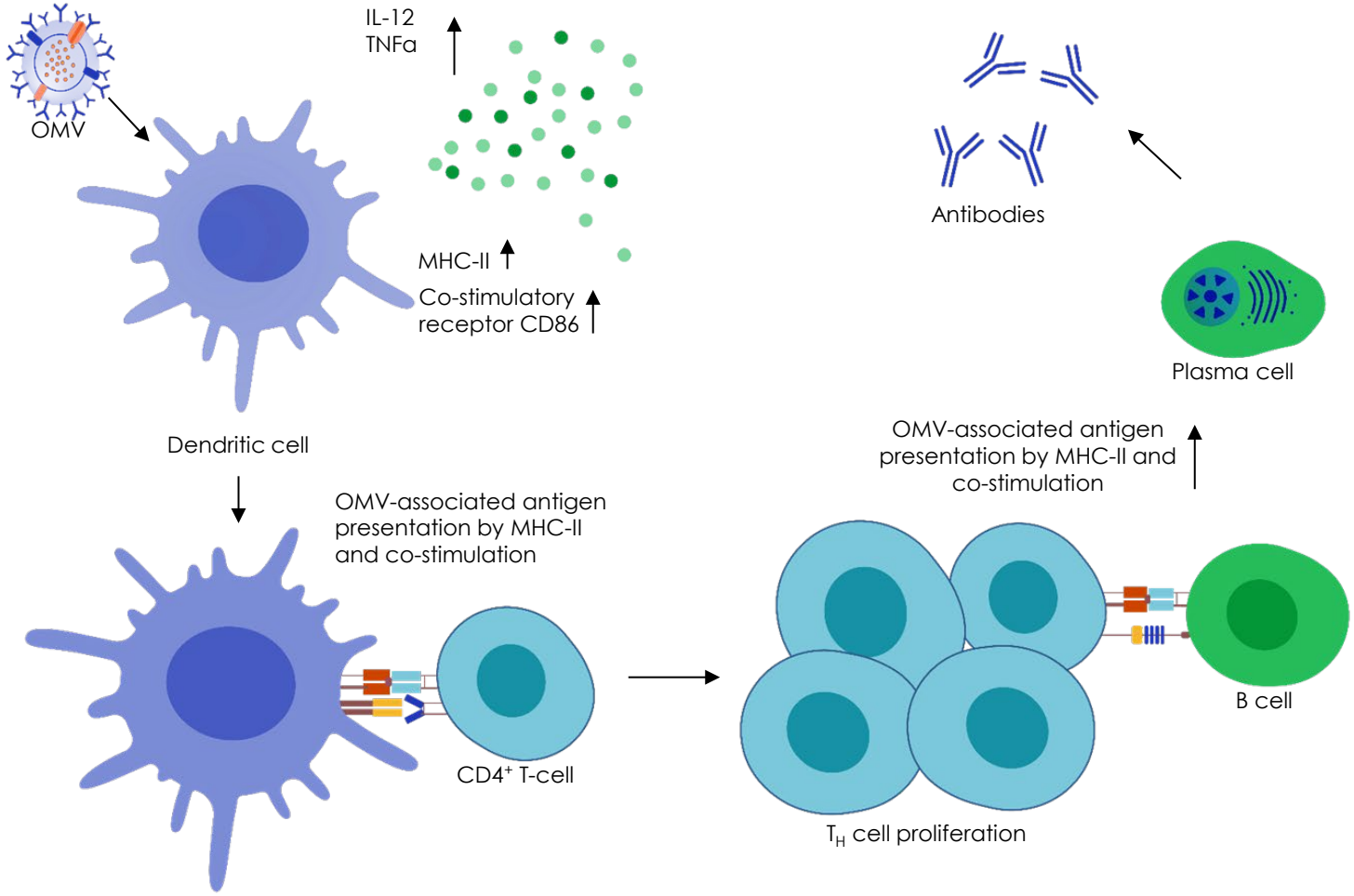
Macrophages



Reference: Tiku 2021. Host immunity and cellular responses to bacterial outer membrane vesicles, Trends Immunol

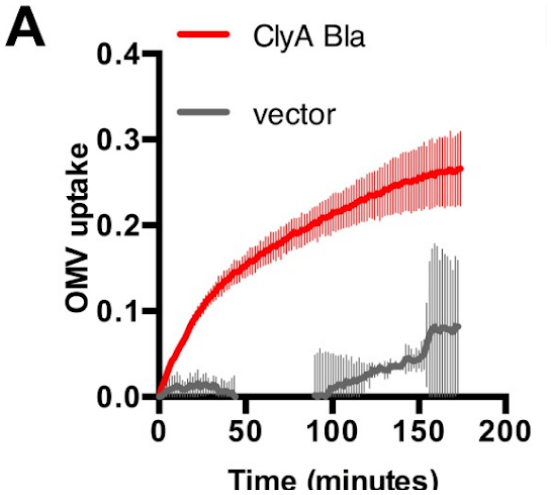
Potent Activation of Acquired Immune Responses by WT LPS Vesicles

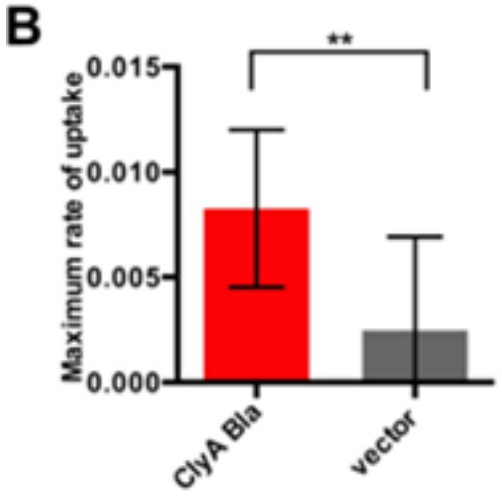
Adaptive Immune Responses against Membrane Vesicles

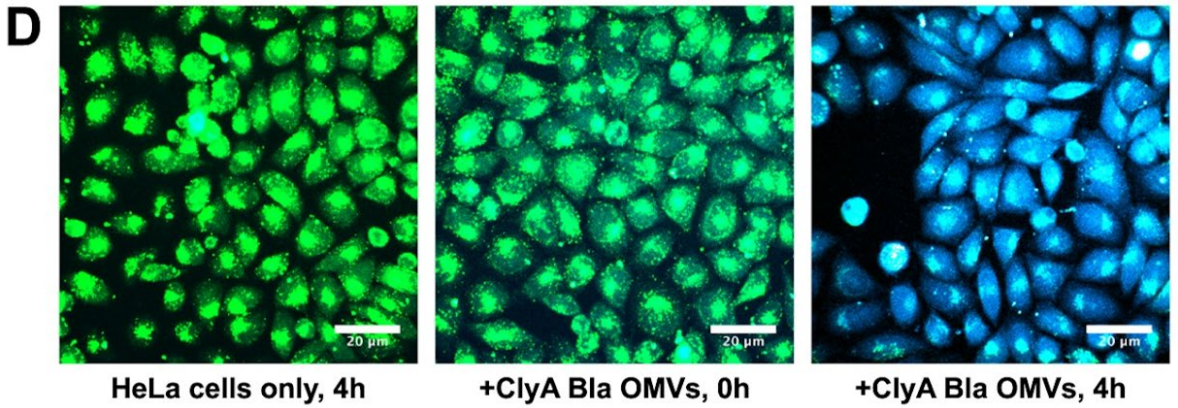


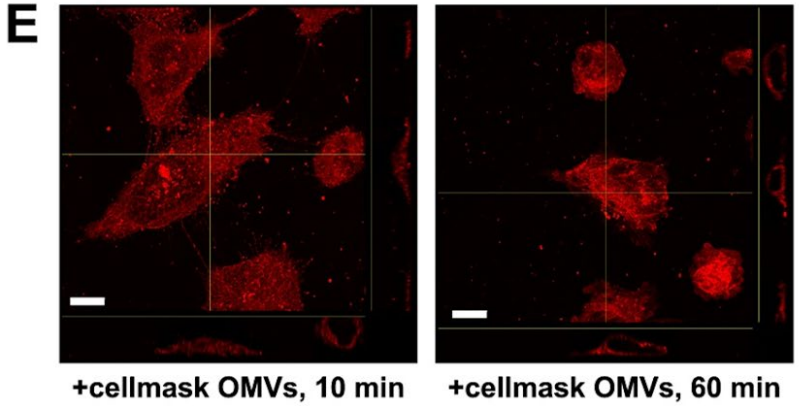
Reference: Tiku 2021. Host immunity and cellular responses to bacterial outer membrane vesicles, Trends Immunol

Rapid Uptake Cells using Membrane Protein ClyA







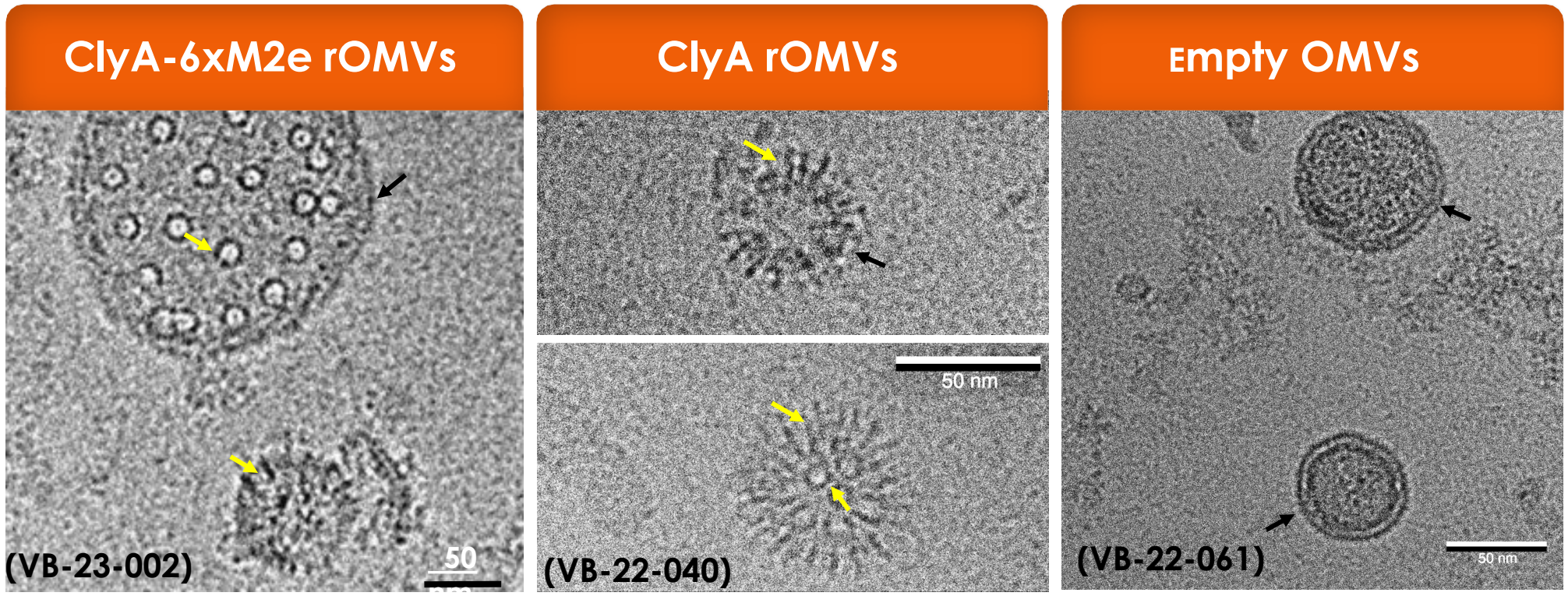


Reference: O'Donaghue Lipopolysaccharide structure impacts the entry kinetics of bacterial outer membrane vesicles into host cells. 2017 PLOS Pathogens

Mosaic Display of Multiple M2e Antigens in Geometric Molecular Patterns on OMVs

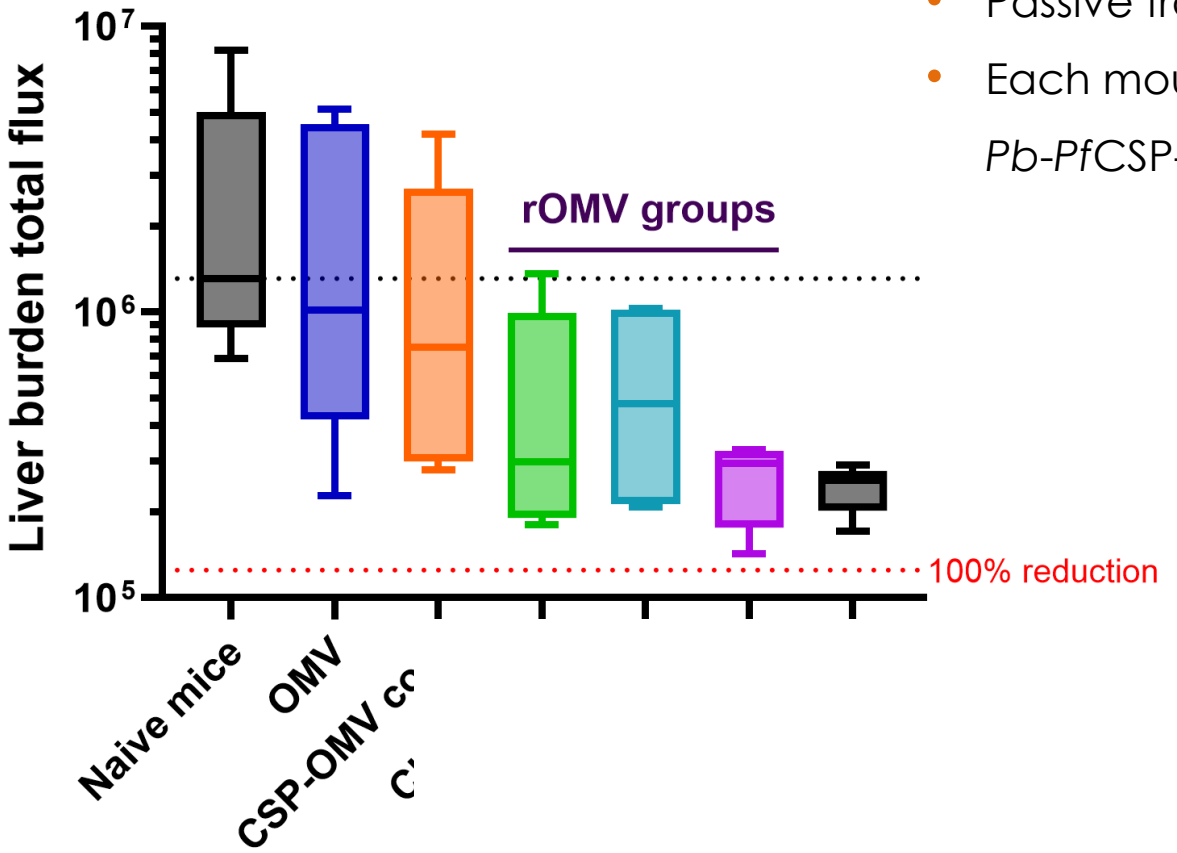
ClyA Pores and Lipid Bilayer Membrane Visible, 17,500X Magnification Cryo EM

ClyA pores present in both ClyA-6xM2e rOMVs and ClyA OMVs but absent in empty OMVs



Versatope Candidates Outperform CSP-OMV Conjugates in Preventing Infection

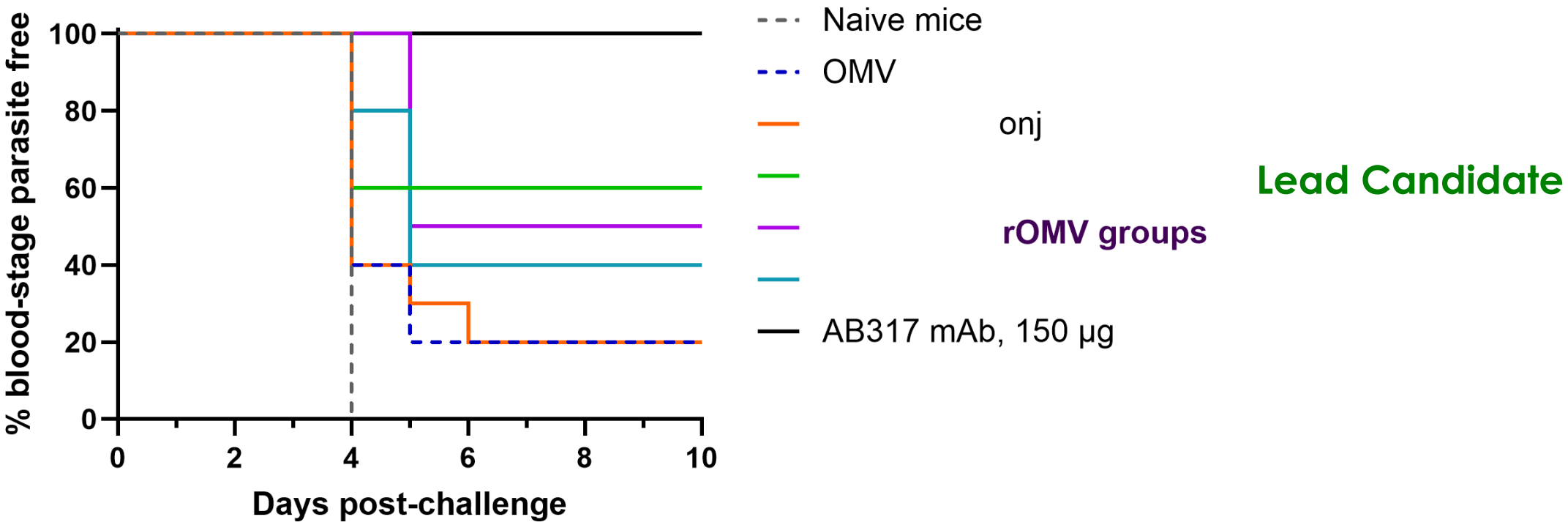
Liver burden reduction on par with neutralizing monoclonal antibody



- Passive transfer of pooled anti-sera from CD1 mouse immunizations
- Each mouse challenged by 5 bites from mosquitos infected with *Pb-Pf*CSP-Luc sporozoites

Versatope Outperformed CSP-OMV Conjugates in Preventing Infection

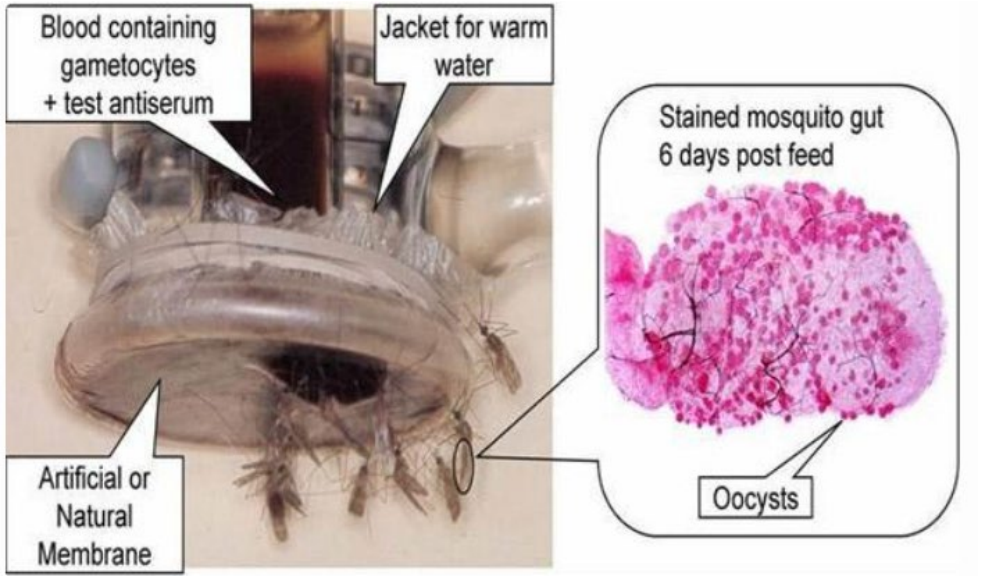
40-60% parasite free survival from three rOMV designs



Protective efficacy of CSP rOMVs highlights the potential of low-cost rOMV-based malaria vaccines by large-scale bacterial fermentation

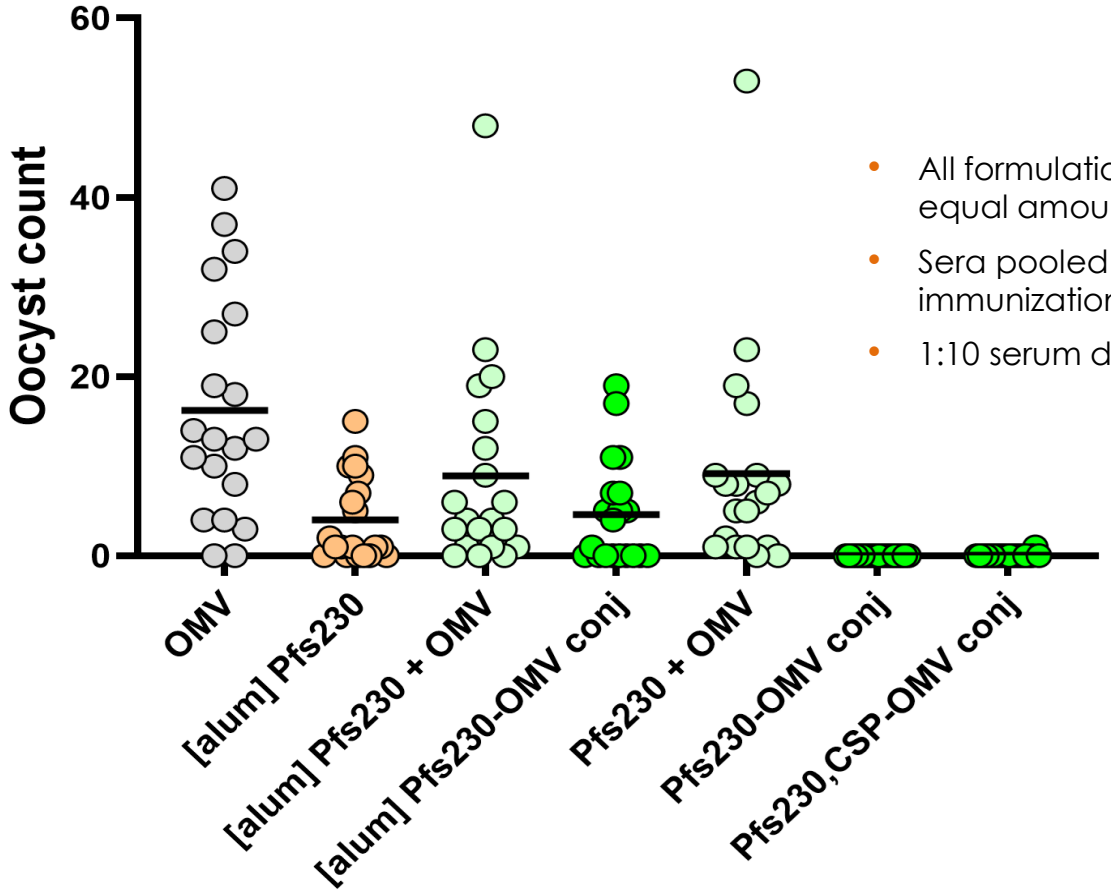
Pfs230-OMV Chemical Conjugate Elicits Strong Transmission Blocking Antibodies

Standard membrane feeding assay (SMFA) to analyze transmission blocking activity



Credit: NIAID, malaria immunology

100% transmission blocking only when antigen is conjugated to vesicles and Alum adjuvant is *excluded*



- All formulations contained equal amounts of Pfs230
- Sera pooled from CD1 mouse immunization groups
- 1:10 serum dilutions for SMFA

Scalable Proprietary Manufacturing Process

VT-105

A fully chemically defined medium for the production of **VT-105**

CDMO

In house process transferred to **CDMO**

24 Assays

Qualified and 11 Assays for information only

Large Scale

Process like brewing beer.

cGMP 40L

In bioreactor for >1000 vials (5000 doses at 20 µg per dose)

Spray-Dried

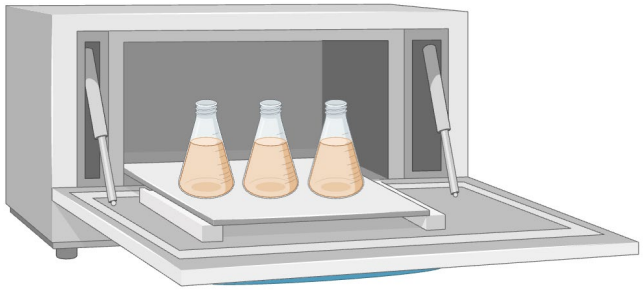
Lyophilization for Stability at RT

Which leads to better economics for Versatope:

- Demonstrated excellent reproducibility
- Testing data shows that extended Manufacturing is Feasible
- Favorable cost of goods due to high yields, basic broth medium with microbial bioreactors
- Portable and small scale equipment is available for decentralized manufacturing basic broth medium with microbial bioreactors

USP and DSP Flow Charts for Manufacturing

Upstream process I



Shake flask

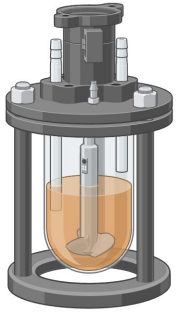
Adaptation phase, 28h

Working cell bank one vial

Select medium

Adaptation I and II

Upstream process II



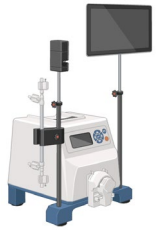
Bioreactor 15L or 30L

Production phase - inoculation in bioreactor

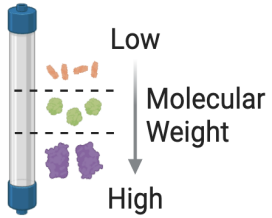
Induction

Harvest

Downstream process



TFF - Concentration and diafiltration

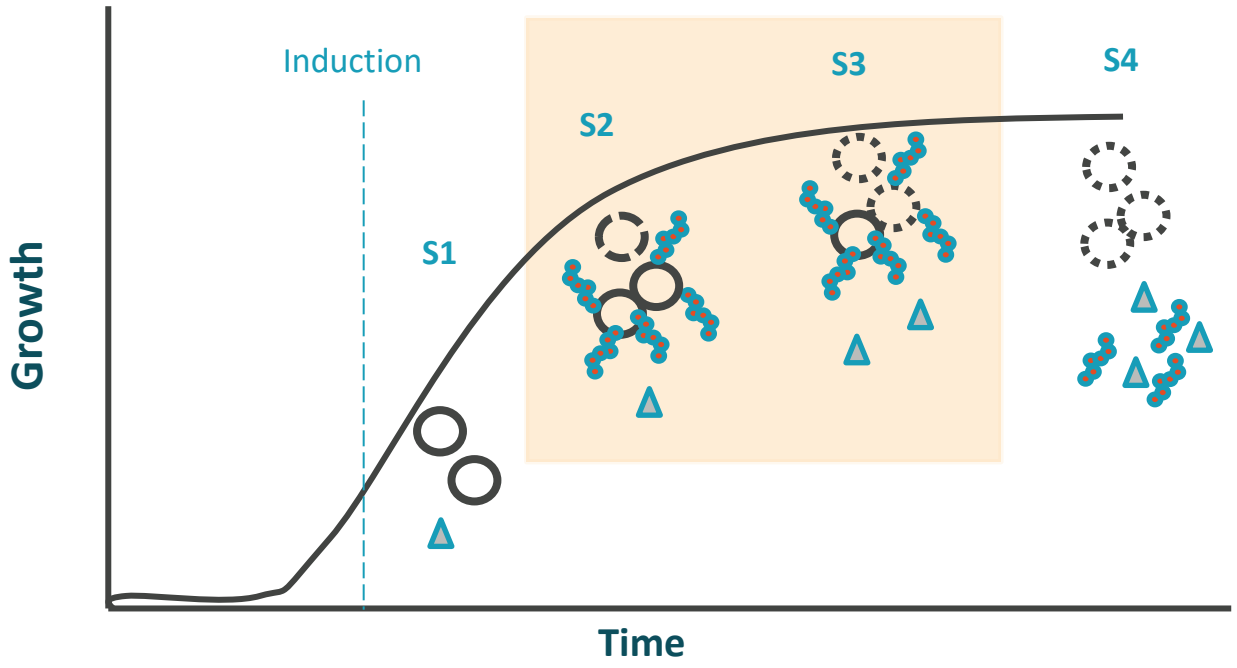


Chromatography

Sterile filtration

Fill finish in vials

In Process Monitoring of Upstream Bioreactor Process



Target/Antigen
OMV
Lysis material

S1
OMV quantity: Low
Antigen-OMV quantity: Low

S2
OMV quantity: High
Antigen-OMV quantity: High

S3
OMV quantity: High
Antigen-OMV quantity: High
OMV quality: Poor
Cell lysis: Medium

S4
OMV quantity: Low
Antigen-OMV quantity: Low
OMV quality: Very poor
Cell lysis: High

Monitoring: In-process

- SDS-PAGE
- Antigen & reporter antigens (OMV vrs non-OMV)
- SEC excluded/included species

Monitoring: Pure Intermediate

- SDS-PAGE, RP-HPLC
- Antigen & reporter antigens (rOMVs vs non-rOMVs)
- SEC excluded/included species
- NTA & TEM

Critical Quality Attributes (CQA's)

High purity & reproducible profile

- Size-exclusion chromatography
- SDS-PAGE/densitometry
- OMV reporter proteins, immunoblot/densitometry
- Mass-spec Protein Profiling

Controlled specific antigen content (ClyA-6xM2e)

- RP-UPLC, MS, ELISA
- SDS-PAGE Densitometry

Low pyrogenicity/ rigorous contamination control

- MAT (monocyte activation test)
- LAL, GC-MS

Low (& controlled) residual host cell DNA (HCD)

- q-PCR, gel electrophoresis
- Picogreen

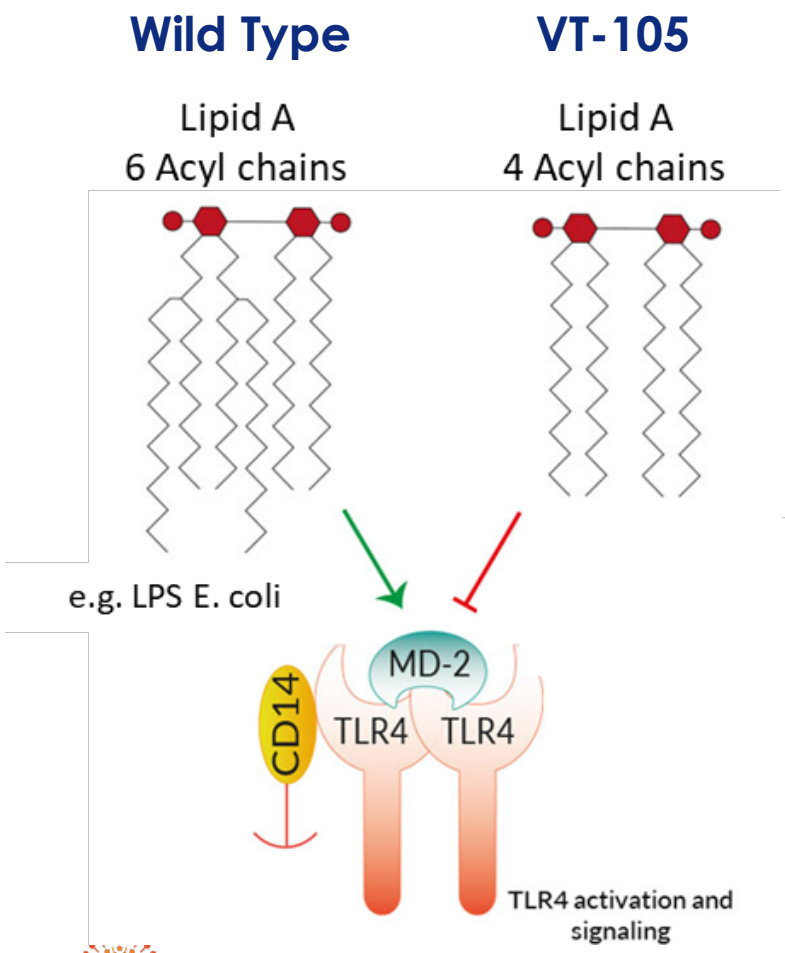
Understanding of the range and distribution of OMV sizes

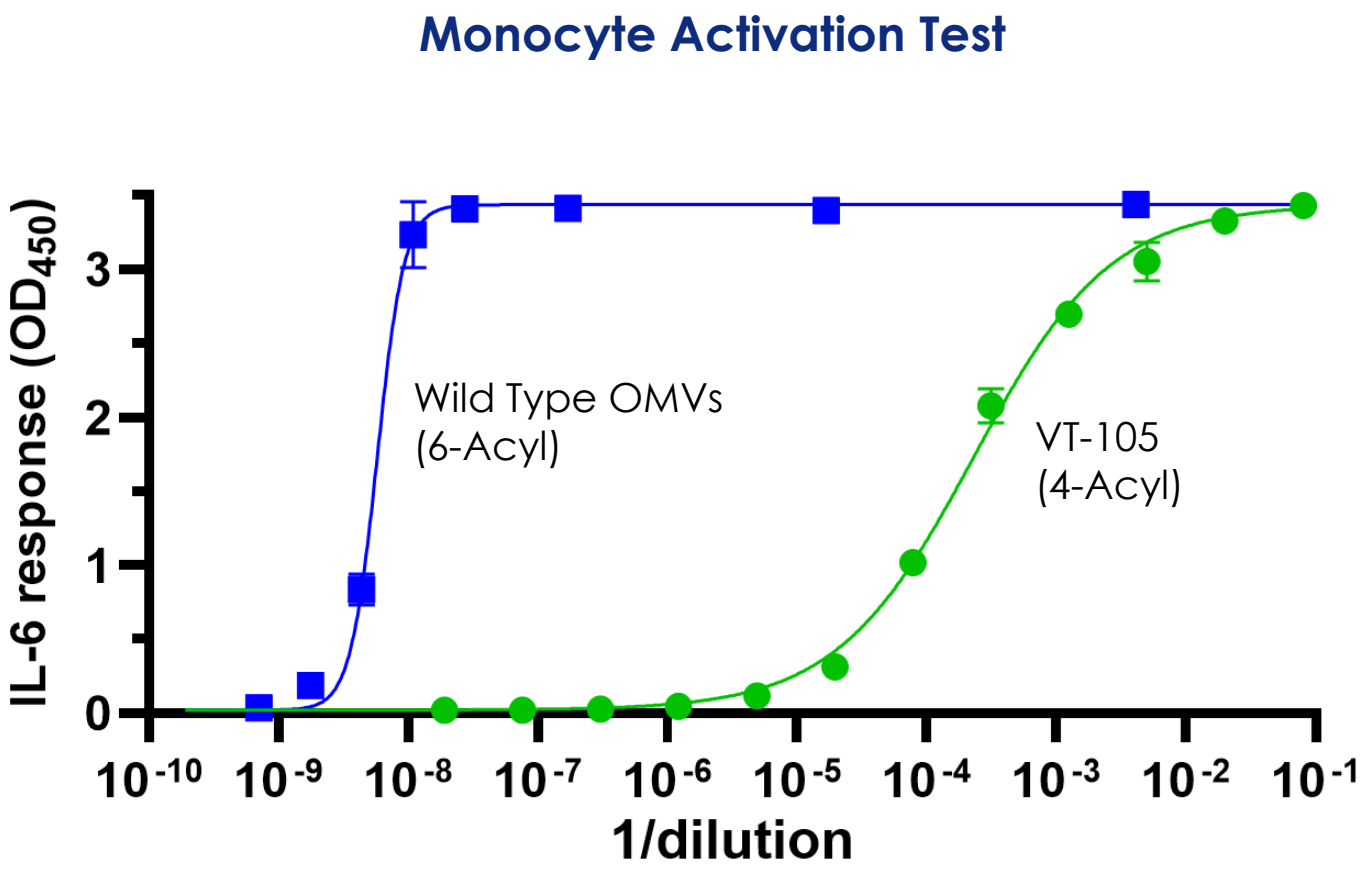
- Nanotracker Analysis (NTA)
- Dynamic Light Scattering (DLS)
- Transmission Electron Microscope (TEM
- Cryo-Electron Microscope (Cryo-EM)

LipoPolysaccharide (LPS) Acyl Chains Removed by Genetic Engineering

In order to improve tolerance, reduce reactogenicity for use in humans

Pyrogenicity in VT-105 is one million-fold more attenuated than wild-type nano-vesicles





VERSATOPE

Economical Manufacturing Plan on Scale-Up*

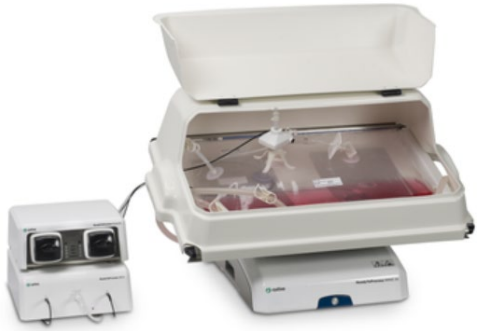
End to end production at a single site with extended batch manufacturing

Stage	Bioreactor (Working Volume)	Total Number	Doses (20µg)	Cost of Goods per dose
Phase 1 Current Scale	40L	2000 vials	10,000	$500
Phase 2a + 2b (2025; $2.4M)	400L	20,000	100,000	$24
2 Phase 2b* (2026; ~$1.8M)	400L	20,000	100,000	$18
Phase 3 (2027-2028; $14M)	2,000	640,000	8,000,000	< $2
Commercial Scale	2,000+	5,120,000	64,000,000	< $1

*Ball park quotes, lyophilized preferred

Streamlined Process Available for Decentralized Production

Portable cGMP bioreactor for upstream process

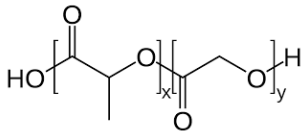


Portable, standard downstream process

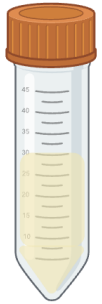
- Tangential flow filtration (TFF)
- Single-pass chromatography
- Established analytics

Research Protocol for Capture of VT-105 Nanoparticles in PLGA Microparticles

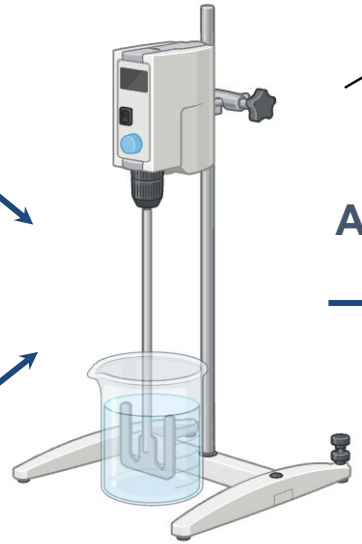
Laboratory Scale Equipment



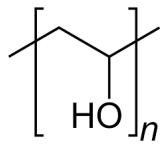
PLGA in DCM



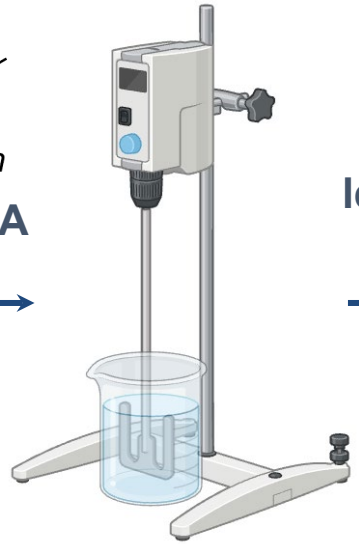
Conc. VT105
In PBS



Emulsion w/o



Add PVA



Emulsion w/o/w

Dilute in
less conc.
PVA

Evaporate DCM,
16 h

Wash and
centrifuge in
water 3x

Lyophilize

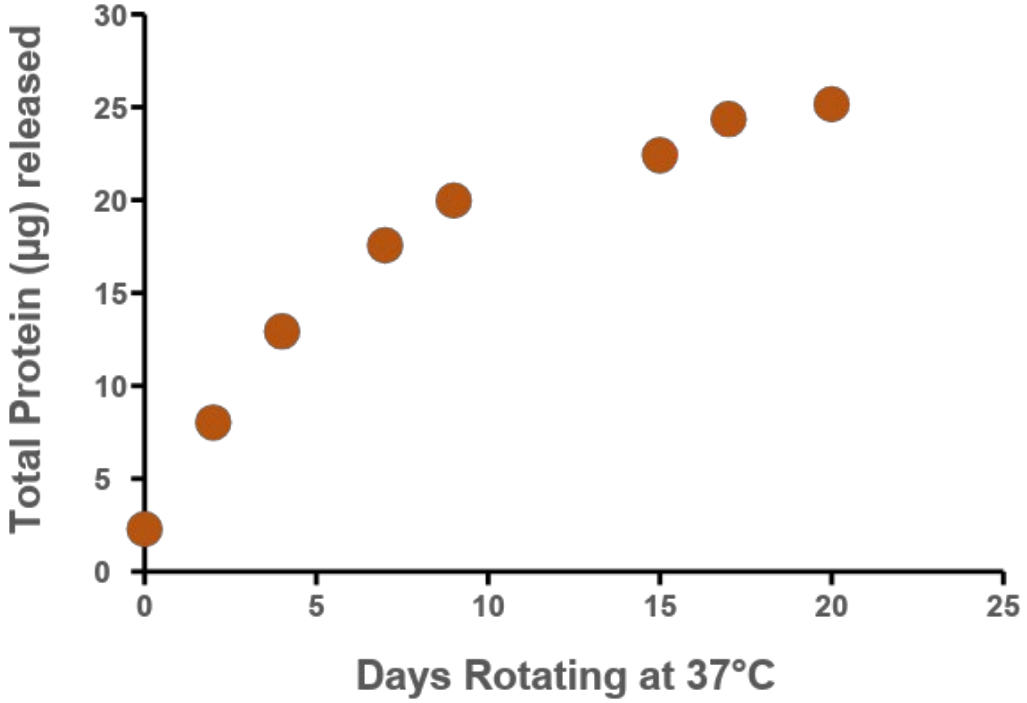
Icons created with BioRender

Sustained in Vitro Release of bEVs Over More Than 15 Days With PLGA

Consistent with Studies in Literature (H.C. Watkins et al., Vaccine, 2017)

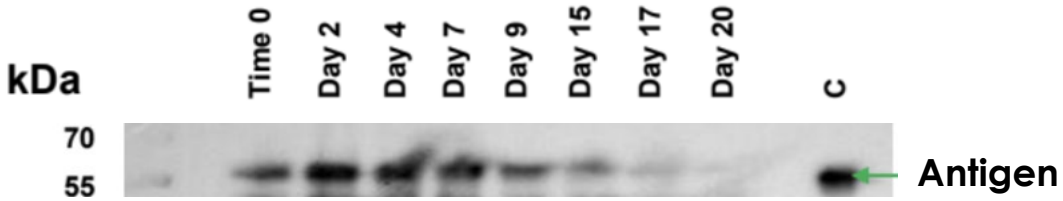
Cumulative protein release

PLGA particles rotated for 3 weeks at 37°C



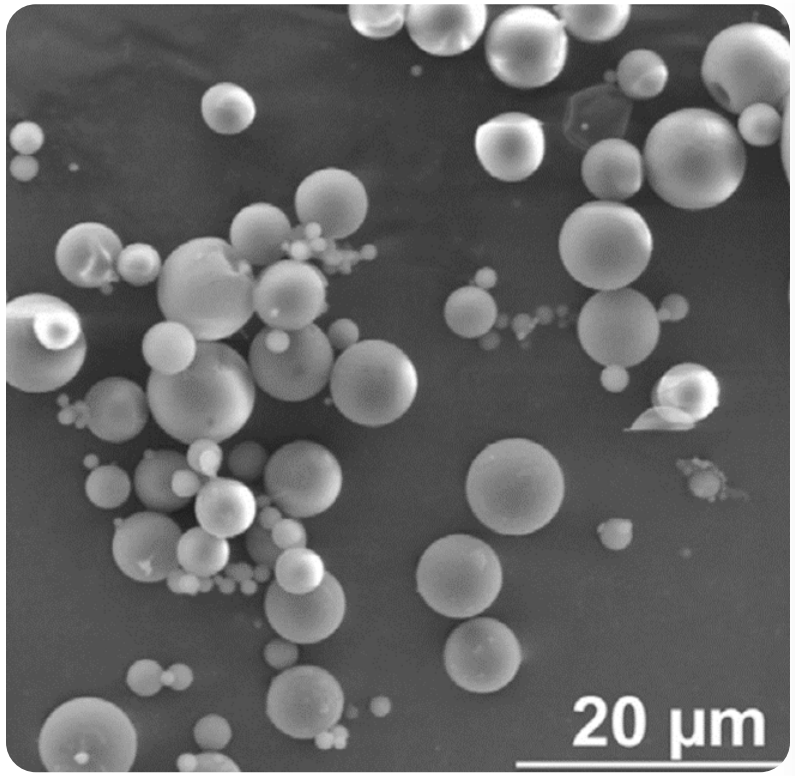
Western Blot

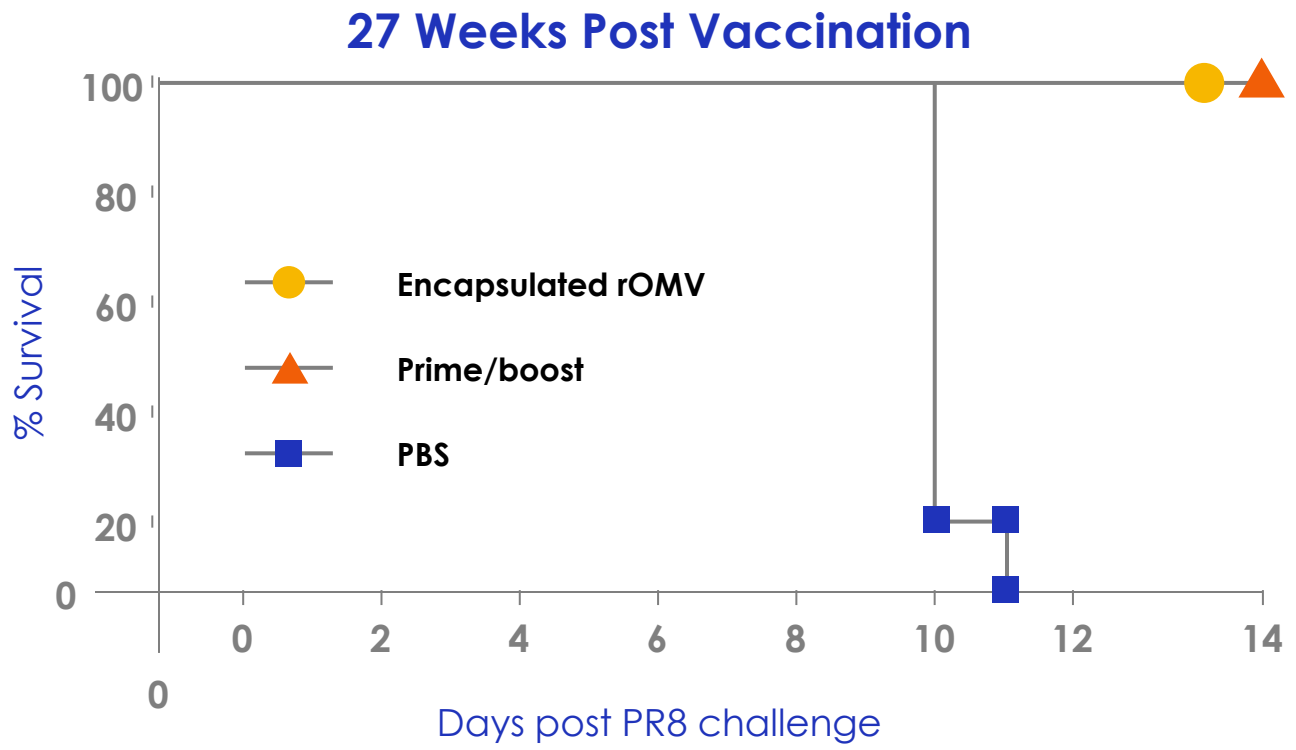
Samples from protein release study, probed for bEVs specific antigen



- Immunizations with CSP rOMVs encapsulated in PLGA are ongoing at Versatope

Single Dose Formulation* Provides Long Term Protection





*PLGA, Poly-Lactide co-Glycolic Acid
Intramuscular immunization

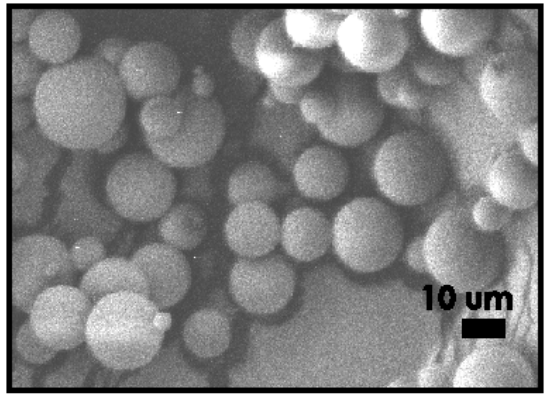
See Watkins et al, Vaccine (2017)

PLGA Microparticles* Provide Protection After a Single Dose

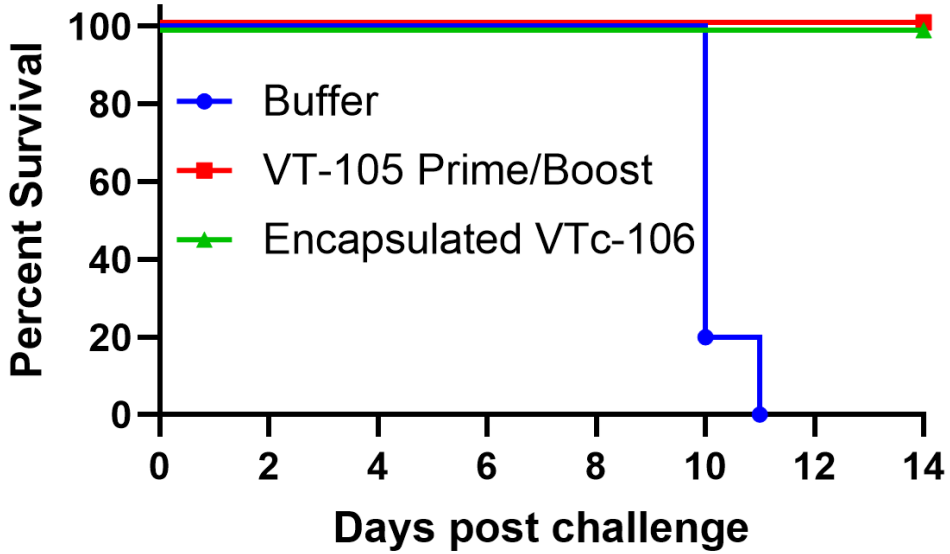
A case study with VTc-106 (VT-105 with PLGA)

*PLGA, Poly-Lactide co-Glycolic Acid

PLGA microparticles with encapsulated bEVs

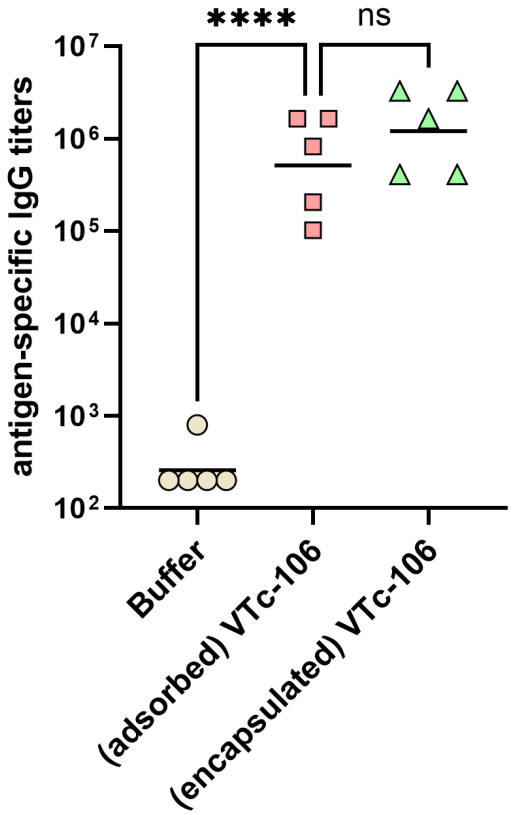


Protection in mice 6 months after injection

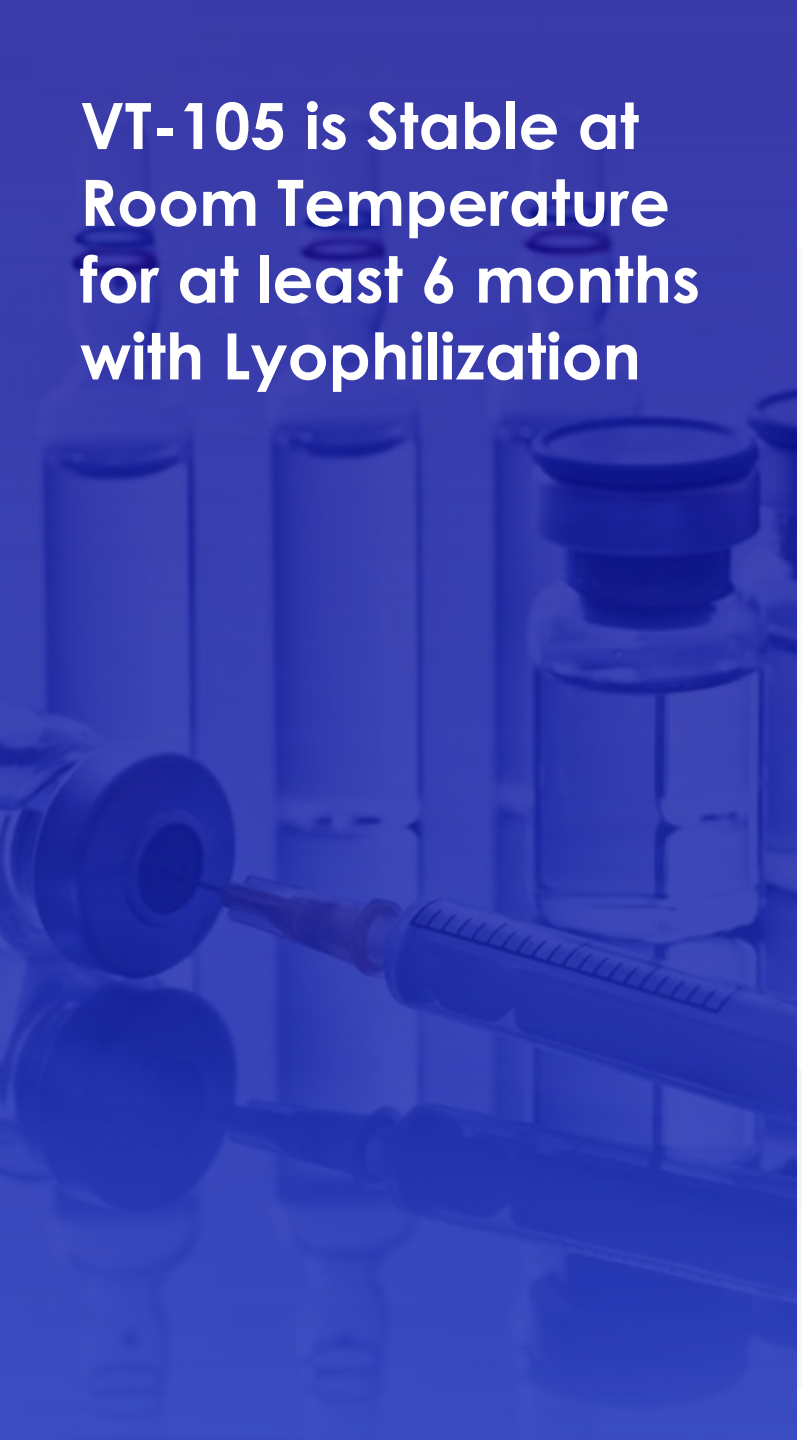


Watkins et al, Vaccine (2017)

Similar IgG titers with adsorbed or encapsulated bEVs



VT-105 is Stable at Room Temperature for at least 6 months with Lyophilization



Percent Remaining VT-105 by ClyA-6xM2e-specific ELISA

		-80°C*	-20°C*	4°C*	Lyophilized Room Temperature 25°C**	Liquid Room Temperature 25°C**
Time	00	100	100	100	92 ± 10	100
Week	04	93 ± 11	89 ± 10	79 ± 4	77 ± 11	<30
Week	12	97 ± 10	95 ± 8	69 ± 5	85 ± 13	ND
Week	24	96 ± 10	96 ± 10	46 ± 7	89 ± 9	ND

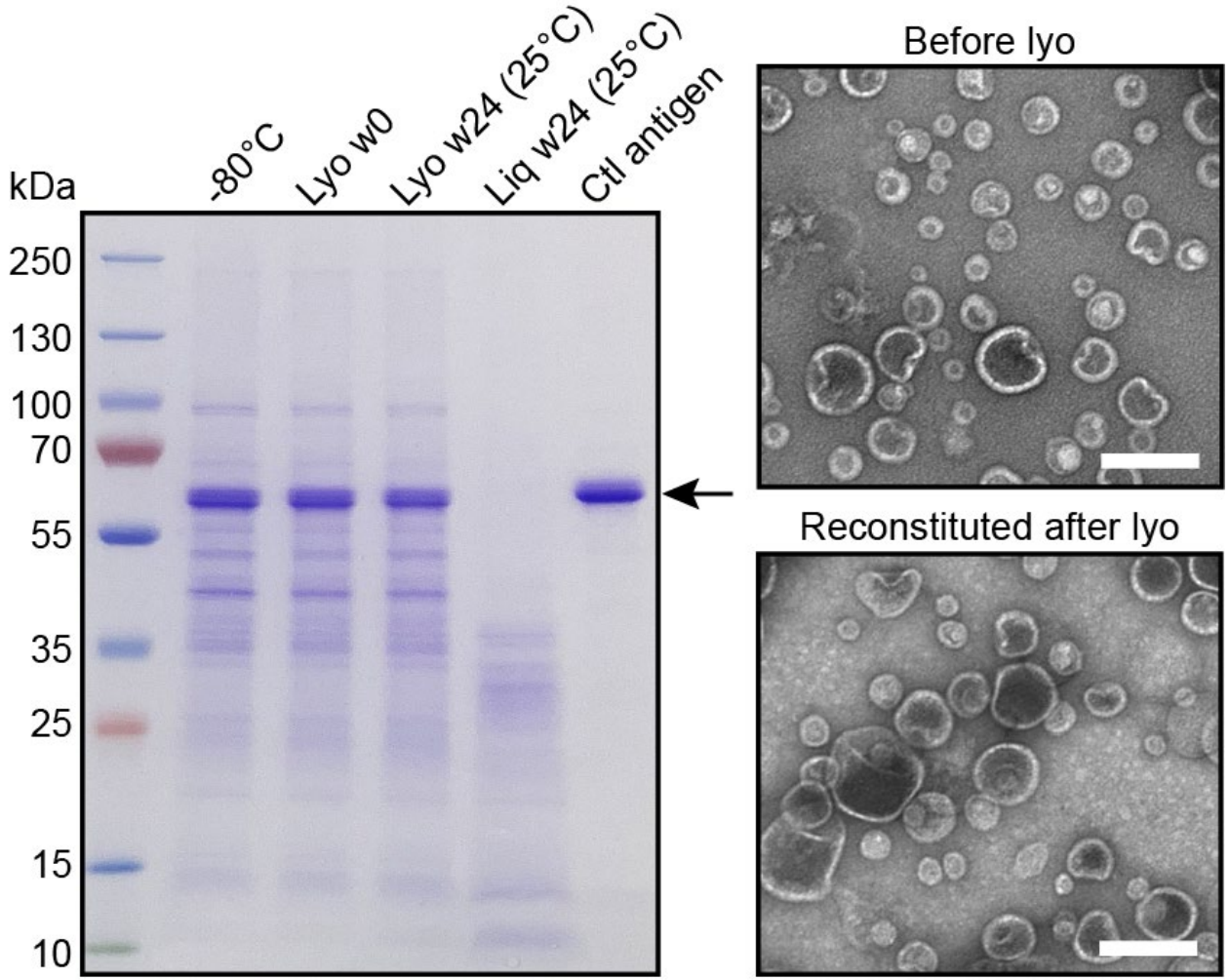
3 biological replicate; each replicate done in triplicate

*Analyzed by capture ELISA

** Analyzed by direct binding ELISA

ND: Not detectable

VT-105 retains antigen stability when stored lyophilized at 25°C for 24 weeks



WHO Preferred Product Characteristics (PPCs) for Malaria Vaccines

Supporting data indicates VT-201 could meet all key PPCs

Effective: > 90% reduction in blood-stage infection over 12 months

- VT-201 antigen outperforms approved RTS,S vaccine in passive transfer + *Pb-Pf*CSP-Luc mouse model

Safe: Comparable to or better than current WHO-recommended vaccine

- No adverse events in safety-tox studies with influenza candidate VT-105

Affordable

- Low-cost *E. coli* bacteria fermentation with scalable downstream purification
- Recent process modifications increased yield > 10x
- Target: > 1000 human doses / L culture, with < $1 per dose at commercial scale
  - GSK and Bharat Biotech target for RTS,S: < $5 per dose by 2028

Stable: Stable at 4°C for 2 years preferred; -20°C for 2 years acceptable

- > 6-month stability at 25°C demonstrated for influenza candidate VT-105
- Stability study with VT-201 starting next week

Minimal Doses: Single dose preferred; 2-3 doses acceptable if required for long-lasting immunity

- IgG titers from CSP and Pfs230 rOMV immunizations saturate after two doses in mice
- Single dose PLGA microparticle formulation developed at Cornell and Versatope
  - Strong IgG titers against influenza and malaria antigens
  - Outside scope of Phase II SBIR

VT-201 Target Product Profile – Pediatric

Characteristic	Minimum	Preferred
Product	VT-201 ClyA-CSP OMV vaccine for blocking infection	Co-administered with Pfs230 and RH5 as tri-specific vaccine
Route of Administration	Intramuscular (IM)	Needle-free delivery or sublingual tablet by the oral route
Indication for EUA	Prevent severe malaria	Prevent severe and clinical malaria, sterile protection
Target Population	Pediatrics (5-36 months) in malaria endemic regions	All age groups, school-age children and pregnant women
Safety/Reactogenicity	Comparable to RTS, S/AS01; transient pain, redness, mild fever	Superior safety profile; minimal systemic reactogenicity, no fever
Efficacy	Comparable to current RTS,S/AS01	Superior to current seasonal vaccines, lifetime immunity
Schedule	3 doses primary series (0, 1, 2 month + 12 month booster)	2 dose primary series or single dose with PLGA with no booster
Onset of Immunity	Within 84 days of immunization	Within 28 days of immunization
Duration of Protection	One year	Multiple years
Presentation	Single dose vial or prefilled syringe	Single dose tablet
Volume per dose	0.5 mL	<0.5 mL
Stability/Storage	Five year stability when stored at -20°C	Multi-year stability when stored at room temperature as lyophilized product (25°C)

Clinical Study Estimated Costs

Phase	Proposed # of Patients (assuming 2 arms)	USD Estimated Min	USD Estimated Max
Phase 1	60	$2,000,000	$4,000,000
Phase 2a* Controlled Human Malaria Infection (CHMI) model	30-60	$5,000,000	$15,000,000
Phase 2b Field trials in endemic regions	400-1000	$10,000,000	$25,000,000
Phase 3	5,000-15,000	$50,000,000	$200,000,000

*WRAIR, UW Fred Hutchinson, U Maryland Center for Vaccine Development

IRSS, Nanoro, Burkina Faso, KEMRI, Kilifi, Kenya,
Ifakara Health Institute, Bagamoyo Tanzania, Gabon Med Res Unit, Albert Schweitzer Hospital

Versatope Founder's Publications Validated Technology

- Weyant KB et al. 2023. A modular vaccine platform enabled by decoration of bacterial outer membrane vesicles with biotinylated antigens
- Gnopo YMD, Misra A, Hsu HL, DeLisa MP, Daniel S, Putnam D. J Colloid Interface Sci. 2020 Oct 15;578:522-532 Induced fusion and aggregation of bacterial outer membrane vesicles: Experimental and theoretical analysis.
- Baker JL, Chen L, Rosenthal JA, Putnam D, DeLisa MP. Curr Opin Biotechnol. 2014. 29:76-84. Microbial biosynthesis of designer outer membrane vesicles
- Chen et al. PNAS 2010.107(7): 3099. Delivery of Foreign Antigens by Engineered Outer Membrane Vesicle Vaccines.
- Rosenthal et al. PLOS One. 2014. 9(11):e:112802. Mechanistic Insight into the TH1-biased Immune Response to Recombinant Subunit Vaccines Delivered by Probiotic Bacteria-derived Outer Membrane Vesicles.
- Rosenthal JA, Chen L, Baker JL, Putnam D, DeLisa MP. Curr Opin Biotechnol. 2014. 28:51-8 Pathogen-like particles: biomimetic vaccine carriers engineered at the nanoscale.
- Rappazzo et al. Vaccine. 2016. 34:1 252. Recombinant M2e Outer Membrane Vesicle Vaccines Protect Against Lethal Influenza A Challenge in BALB/c mice.
- Park M, Sun Q, Liu F, DeLisa MP, Chen W. PLoS One. 2014 May 12;9(5):e97103. Positional assembly of enzymes on bacterial outer membrane vesicles for cascade reactions.
- Chen et al. Proc Natl Acad Sci U S A. 2016 Jun 28;113(26):E3609-18. Outer Membrane Vesicles Displaying Engineered Glycotopes Elicit Protective Antibodies.
- Valentine JL Cell Chem Biol. 2016 Jun 23;23(6):655-65. Immunization with Outer Membrane Vesicles Displaying Designer Glycotopes Yields Class-Switched, Glycan-Specific Antibodies.
- Watkins et al. Molecular Therapy 2017 25(4):1-14. Safe recombinant Outer Membrane Vesicles that Display M2e Elicit Heterologous Influenza Protection.
- Watkins, HC, Pagan, CL, Childs, HR, Posada, S, Chau, A, Rios, J, Guarino, C, DeLisa, MP, Whittaker, GR, Putnam, DA. 2017. Vaccine. Sep 25;35(40):5373-5380. Single dose Poly(lactic-co-glycolide) Microparticle Vaccine Provides Long Lasting Influenza Protection via Controlled Release of Detoxified Recombinant Outer Membrane Vesicles Displaying a Heterospecies M2e-derived Peptides.
- Gnopo YMD, Watkins HC, Stevenson TC, DeLisa MP, Putnam D Adv Drug Deliv Rev. 2017 May 15;114:132-142 Designer outer membrane vesicles as immunomodulatory systems – Reprogramming bacteria for vaccine delivery
- Stevenson TC, Cywes-Bentley C, Moeller TD, Weyant KB, Putnam D, et al. Proc Natl Acad Sci U S A. 2018 Mar 19 Immunization with outer membrane vesicles displaying conserved surface polysaccharide antigen elicits broadly antimicrobial antibodies.

Versatope OMV Cell Lines: Genetically Engineered for Enhanced Therapeutic Potential

Hyper-vesiculation

- Achieves up to **500X** higher yield and purity

Safety

- **1,000,000** times less pyrogenic than wild-type (WT) nanovesicles

Versatility

- Fusion protein X Targeting domain X Payload/Combinatorial antibodies

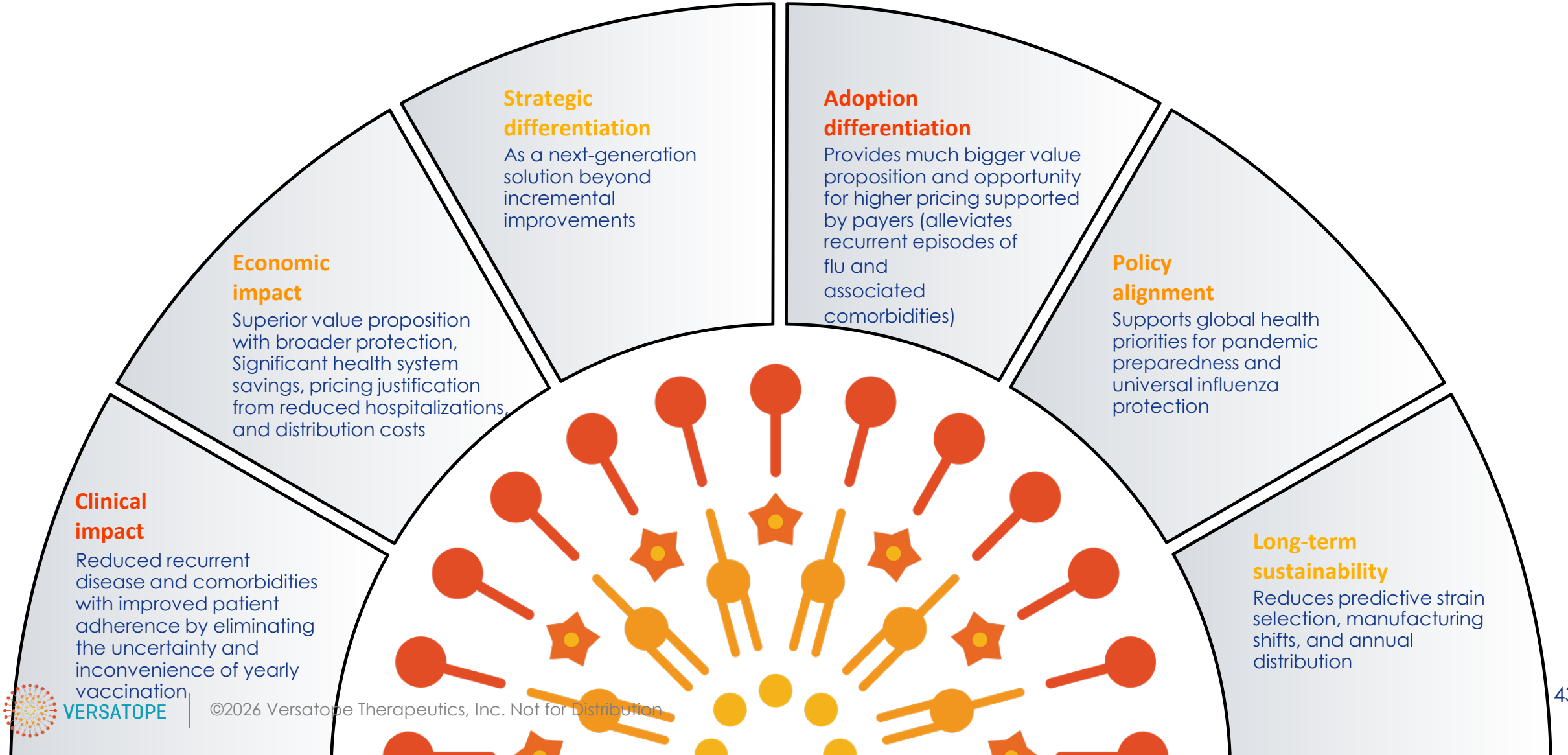
Potency

- High density display with up to **2000** molecules/OMV

Thermostability

- Formulated VT-105 is stable for at least **6** months at room temperature
- Low-cost manufacturing

What Makes Versatope Different



VERSATOPE
Delivering Immunity

Back Up Slides

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President & CEO
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Versatope Exclusive Worldwide Patents

Versatope filed a PCT (patent cooperation treaty) in March 2024

Exclusive Worldwide License to IP from Cornell University

Family Patents	Patent Title	Patents	Priority Date
Composition and methods	Membrane vesicles comprising multiple influenza antigens for vaccines	**Pending: PCT/US24/20044** WO 2024/196719 National phase: September, 2025	**Mar 17, 2023** (Expected expiry: 2045)
Composition and methods	Compositions and methods for the display of proteins on the surface of bacteria and their derived vesicles and uses thereof	**Issued patents** US 9051565 B2, US 9394344 B2, CN 101827943 B CN 105950608 B	**May 07, 2007** (Expected expiry: 2030)
Platform	Subunit vaccine delivery platform for robust humoral and cellular immune responses	**Issued patents** US 9808517 B2 (2017) US 10537627 B2 (2020), US 10918706 B2 (2021) CN 105307673 B Pending in US and CN	**Apr 6, 2012** (Expected expiry: 2033

Clinical Development Team

Christopher Locher, PhD

CEO 20+ years of biotech experience

Mammen P. Mammen, MD

Chief Medical Officer
Colonel (Retired)

Peter Patriarca, MD

Regulatory Advisor
Former Director of Vaccines, FDA

Alan Barber

CFO 20+ years exp.

Jessica Lee, MPH

SVP Clin Reg Affairs

Kumkum Saxena, PhD

VP, Head Preclinical R&D

Candice Del Rio, MS, RN

Senior Director of Clinical Project Management

Nicole Close, PhD

Biostatistics Consultant

Timothy Myott, CQA

Head of Quality Assurance

Erin G. Neff, MS

Project and Alliance [illegible]nent

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University of Virginia

James Tartaglia, PhD

Consultant Sanofi, retired

SANOFI PASTEUR