hēlocyte

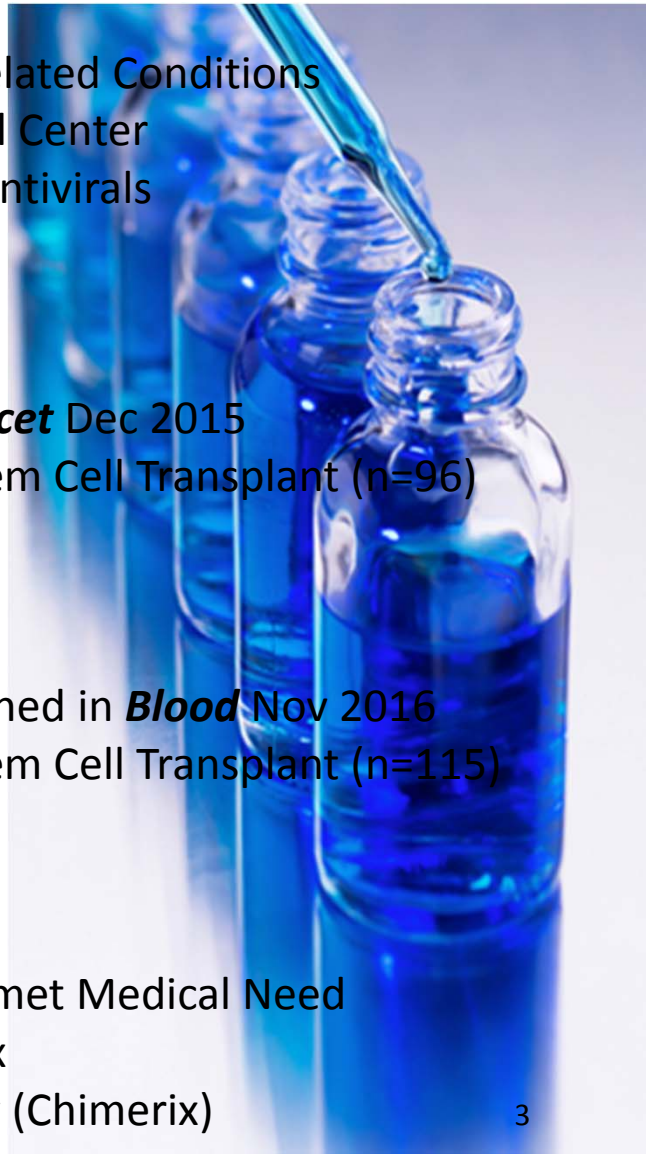
Clinical-Stage Immunotherapy

APRIL 2017

Forward-Looking Statements

Statements in this presentation that are not descriptions of historical facts are forward-looking statements within the meaning of the "safe harbor" provisions of the Private Securities Litigation Reform Act of 1995. We have attempted to identify forward-looking statements by terminology including "anticipates," "believes," "can," "continue," "could," "estimates," "expects," "intends," "may," "plans," "potential," "predicts," "should," or "will" or the negative of these terms or other comparable terminology. Forward-looking statements are based on management's current expectations and are subject to risks and uncertainties that could negatively affect our business, operating results, financial condition and stock price. Factors that could cause actual results to differ materially from those currently anticipated are risks relating to: our growth strategy; results of research and development activities; uncertainties relating to preclinical and clinical testing; our dependence on third party suppliers; our ability to obtain, perform under and maintain financing and strategic agreements and relationships; our ability to attract, integrate, and retain key personnel; the early stage of products under development; our need for substantial funds; government regulation; patent and intellectual property matters; competition; as well as other risks described in our parent company's SEC filings. We expressly disclaim any obligation or undertaking to update or revise any statements contained herein to reflect any change in our expectations or any changes in events, conditions or circumstances after the date of this presentation.

Overview



- Novel Immunotherapies to Treat Cytomegalovirus (CMV)-related Conditions
  - Based on Research from City of Hope National Medical Center
  - Potential of Lower Toxicity, Increased Durability over Antivirals

- Three Novel Biologics, Two Currently In Phase 2
  - PepVax: HLA-restricted (Single-Antigen) CMV vaccine
    - Phase 1b: data (in patients) published in ***The Lancet*** Dec 2015
    - Phase 2: ongoing multicenter, double-blind in Stem Cell Transplant (n=96)
      - Topline (100-day) Data as early as 1H2018
  - Triplex: Universal (Multi-Antigen) CMV Vaccine
    - Phase 1: data presented at **ASH** Dec 2015, published in ***Blood*** Nov 2016
    - Phase 2: ongoing multicenter, double-blind in Stem Cell Transplant (n=115)
      - Topline (100-day) Data as early as 2H2017
    - Additional Indications in CMV, Oncology

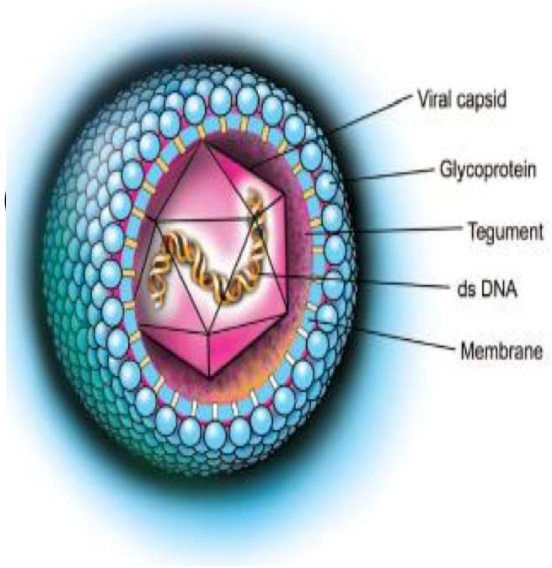
- Well-Defined, Orphan Disease Markets with Significant Unmet Medical Need
- Biologic & Orphan Exclusivity, Robust IP Portfolio for Triplex
- Significant Grant Funding (NCI, ACTG, NHLBI), $2.5B+ Proxy (Chimerix)

Development Pipeline

Novel Immunotherapies For Common Virus

- CDC estimates 50-80% infected with Cytomegalovirus (CMV) by age of 40
  - Easily transmitted: saliva, urine, and in utero
  - Life-long infection, asymptomatic in healthy individuals

- Life-Threatening in Those With Weak Immune Systems
  - Allogeneic Hematopoietic Stem Cell Transplant Recipients
  - Allogeneic Solid Organ Transplant Recipients ("SOT")
  - Developing Fetus or Newborn Children



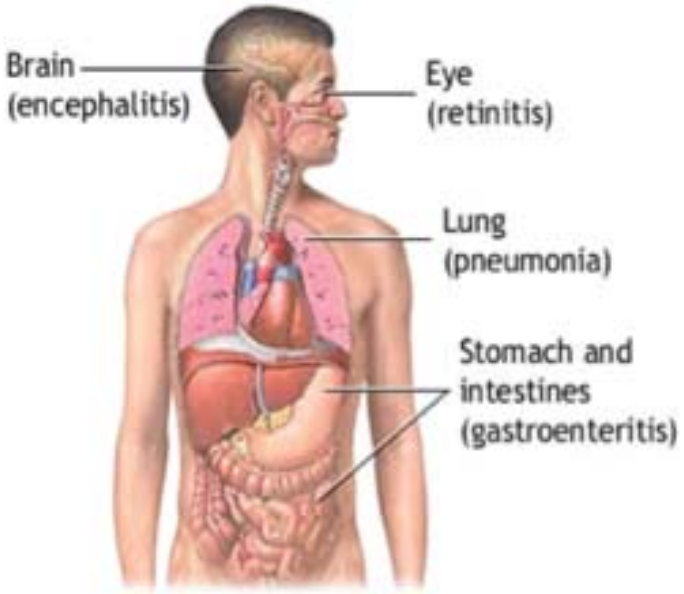
- Standard of Care: highly toxic, moderately effective antivirals

- Helocyte Vaccines
  - T Cell Response to Control CMV in Transplant Recipients
  - Antibody Response to Prevent CMV in Newborn Children

Complications of Cytomegalovirus

Direct Effects

- Viral Syndrome
  - Fever, malaise, myalgia, leukopenia, thrombocytopenia
- Tissue Invasion (End Organ Disease)
  - Hepatitis, colitis, nephritis, pancreatitis, retinitis, encephalitis, pneumonia (most serious)
- Other
  - Bacteremia, fungemia, Graft Versus Host Disease ("GvHD")



Occurrence

- Early and late after allogeneic HSCT and SOT (kidney, liver, heart, lung, pancreas and intestine)
- At birth upon transmission from mother to fetus

PepVax Overview

- HLA-Restricted (Single-Antigen) CMV Vaccine: Treats ~35% of Patients with matched HLA type (cell marker)
- Mechanism: T cell Response to Primary CMV Protein, pp65
- Indication: CMV Control in Post-Transplant Setting
- Phase 1 in 63 Healthy Volunteers **(COMPLETED)**
  - Safe, Well-Tolerated at all Dose Levels
  - Robust, Durable Immunogenicity
- Phase 1b in 36 Patients **(LANCET 12/2015)**
  - Safe, Well-Tolerated
  - Highly Immunogenic, Efficacious
- Multicenter Phase 2 in 96 Patients **(ENROLLING)**
  - Topline (100-Day) Data by 1H2018
  - NCI Funding: ~$5M

PepVax Clinical Experience

	Design	Dosing Schedule	1˚ Endpoint	2˚ Endpoint
Phase 1 Dose Escalation Study (Completed)	• Single-Center (City of Hope) Dose Escalation in 63 healthy volunteers (CMV +/-) • Two T-helpers tested: PADRE and TETANUS +/- TLR9 Agonist	• Four SC doses (1 x 3 weeks) • Dose Levels: 0.5mg, 2.5mg and 10mg vaccine	• Safe, well-tolerated, less AEs with TET *AEs: injection site reactions, flu-like symptoms*	• ↑ pp65 CD8+ T-cells
Phase 1b Pilot Study in Patients (Completed, Published in *The Lancet*)	Single-Center (City of Hope) Study in 36 Allogeneic HSCT CMV(+)Recipients Randomized (1:1) between Vaccine Arm (VA) and Observation Arm (OA)	Two Subcutaneous Vaccinations After Transplant: • Day 28 • Day 56	• Overall Safe and Well-tolerated ***Published in The Lancet Haematology (12/28/2015)***	• Increase in CD8+ T-cells • **Reduced CMV Reactivation** ***6% vs. 33%, p=0.044*** • **Reduced Relapse** ***6% vs. 28%, p=0.015*** • **Reduced Death** ***0 vs. 39%***
Phase 2 (Enrolling As Of 07/2015)	Multi-Center, Double-Blinded Study in 96 Allogeneic HSCT CMV(+) Recipients Randomized (1:1) between Vaccine Arm and Observation Arm	Two Subcutaneous Vaccinations After Transplant: • Day 28 • Day 56	CMV Reactivation through Day 100 as monitored by PCR	• Immune Response • Viremia Duration • Antivirals Use • Frequency of Relapse

PepVax: 1st Vaccine To Control CMV

- **Phase 1b in 36 Stem Cell Transplant Recipients: published with editorial (12/2015)**
  - Vaccine-induced T cell response correlates with CMV control
  - Balanced Disease Risk Index (survival predictor), immunosuppression between arms

	Vaccine (n=18)	Observation (n=18)	p
Patients with serious adverse events	4 (22%)	9 (50%)	0·16*
Patients with serious adverse events related to vaccine	1	NA	..
Grade 3–4 adverse events	54	91	0·2†
Patients with acute GVHD 28 days after HCT	..	..	0·74†
Grade I	1 (6%)	1 (6%)	..
Grade II	6 (33%)	5 (28%)	..
Grade III–IV	0	0	..
Disease relapse	1 (6%)	5 (28%)	0·015
Death	0	7 (39%)	..
CMV viraemia (≥500 gc/mL)	1 (6%)	6 (33%)	0·044*‡
CMV disease (gastrointestinal)	1 (6%)	1 (6%)	0·76*‡
Duration of pre-emptive CMV treatment (days)§	15	263	0·015†‡

Data are number (%). p values are two-sided, unless otherwise stated. Patients were followed up for at least 180 days after HCT, or until May 31, 2015. CMV=cytomegalovirus. gc=genomic viral copies. GVHD=graft-versus-host disease. HCT=haemopoietic cell transplantation. NA=not applicable. *Fisher's exact test. †Rank-sum test. ‡One-sided test. §≥500 gc/mL CMV viraemia.

Table 2: **Selected safety outcomes**

Triplex Overview

- Universal (Multi-Antigen) CMV Vaccine:
  - Suitable for use in ~100% of Patients
- Mechanism: T cell Response to Three Immuno-Dominant CMV Proteins:
  - pp65 (like PepVax) *in addition to* IE1 & IE2
- Indication: CMV Control in Post-Transplant, Oncology
- Phase 1 in 24 Healthy Volunteers
  - Safe, Well-Tolerated at Three Dose Levels
  - Robust, Durable Immunogenicity
  - Presented at **ASH** (12/2015)
  - Published in **BLOOD** (11/2016)
- Multicenter Phase 2 in 115 Patients **(ENROLLING)**
  - Topline (100-Day) Data by 1H2018
  - NCI Funding: ~$3M

Triplex Clinical Experience

	Design	Dosing Schedule	1˚ Endpoint	2˚ Endpoint(s)
Phase 1 (Completed, Published in *Blood*)	Single-Center (City of Hope) Dose Escalation (three levels) in 24 Healthy Volunteers (CMV +/-)	• Two IM injections four weeks apart	• Safe and Well-Tolerated in All Dose Cohorts ***Presented at ASH (December 2015)*** ***Published in Blood (November 2016)***	• ↑ pp65-, IE1-, IE2- specific CD8 and CD4 T-cells *Particularly pronounced increase in T-cells in those with low baseline levels*
Phase 2 (Enrolling As Of 11/2015)	Multi-Center, Randomized (1:1), Double-Blinded Study in 115 Allogeneic HSCT CMV(+) Recipients	Two IM Vaccinations After Transplant: • Day 28 • Day 56	CMV Reactivation through Day 100 as monitored by PCR	• Immune Response • Viremia Duration • Late Viremia • Antivirals Use

Triplex: 1st Universal Multi-Antigen CMV Vaccine

- **Phase 1 Data: Presented @ ASH (12/2015), Published in *Blood* (11/2016)**
  - 24 Healthy Volunteers (3 Dose Levels)
  - Safety: well tolerated, no SAE or dose-limiting tox
  - Immunogenicity: robust, durable T cell response observed even in:
    - CMV-negative subjects with no prior immunity (Most At-Risk in SOT)
    - CMV-positive subjects with low baseline immunity (Most At-Risk in HSCT)

ASH 57th Annual Meeting & Exposition
Orlando, FL • December 5-8, 2015

3108 Safety, Maximum Tolerated Dose and Immunogenicity of CMV-MVA-Triplex in Healthy Volunteers with or without Prior Immunity to CMV and Vaccinia

Clinical Allogeneic Transplantation: Conditioning Regimens, Engraftment and Acute Transplant Toxicities
Program: Oral and Poster Abstracts
Session: 721. Clinical Allogeneic Transplantation: Conditioning Regimens, Engraftment and Acute Transplant Toxicities: Poster II

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Safety, Maximum Tolerated Dose and Immunogenicity of CMV-MVA-Triplex in Healthy Volunteers with or without Prior Immunity to CMV and Vaccinia

Don J. Diamond, Corinna La Rosa, Jeffrey Longmate, Joy Martinez, Qiao Zhou, Theodora Kaltcheva, Jennifer Drake, Mary Carroll, Sanjeet Dadwal, Ibrahim Aldoss, Ryotaro Nakamura and John A. Zaia

Blood 2015 126:3108;

Immunogenicity: PepVax, TransVax, Triplex

- PepVax *versus* TransVax (in patients)
  - Difference in pp65 CD8 T Cells Between Placebo, Vaccine Arms
    - TransVax: Phase 2, n=80 (p=0.232), *no difference*
    - PepVax: Phase 1b, n=36 (p=0.0018), *significant different*
    - *PepVax elicited ~5.2x more pp65 CD8 T Cells vs TransVax*
- PepVax versus Triplex (in healthy volunteers)
  - *2 Injections of Triplex elicited Median Number of pp65 CD8 T Cells 27x higher than 2 Injections of PepVax*
    - *Immunogenicity of PepVax sufficient to control CMV (Lancet, Phase 1b)*
  - Triplex further elicited IE1- and IE2- specific T cell responses
    - Neither IE1 or IE2 targeted by TransVax or PepVax

Pentamer Vaccine for Congenital CMV

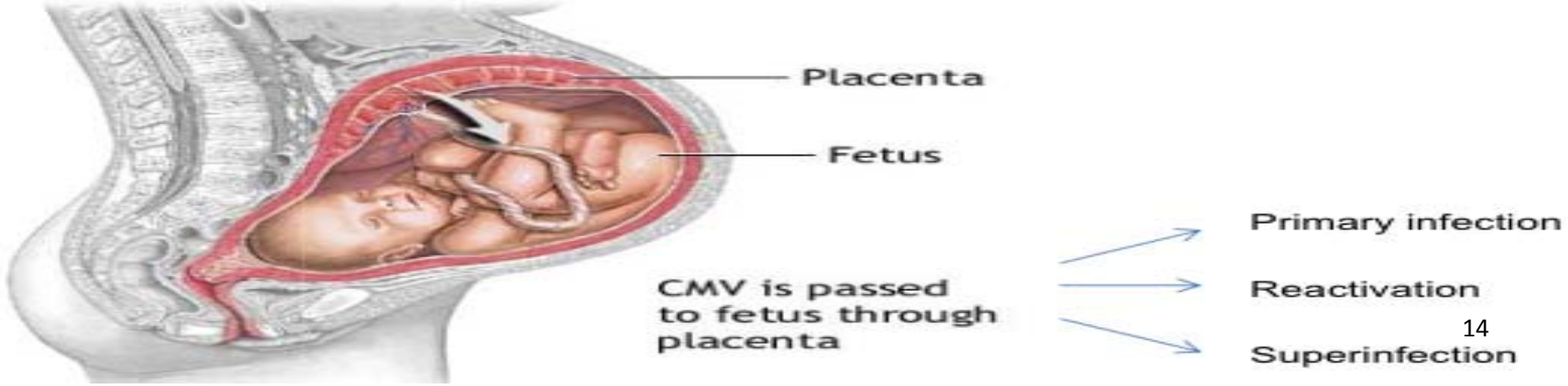
- CMV Most Common Congenital Infection: 0.5%-2% of all pregnancies (38K in US / year)
  - Institute of Medicine ranks new vaccine as “Highest Priority”
  - Severe Complications (10-15%): hearing loss, mental retardation, retinitis
- Prevention in utero requires humoral (NAb) response (vs. cell-mediated for HSCT, SOT)
- Expected Clinical Trials: Phase 1 Planned 2019

The New York Times

HEALTH

CMV Is a Greater Threat to Infants Than Zika, but Far Less Often Discussed

By CATHERINE SAINT LOUIS OCT. 24, 2016



Congenital CMV Pipeline

Company	Target	Status
Hookipa	gB, pp65	Phase 1, $30M+ Raised
VBI	gB (VLP)	Phase 1, $30M+ Raised
RedVax	Pentamer (VLP)	Pre-Clinical; Acquired by Pfizer in 2015 (undisclosed amount)
Novartis	Pentamer & gB (antibody)	Phase 1
Merck	Pentamer (rAD169)	Phase 1

Standard of Care, Potential Sales

- **Antivirals: Standard of Care for CMV Control in Post-Transplant Setting**
  - Moderately effective, highly toxic (*Black Box Warning*)
  - Mechanism: merely suppress CMV during treatment
    - Don't educate immune system to fight CMV
    - Delay immune reconstitution, resulting in "late CMV"
  - Preemptive (~$25K per course): upon CMV detection
  - Prophylactic (~$40K per course): upon transplant
  - Overall Burden: $58K to $74K per patient (Jain, Cytotherapy 2014)

Indication	US Incidence	EU Incidence
CMV in Allogeneic Stem Cell Transplant	**~8,000**	**~15,000**
CMV in Allogeneic Solid Organ Transplant	**~15,000**	**~15,000**

- **Potential Sales for CMV Vaccine in Post-Transplant (@$50K/course): >$2.5B**

IP & Market Exclusivity

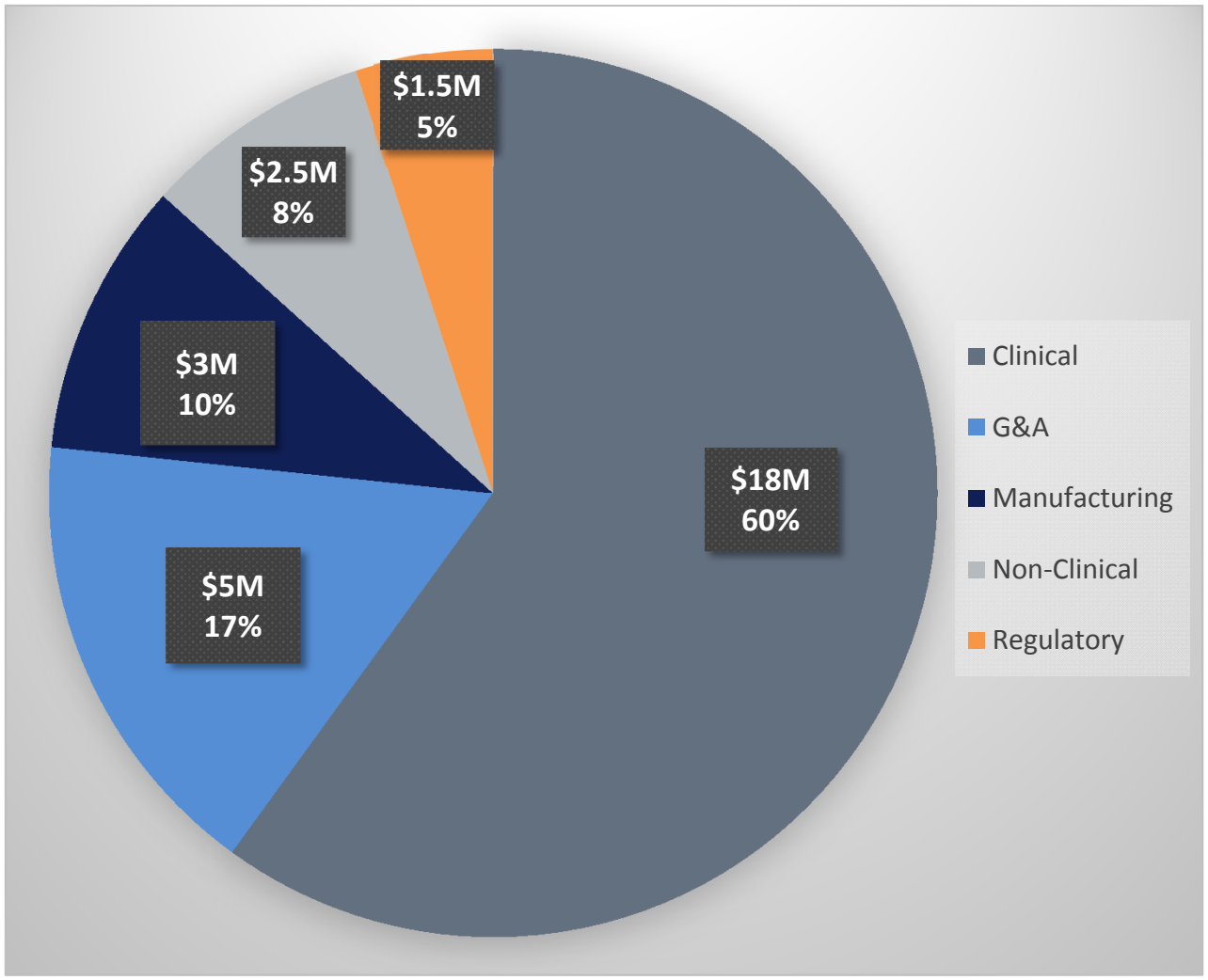
- Regulatory (Applicable to all Helocyte Programs)
  - Orphan Market Exclusivity (from approval): 7 Years (US), 10 Years (EU)
  - Biologic Market Exclusivity (from approval): 12 Years (US), 11 Years (EU)

- Triplex IP
  - HCMV Antigens Expressed in MVA, Methods (7,163,685), expires 2024
  - rMVA Vaccines and Methods of Prep Thereof (14/075,975), expires 2030
  - rMVA Vaccines and Methods of Prep Thereof (8,580,276), expires 2031
  - Other applications relating to MVA construct extend protection to 2033
  - Patent Term Adjustment, Patent Term Extension possible

- Pentamer IP
  - MVA Vaccine UL128 Complex, Methods (PCT/US2013/32554)

Total Budget (Thru ~1H2019): ~$30M*

**$4M already paid, supplementing ~$8M in NCI funding*



Clinical Development
Triplex: HSCT (P2), SOT (P2), AIDS (P2), GBM (P2)
PepVax: HSCT (P2)
Pentamer: Phase 1

Read-Outs By 1H2019:
- PepVax Phase 2 in HSCT
- Triplex Phase 2 in HSCT
- Triplex Phase 2 in SOT?
- Triplex Phase 2 in HIV?

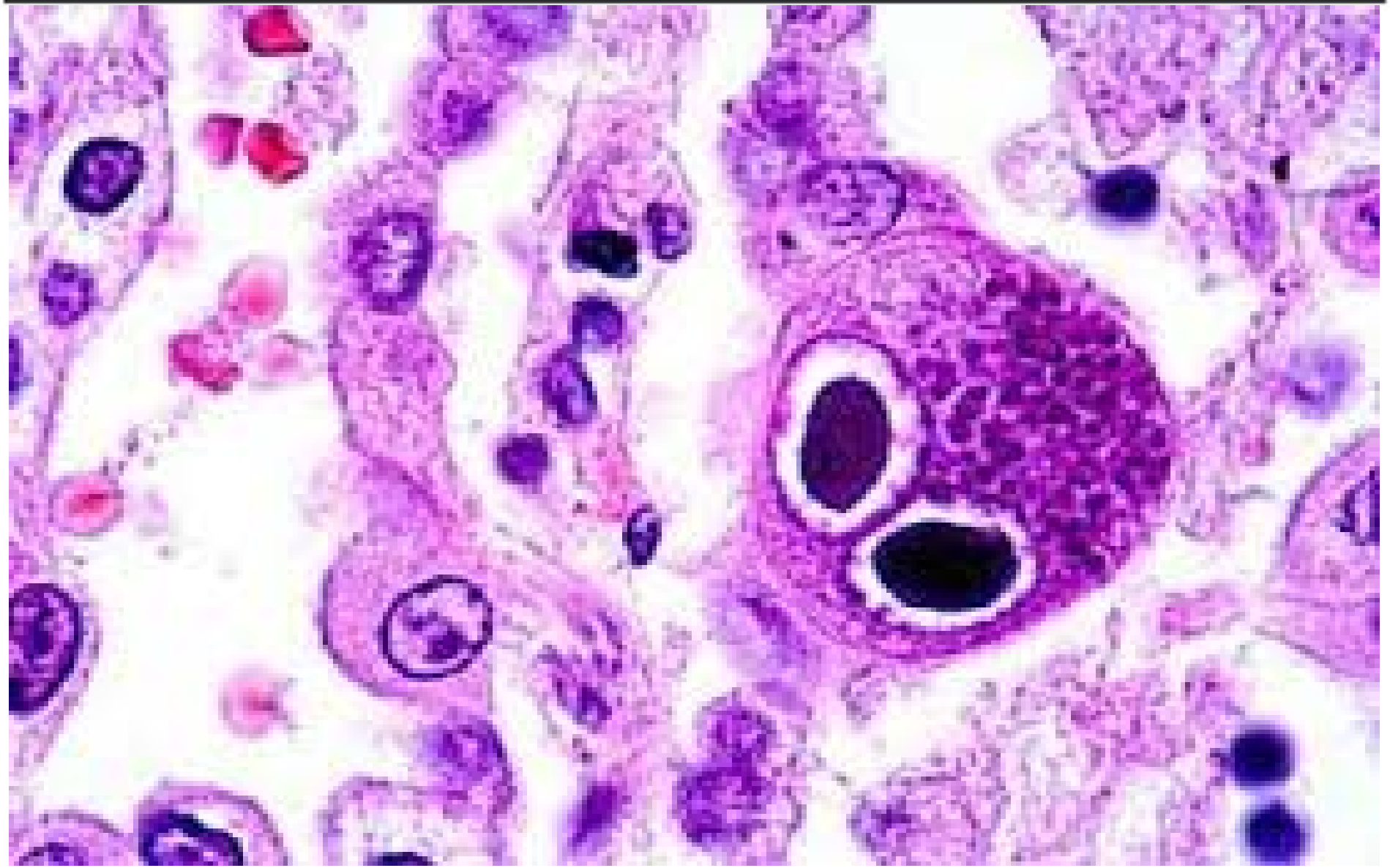
Supplementing Grant Funding To Accelerate Outcomes and Enhance Quality of Data

Investment Considerations

- Novel Biologic Immunotherapies Targeting $Billion Orphan Markets
- PepVax (HLA-Restricted, Single Antigen): 1st Vaccine to Control CMV
  - Phase 1b Showed Safe, Immunogenic, Effective (Published in ***Lancet***)
- Triplex Universal, Multi-Antigen CMV Vaccine
  - Phase 1 Showed Safe, Immunogenic (Published in ***Blood***)
- Far Less Toxic, More Durable Alternative to Standard of Care (antivirals)
- Data in 12-24 months from two Phase 2 Studies
- Significant Grant Funding: Reduces Capital Requirements, Validates Approach
- Seasoned Management Team, Supplemented by Shared Services of Parent Co

For More Information, Contact:
Frank Taffy, Co-Founder, President, CEO, Board Member
frank@helocyte.com

Backup Slides



Leadership

Fortress Biotech Management	
Lindsay A. Rosenwald, M.D. Executive Chairman	20+ years experience Life Sciences Entrepreneur and Investor
Michael S. Weiss, J.D. Executive Vice Chairman	20+ years experience Life Sciences Entrepreneur and Investor

Helocyte Management	
Lindsay A. Rosenwald, M.D. Co-Founder and Executive Chairman	20+ years experience Life Sciences Entrepreneur and Investor
Frank Taffy, J.D. Co-Founder, President and Chief Executive Officer	15+ years experience **Forest Labs:** former Head of Business Affairs
David J. Horin, C.P.A. Interim Chief Financial Officer	15+ years experience **Chord Advisors:** Managing Partner
Elizabeth Moore, M.S. Consultant Regulatory Affairs	30+ years experience **Pfizer La Jolla**: former Head of Regulatory Affairs

Helocyte Board of Directors
Lindsay A. Rosenwald, M.D. Executive Chairman
Michael S. Weiss, J.D. Director
Kenneth W. Cappell, M.B.A. Director
Frank Taffy, J.D. Director

Helocyte Scientific Advisory Board	
Don J. Diamond, Ph.D. Co-Founder and Chairman of Scientific Advisory Board	**City of Hope**: Chair of Experimental Therapeutics
Four Additional SAB Members Appointments To Be Disclosed Soon	TBA

Helocyte Leadership

Lindsay A. Rosenwald, M.D., Executive Chairman of the Board of Directors

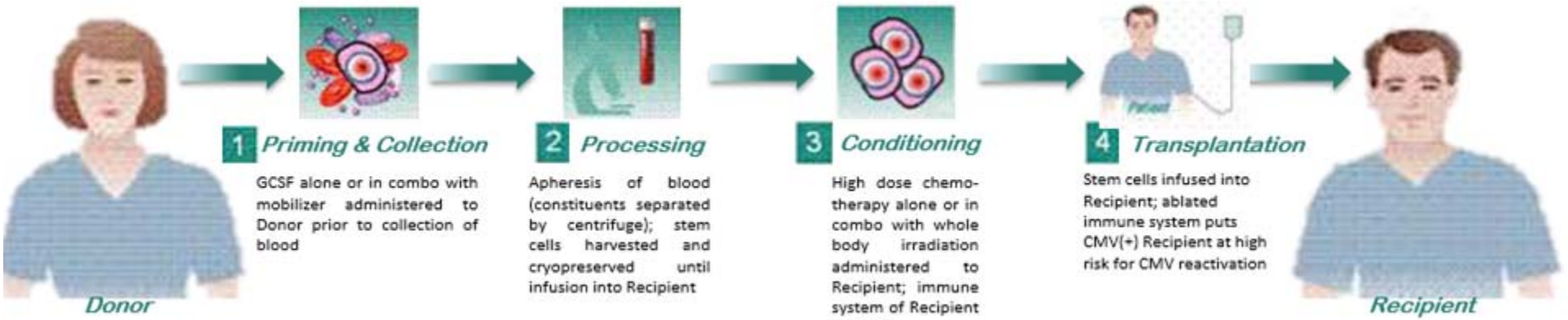
- Served as Executive Chairman of the Board of Directors of Helocyte since inception
- Member of the Board of Directors of Fortress since October 2009
- Served as Chairman, President and Chief Executive Officer of Fortress since December 2013
- Co-Portfolio Manager and Partner of Opus Point Partners LLC, which he co-founded in 2009
- Served as the Chairman of Paramount BioCapital, Inc. from 1991 to 2008
- Over the last 23 years, acted as a biotechnology entrepreneur, involved in the founding and recapitalization of numerous public and private biotechnology and life sciences companies
- Received his B.S. in finance from Pennsylvania State University and his M.D. from Temple University School

Frank Taffy, J.D., Co-Founder, President, Chief Executive Officer and Director

- Served as President and Chief Executive Officer of Helocyte since June of 2015
- More than fifteen years of experience in life sciences corporate development and business operations
- Identified Helocyte programs, co-founded company during role as Entrepreneur in Residence at Fortress
- Previously held the positions of Head of Business Affairs at Forest Labs (now Allergan Plc) and Director of Corporate Development at Life Technologies (now Thermo Fisher Scientific), where he also held Board positions
- Served as Vice President and General Counsel of Paramount Biosciences LLC
- Started career as Counsel for Intellectual Property at The Procter and Gamble Company
- Holds a B.A. in biochemistry from University of North Texas and a J.D. from Syracuse University College of Law

CMV in Hematopoietic Stem Cell Transplant (HSCT)

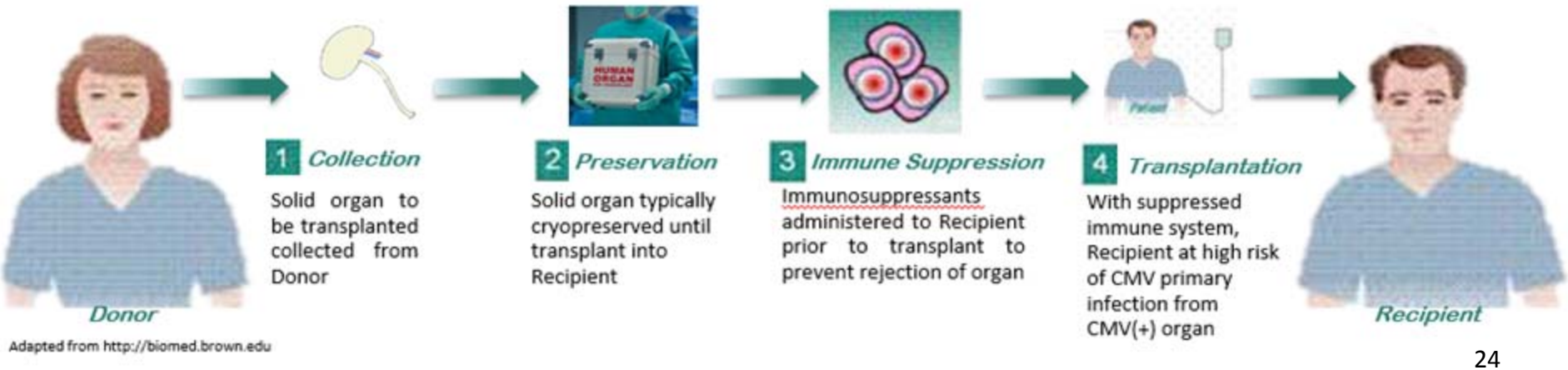
- Hematopoietic Stem Cell Transplant
  - Leading therapy for hematological malignancies (*e.g.,* chronic and acute leukemias)
  - Trend towards increased use (particularly in EU) as outcomes improve
  - Allogeneic: stem cells transplanted from healthy Donor
- Process (Two Stages)
  - Conditioning: prior to transplant; high-dose chemo +/- radiation
    - Ablates bone marrow, cells needed to fight infection (CMV)
    - Immunosuppressants often administered to prevent rejection of graft, GvHD
  - Engraftment: occurs two to four weeks after transplant
    - Stem cells travel to bone marrow, produce WBCs, RBCs, platelets
    - Recovery of immune function can take 1-2 years in allogeneic HSCTs
- CMV Reactivation
  - Rate: ~40% between Days 40 and 100 after transplant; ~15% after Day 100 ("late CMV")
  - Most at Risk: seropositive allogeneic Recipient (R+), regardless of Donor status (D+/-)



Adapted from http://biomed.brown.edu

CMV in Solid Organ Transplant (SOT)

- Solid Organ Transplant
  - Allogeneic Recipients receive immuno-suppressants to prevent organ rejection, GvHD
- Process
  - Organ collected from Donor and cryopreserved until transplantation
  - Preserved, allogeneic organ transplanted into immunosuppressed Recipient
- CMV Infection
  - Rate: ~70%, most common infection after allogeneic SOT
    - Most at Risk: seropositive Donor (D+), seronegative Recipient (R-); results in primary infection
    - Risk Factors: size of organ transplanted (viral load); level of immunosuppression (type, dose)



Adapted from http://biomed.brown.edu

Triplex: MVA as Delivery Vehicle

- Vaccinia strain *Ankara* passaged 570x in CEF (re-named Modified Vaccinia *Ankara)*
  - Propagates only in CEF but replicates DNA and prolific expression in eukaryotes
  - Head-head comparison to ALVAC™ shows superior immunogenicity
    - *Zhang et al, JVi 2007*

- Human MVA studies conducted in Germany in 1970's
  - 120K+ individuals (children, elderly) vaccinated
  - No significant adverse events reported

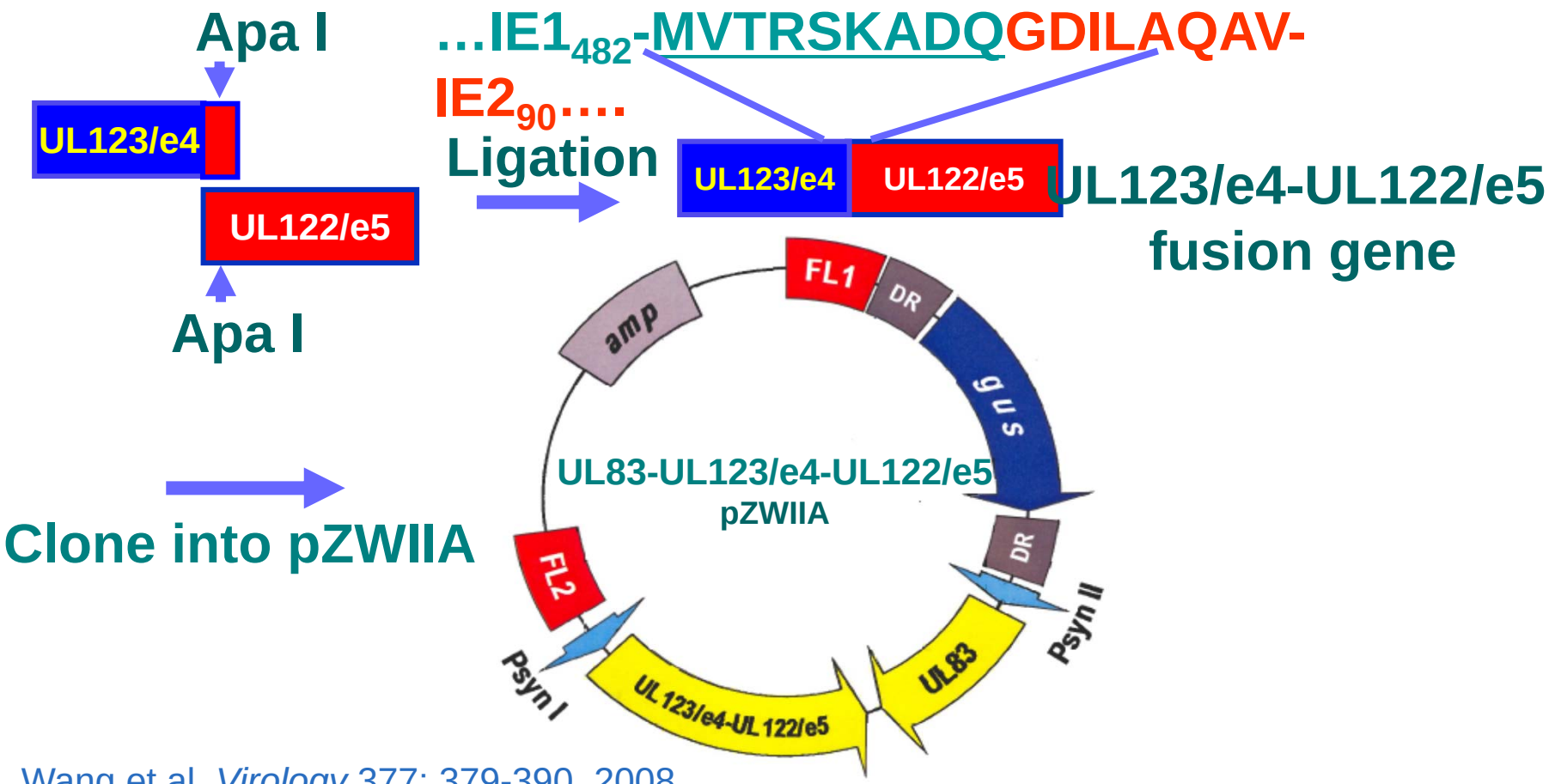
- Recent study by VRC shows safety in healthy vaccinia naïve and immune adults

- European study shows safety after immunization in HIV-infected adults

- Pre-clinical studies in R. macaques shows no propagation, pathogenesis in immunosuppressed animals

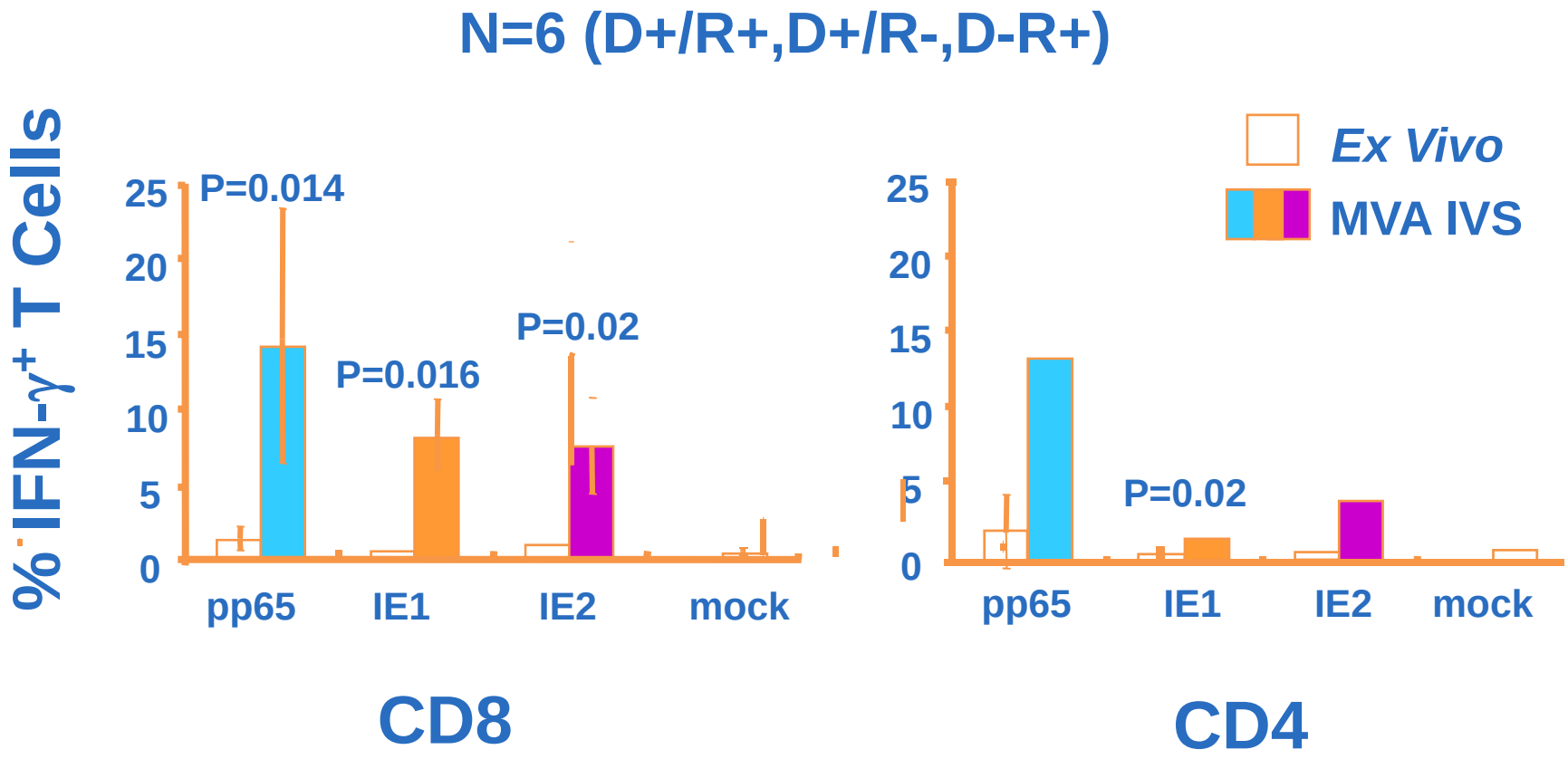
- PK studies shows rapid disappearance of the viral DNA within 6 weeks of administration

Triplex: Construction of UL123/e4-UL122/e5 Fusion Gene, Cloning into pZWIIA



Wang et al, *Virology* 377: 379-390, 2008

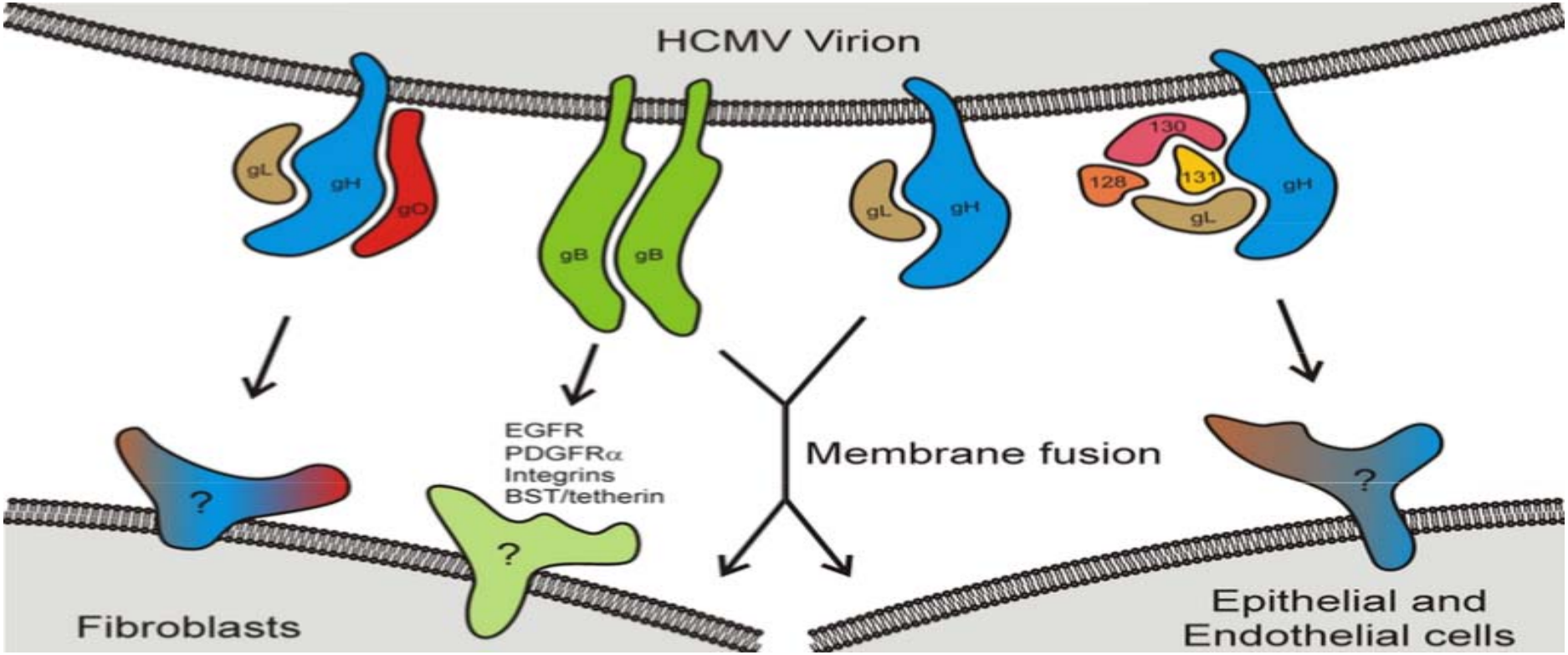
IVS of PBMC with Triplex from d180 Patients Induces Multi-Antigen CD8/CD4 Response



Wang et al, *Vaccine*, 2010

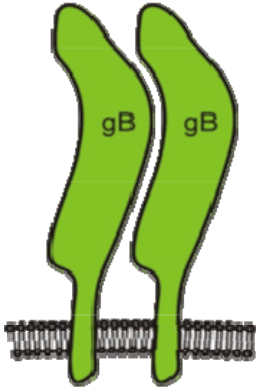
Congenital CMV: Pathway

- Two Pathways for Host Cell Entry
  - Fibroblasts: requires glycoprotein B (gB), focus of development efforts to-date
  - Epithelial, Endothelial Cells: requires pentamer complex (gH/gL/UL128/UL130/UL131A)

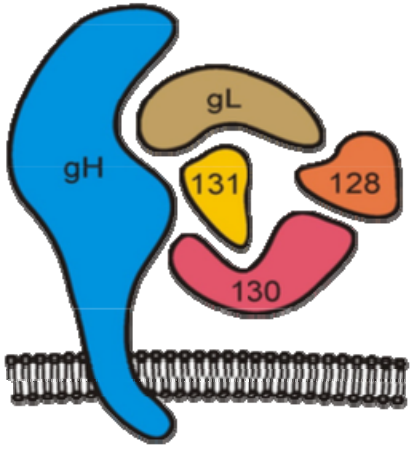


Congenital CMV: Pathway (*cont.*)

- Glycoprotein B (gB)
  - Essential for Virus Entry into Host Fibroblasts
  - Target of Neutralizing Antibodies (NAbs)
  - Fusion protein of, and triggered by, Glycoprotein H (gH)
  - Recombinant gB Subunit Vaccine (Sanofi)
    - Only ~50% Efficacy in Preventing Primary Infection



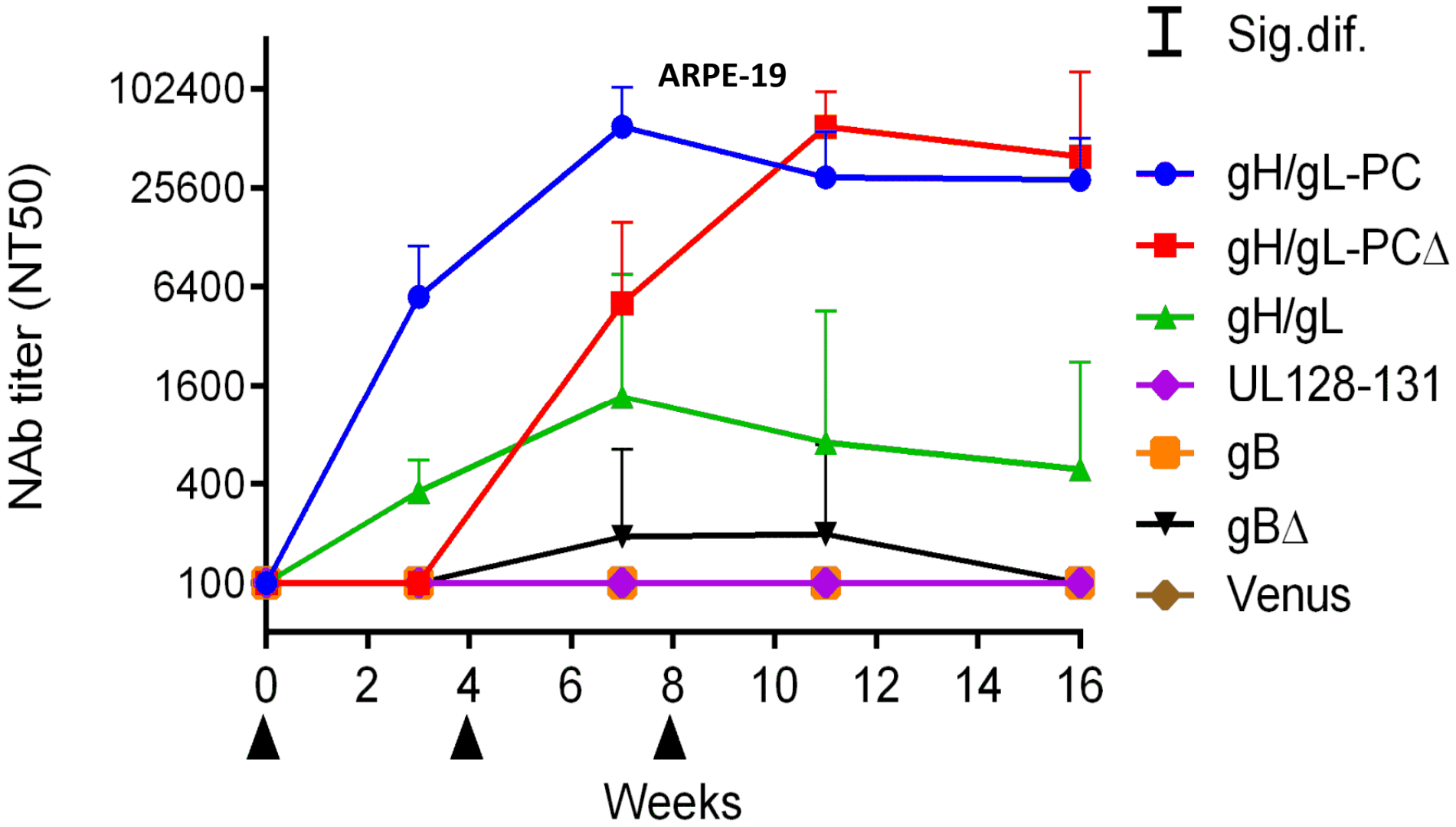
- gH/gL complex (gH/gL-PC)
  - Pentamer (gH, gL, UL128, UL130, UL131)
  - Allows Entry into Epithelial/Endothelial Cells (Epi/EC)
  - Major target of NAbs
  - Absent in Lab Strains (68.1, AD169, Towne)



Pentamer Vaccine for Congenital CMV

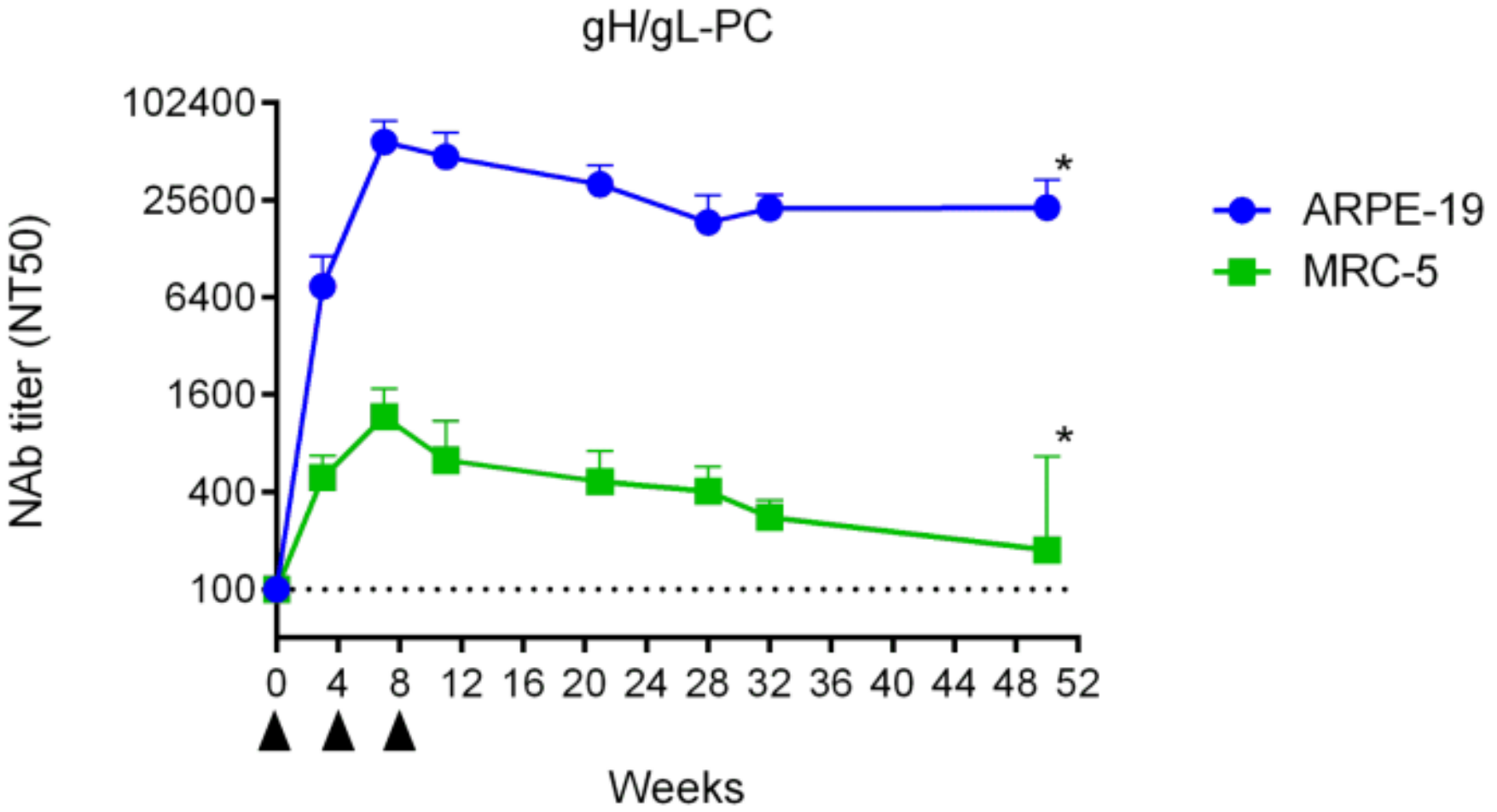
PRODUCT CANDIDATE	➢ Universal NAb vaccine; treats ~ 100% of patients ➢ First recombinant viral vector vaccine for congenital CMV incorporating all five HCMV gH/gL-PC subunits
CONSTRUCT and MOA	➢ Construct: Modified Vaccinia Ankara (MVA) vector expressing five primary subunits of human CMV (gH/gL/UL128/UL130/UL131A) • MVA: highly attenuated; safe & immunogenic poxvirus • Rapid assembly of pentamer complex using BAC technology ➢ MOA: induction of neutralizing antibodies (NAbs) to pentamer complex to prevent CMV entry to fetus through Fibroblasts, Endothelial / Epithelial Cells
TARGET INDICATIONS	➢ Prevention of CMV Transmission from Mother to Fetus
DEVELOPMENT STATUS	➢ Robust and Durable NAbs Generated in Mice, Rhesus Macaques ➢ Rhesus NAbs Prevent HCMV Entry into Epithelial Cells, Fibroblasts
NEXT STEPS	➢ Pre-IND Meeting: Planned 2018

Pentamer Stimulates Superior Murine NAbs: Inhibits HCMV Infection of Epithelial Cells



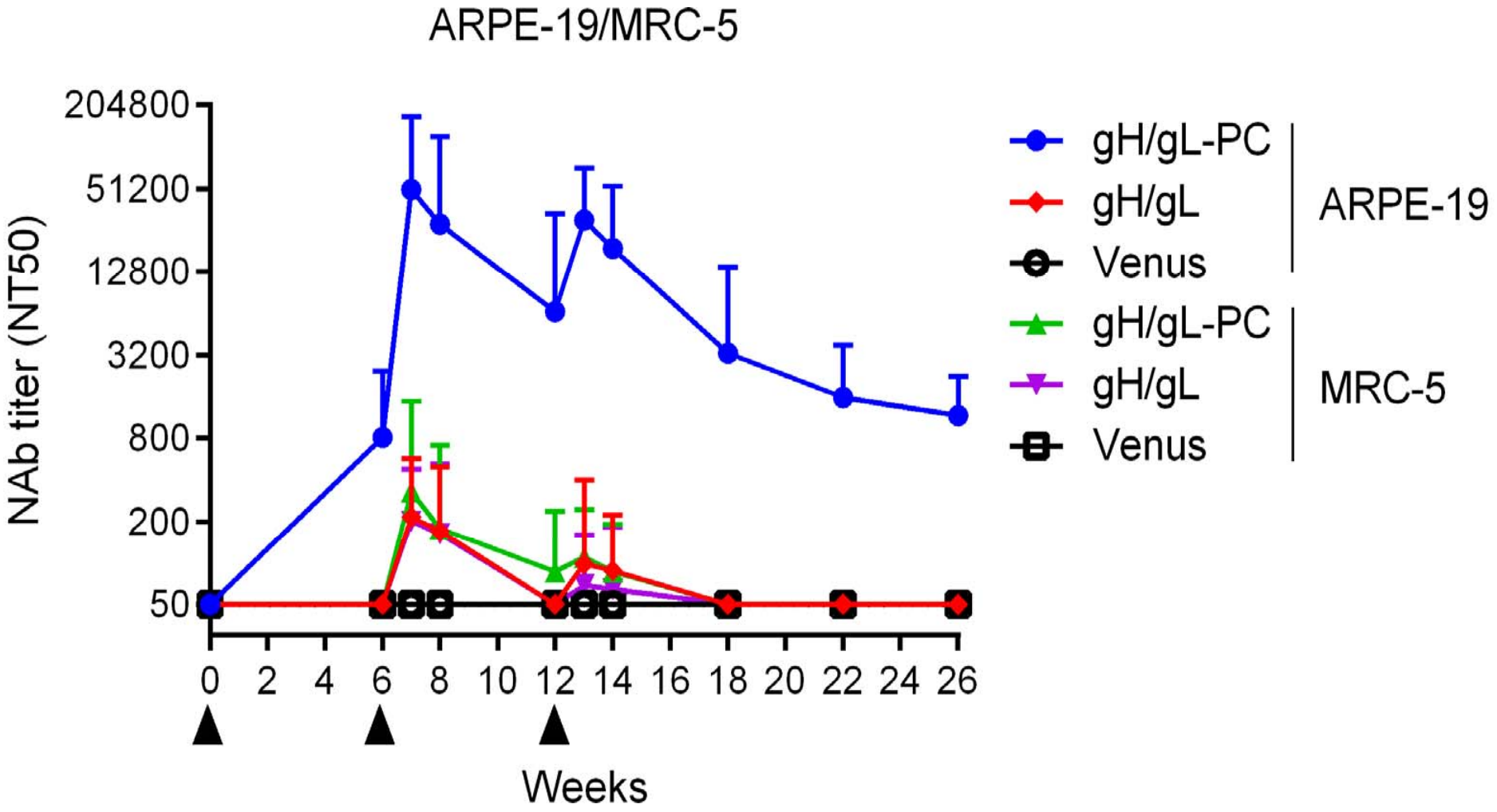
Wussow et al, PLOS Pathogens, 2014

Durability of Pentamer-Induced Murine NAbs



Wussow et al, PLOS Pathogens, 2014

Pentamer Stimulates Superior Rhesus Macaques NAbs: Inhibits HCMV Infection of Epithelial Cells, Fibroblasts



Wussow et al, PLOS Pathogens, 2014