



Programmed Cellular Immunotherapies

Corporate Overview

May 2017



Forward-Looking Statements

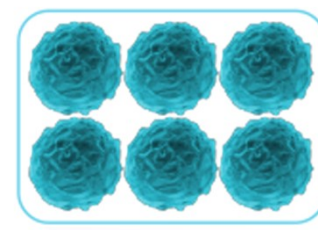
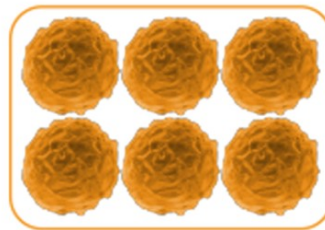
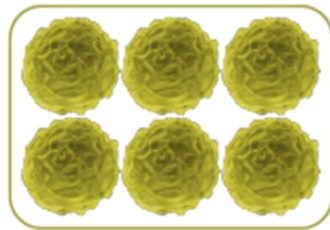
This presentation contains “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995, including statements regarding the therapeutic and market potential of the Company’s product candidates and engineered pluripotent cell platform, the Company’s advancement of and plans related to its product candidates, clinical and preclinical studies, research, manufacturing and partnerships, the Company’s progress and plans for its clinical investigation of ProTmune™ and of FATE-NK100, the Company’s expected product registration strategy for ProTmune, including its ability to pursue accelerated registration, the ability of ProTmune to prevent, or reduce the incidence or severity of life-threatening complications, including acute graft-versus-host disease, the Company’s ability to develop off-the-shelf cancer immunotherapies, including off-the-shelf NK- and T-cell immunotherapies from its engineered pluripotent cell platform, and the Company’s projected cash use and expenditures. These and any other forward-looking statements in this presentation are based on management’s current expectations of future events and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those set forth in or implied by such forward-looking statements. These risks and uncertainties include, but are not limited to, the risk of cessation or delay of planned research, development and clinical activities for a variety of reasons (including any adverse events or other results that may be observed during these activities), any inability to develop programmed cellular immunotherapies which are suitable for therapeutic applications, the risk that results observed in prior preclinical and clinical studies may not be replicated in subsequent studies or clinical trials, the risk that programmed cellular immunotherapies that the Company may develop may not produce therapeutic benefits or may cause other unanticipated adverse effects, and the risk that the Company may allocate its financial and other resources to product candidates that ultimately have less therapeutic or commercial potential than other opportunities. These statements are also subject to other risks and uncertainties as further detailed in the Company’s most recently filed Form 10-Q, and subsequent periodic reports filed by the Company under the Securities Exchange Act of 1934, as amended, any of which could cause actual results to differ materially from those contained in or implied by the forward-looking statements in this presentation. The Company is providing the information in this presentation as of the date hereof and does not undertake any obligation to update any forward-looking statements contained in this presentation unless required by applicable law.

Mission



*To develop first-in-class cell-based immunotherapies
for cancer and immune disorders
by programming cell function and fate*

T cells | **CD34⁺** cells | **NK** cells



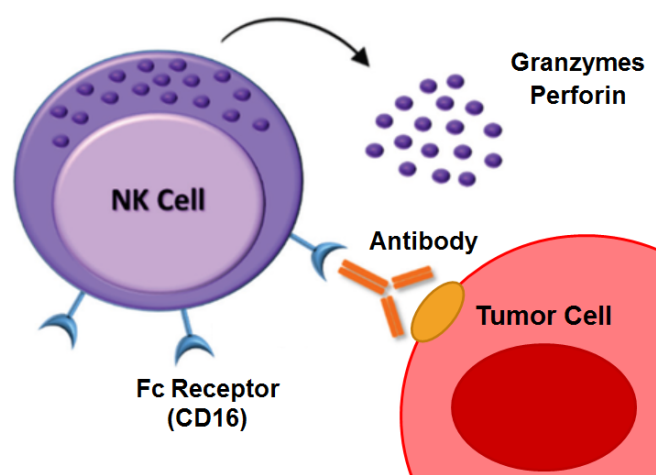
induced Pluripotent Cell Platform
for off-the-shelf engineered immunotherapies

Why Use Cells as the Therapeutic Modality?

Proven Role of Immune Cells in Fighting Cancer



Antibody-Dependent Cellular Cytotoxicity (ADCC)



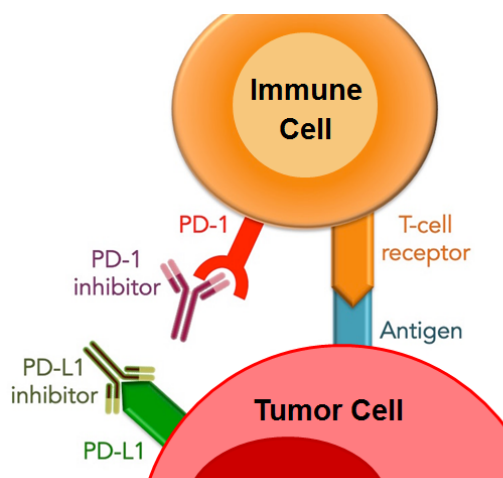
Rituxan®
Rituximab

Herceptin®
trastuzumab

ERBITUX®
CETUXIMAB

DARZALEX®

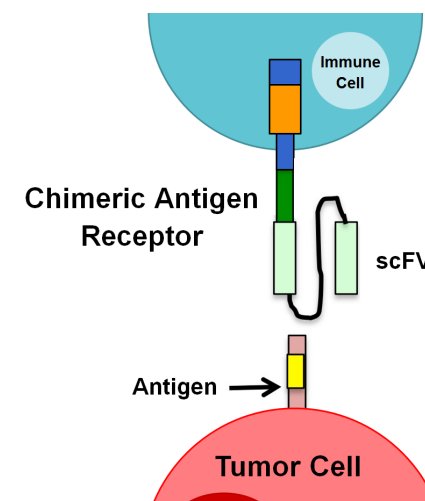
Immune Checkpoint Blockade



OPDIVO™
(nivolumab)

KEYTRUDA®
(pembrolizumab)

Targeted / Activated Cell Products



JUNO
THERAPEUTICS

Kite Pharma

NOVARTIS

Fate
THERAPEUTICS

Indirect

Cell Therapy

Direct

Better Cells for Better Therapies™

Our Approach to Cellular Immunotherapy



Programmed Donor Cell Products



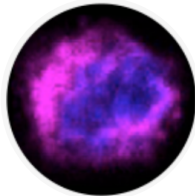
Donors

Cells from healthy donors with
selected traits



Molecules

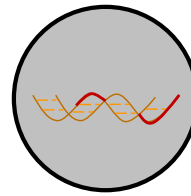
Ex vivo cell modulation to
program biological properties



Cell Products

Cell products programmed for
enhanced therapeutic function

iPSC-derived Cell Products



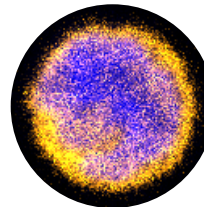
iPSC Cell Line

Renewable pluripotent cell lines
with engineered functionality



Master Bank

Ex vivo expansion / differentiation
to derive clonal cell populations



Cell Products

Off-the-shelf engineered cell
products for 1000s of patients



Pioneering First-in-Class Product Candidates

IMMUNO-ONCOLOGY

- **FATE-NK100 first-in-class adaptive memory NK cell cancer immunotherapy**
 - Multi-faceted anti-tumor activity, persistence and immune checkpoint resistance
 - Broad therapeutic potential across liquid and solid tumors, including with mAbs
 - VOYAGE study ongoing in r/r AML
- **Off-the-shelf NK- and T-cell candidates using renewable engineered iPSC lines**
 - Revolutionary approach to overcome challenges of patient-sourced therapies
 - Platform backed by dominant IP position of 60+ issued patents / 90+ patent applications

IMMUNO-REGULATION

- **ProTmune™ next-generation graft to prevent leading life-threatening HCT complications**
 - Patent-protected, highly-differentiated, easily integrates into current HCT practice
 - Supported by Fast Track and US and EU Orphan Drug Designations
 - PROTECT study ongoing
- **ToleraCyte™ first-in-class immunoregulatory CD34⁺ cell for immune tolerance induction**
 - Novel mechanism of action promotes selective and durable deletion of autoreactive T cells
 - Pre-IND meeting defined clear path to first-in-human testing in adult patients with T1D



Immuno-Oncology Programs

Natural Killer (NK) Cells

Unique Properties & Emerging Role in Cancer Immunotherapy



- **Multi-faceted effector function against tumor cells**
 - Direct killing of tumor cells through release of cytotoxic granules
 - Trigger adaptive immune response (e.g., T cells) through cytokine production
 - Engage and lyse antibody-coated tumor cells through Fc receptor (ADCC)
- **Effector function is not patient specific**
 - NK cell activity is *independent* of antigen recognition (unlike T cells)
 - Unique ability to target stressed / transformed cells, leaving healthy cells unharmed
 - Donor cells can be safely administered without eliciting GvHD
- **Emerging clinical precedent across liquid and solid tumors**
 - Varying degrees of tumor killing across a wide variety of tumor types
 - Improved efficacy in setting of allogeneic adoptive transfer
 - Well-tolerated with low risk of serious adverse events (e.g., CRS, neurotoxicity)



Adaptive Memory NK Cells



Jeffrey S. Miller, MD



UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

Immunity

Volume 42, Issue 3, 17 March 2015, Pages 443–456



Article

Cytomegalovirus Infection Drives Adaptive Epigenetic Diversification of NK Cells with Altered Signaling and Effector Function

Heinrich Schilums^{1,10}, Frank Cichocki^{1,2,10}, Bianca Tes^{3,4}, Jakob Theorell¹, Vivien Beziat¹, Tim D. Holmes¹, Hongya Han¹, Samuel C. C. Chiang⁵, Bree Foley², Kristin Mattsson¹, Stella Larsson⁶, Marie Schaffer⁶, Karl-Johan Malmberg^{1,7,8}, Hans-Gustaf Ljunggren¹, Jeffrey S. Miller², Yenan T. Bryceson^{1,9}

Cancer Research

Microenvironment and Immunology

Adaptive NK Cells with Low TIGIT Expression Are Inherently Resistant to Myeloid-Derived Suppressor Cells

Dhifaf Sarhan, Frank Cichocki, Bin Zhang, Ashley Yingst, Stephen R. Spellman, Sarah Cooley, Michael R. Verneris, Bruce R. Blazar, and Jeffrey S. Miller
DOI: 10.1158/0008-5472.CAN-16-0839 Published 1 October 2016

A specific sub-population of NK cells with adaptive immune and memory-like properties that arises in response to CMV infection

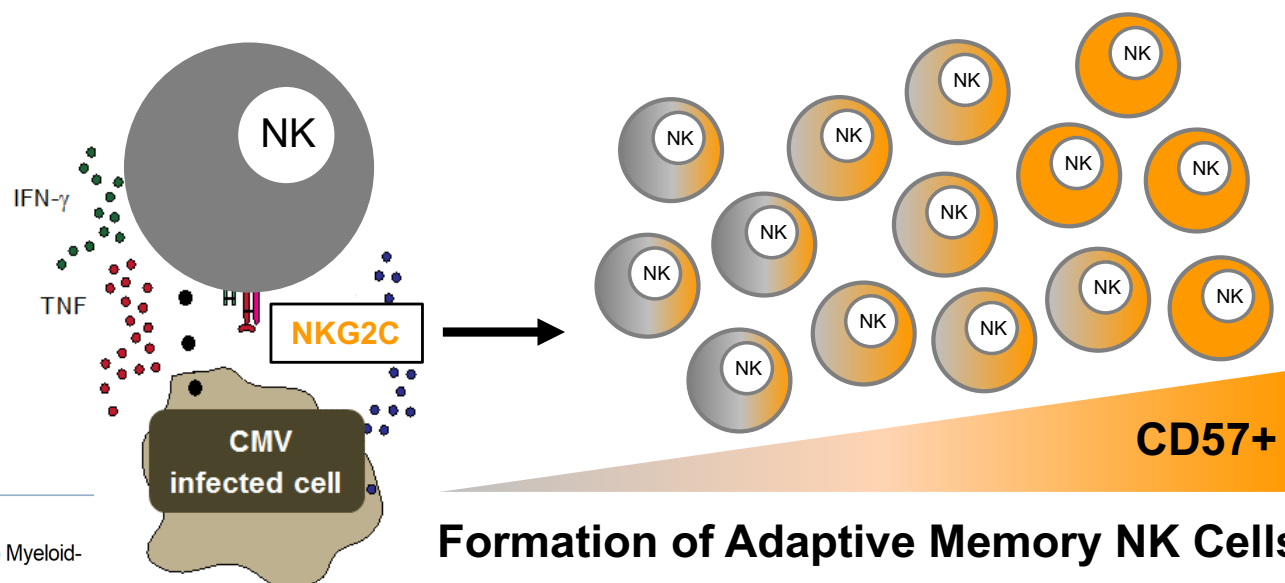
Heightened effector function

Checkpoint resistant

Persistence

CD8+ T cell-like epigenetic profile

Clonal expansion



Formation of Adaptive Memory NK Cells
(5 - 10% of Total NK Cells)

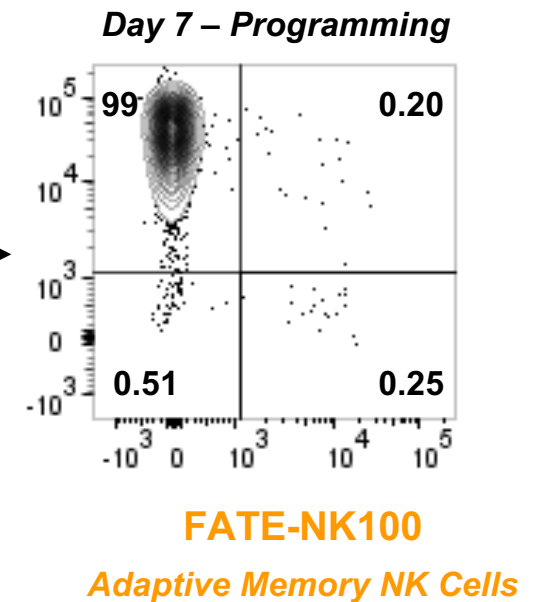
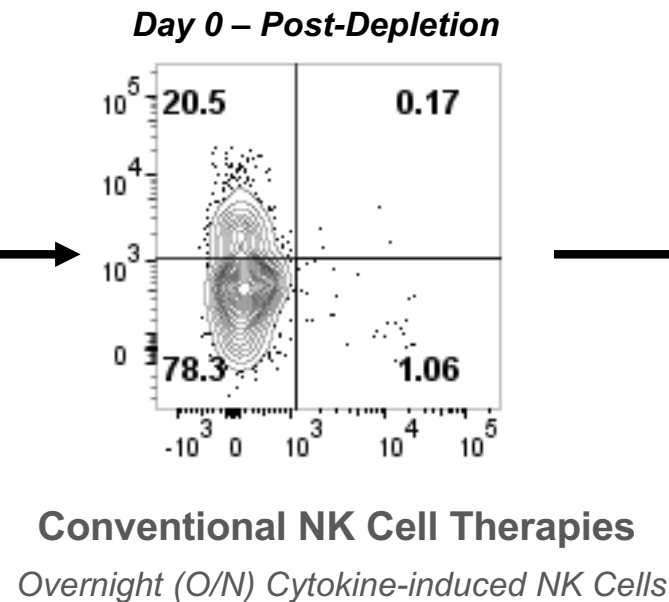
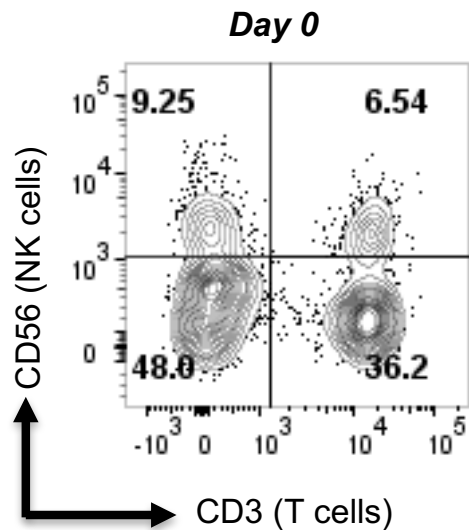
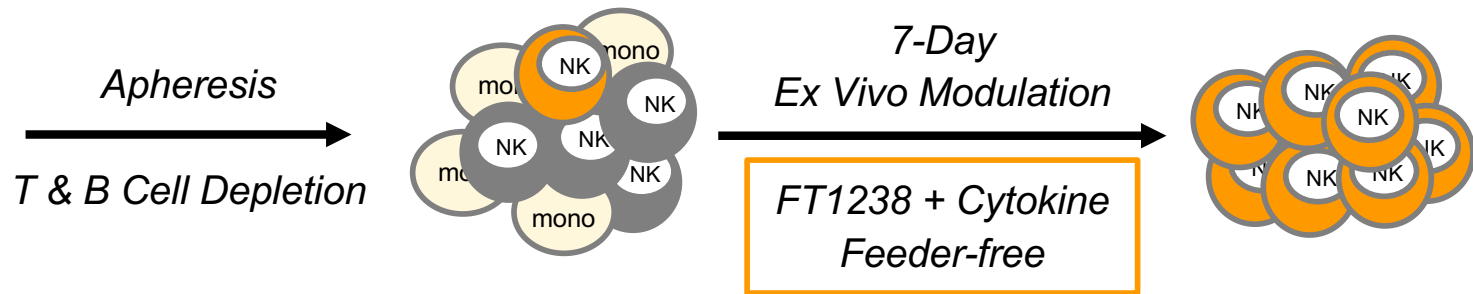
Correlated with reduced relapse risk and superior disease-free survival in HCT

FATE-NK100

Realizing the Potential of Adaptive Memory NK Cells



CMV+ Donor

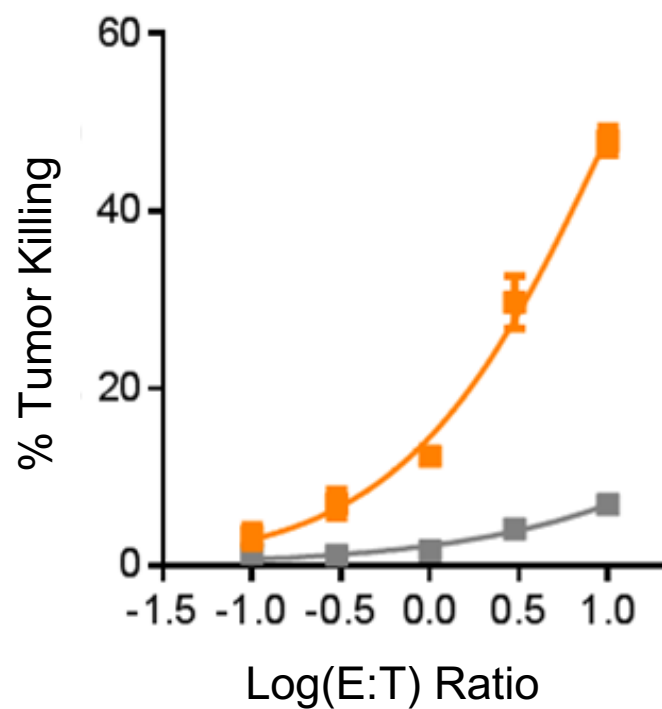


FATE-NK100

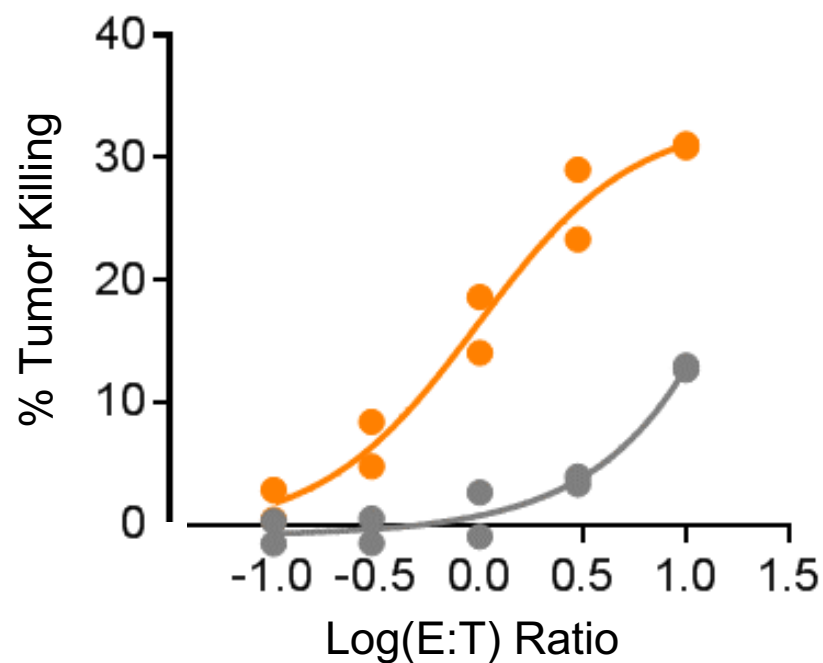
Potent Direct Cellular Cytotoxicity



KG1 AML Cell Line



Patient-Derived Primary AML Blasts

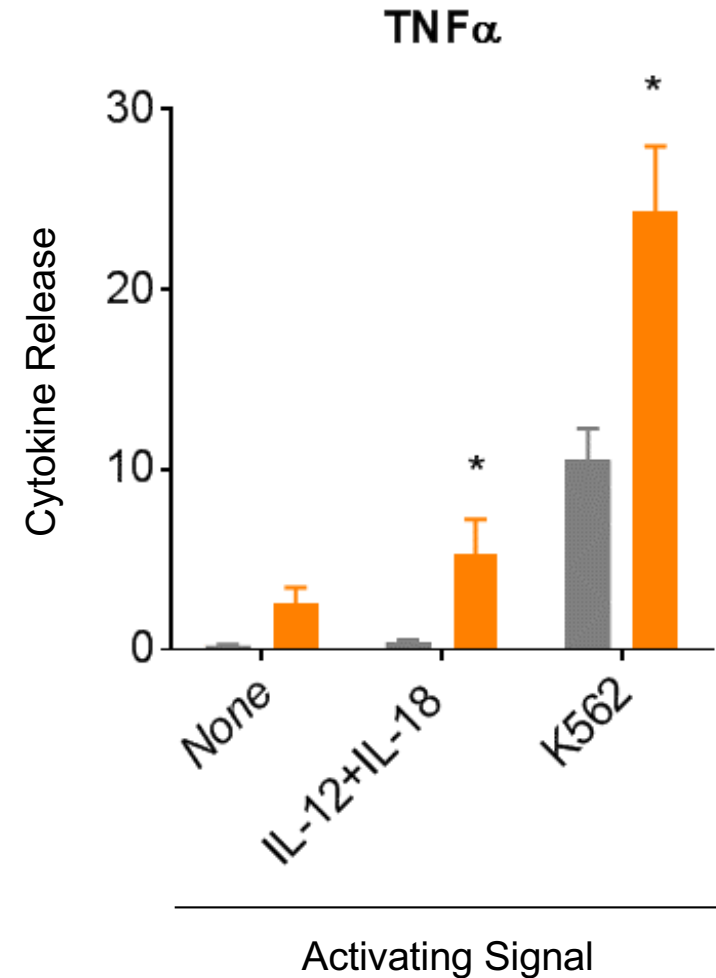
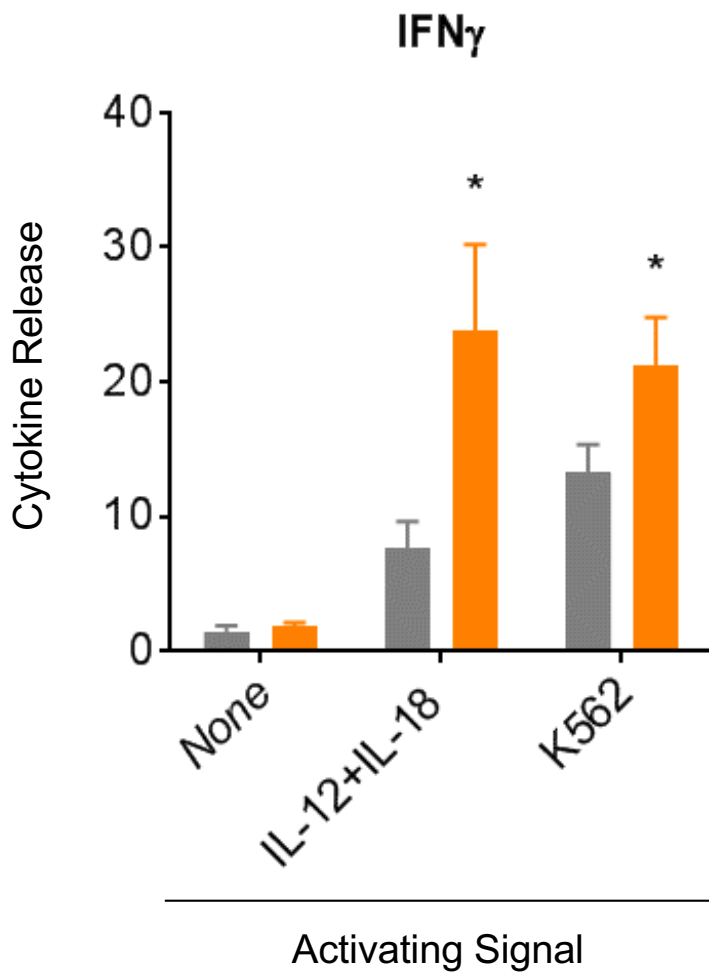


— FATE-NK100

— O/N Cytokine-induced

FATE-NK100

Elevated Cytokine Production



— FATE-NK100

— O/N Cytokine-induced

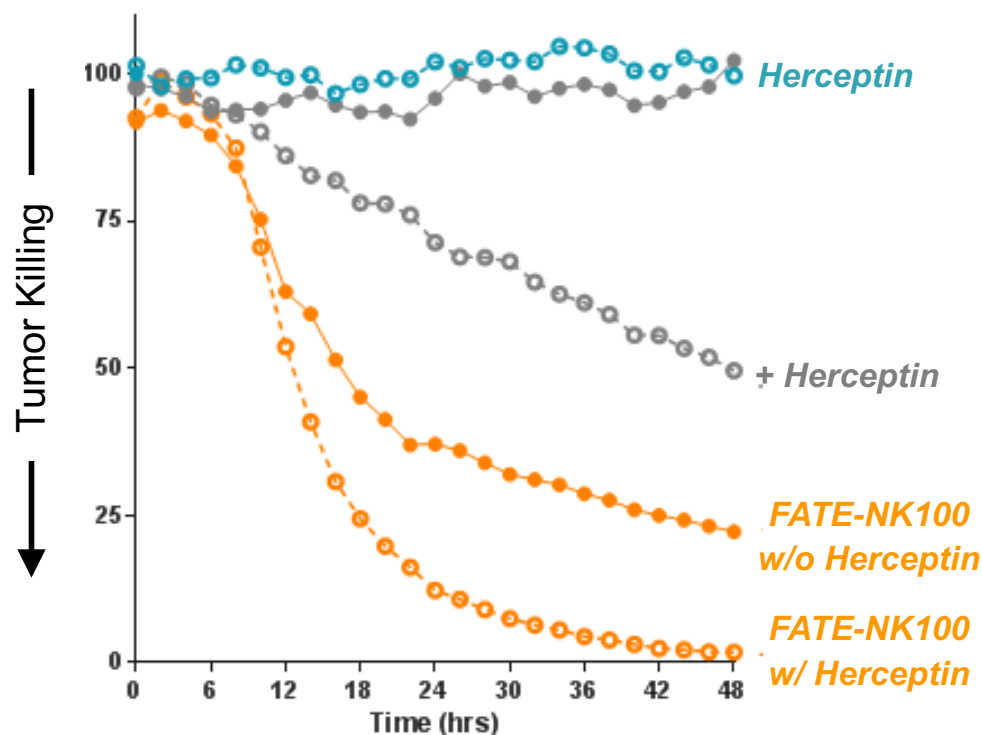
FATE-NK100

Augmented ADCC Effector Function

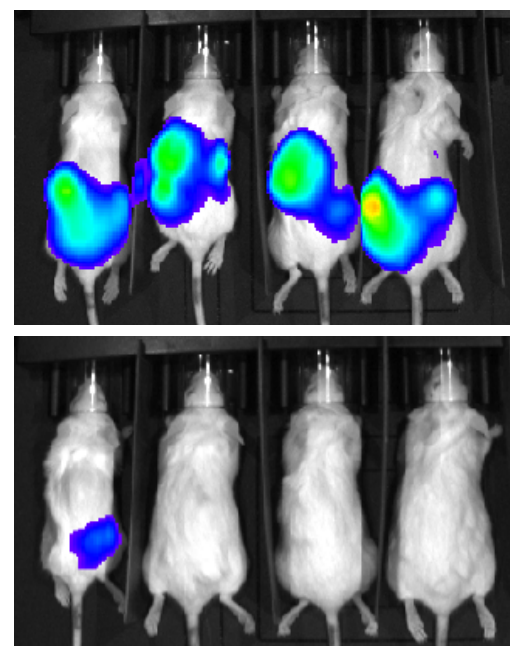


Exploiting CD16 IgG antibody-binding receptor in combination with FDA-approved mAbs for solid tumors

SKOV3 (Ovarian Cancer) Line



Luc-SKOV3 Tumor Image Analysis Day 21



Herceptin

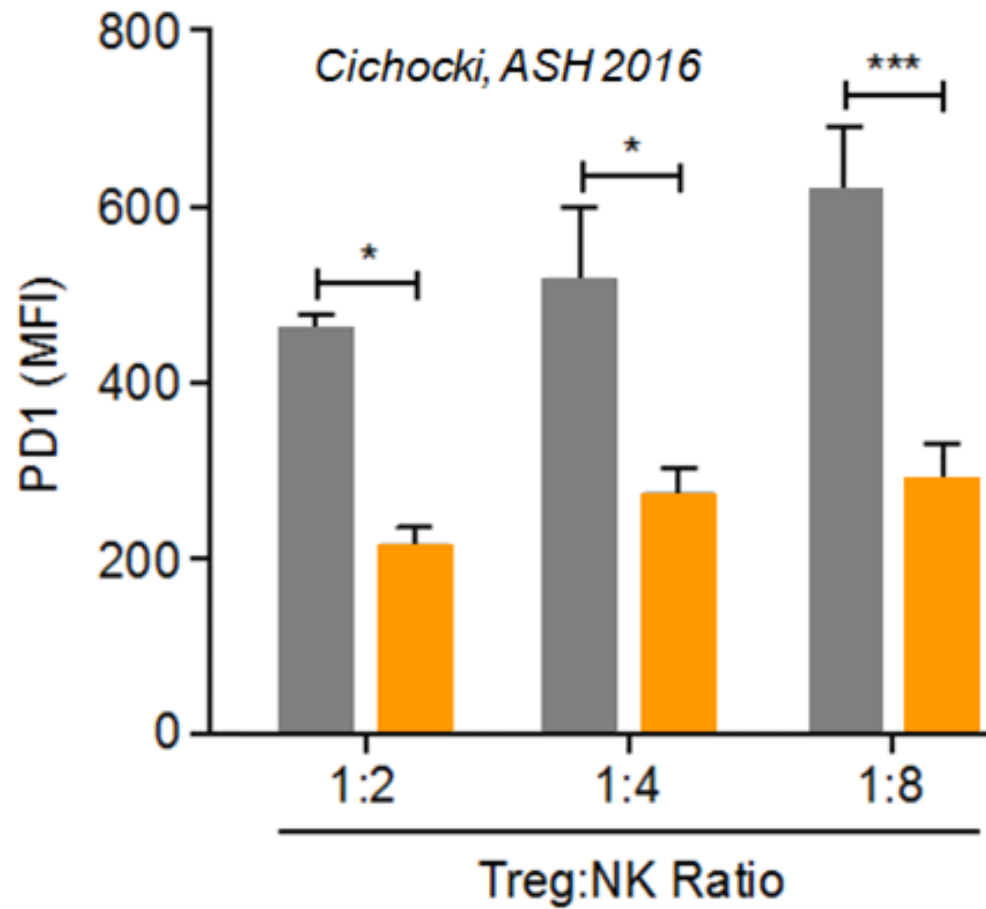
*FATE-NK100
+ Herceptin*

FATE-NK100

Increased Resistance to Immune Checkpoints



Immune Checkpoint Receptor PD1 Cell-Surface Expression

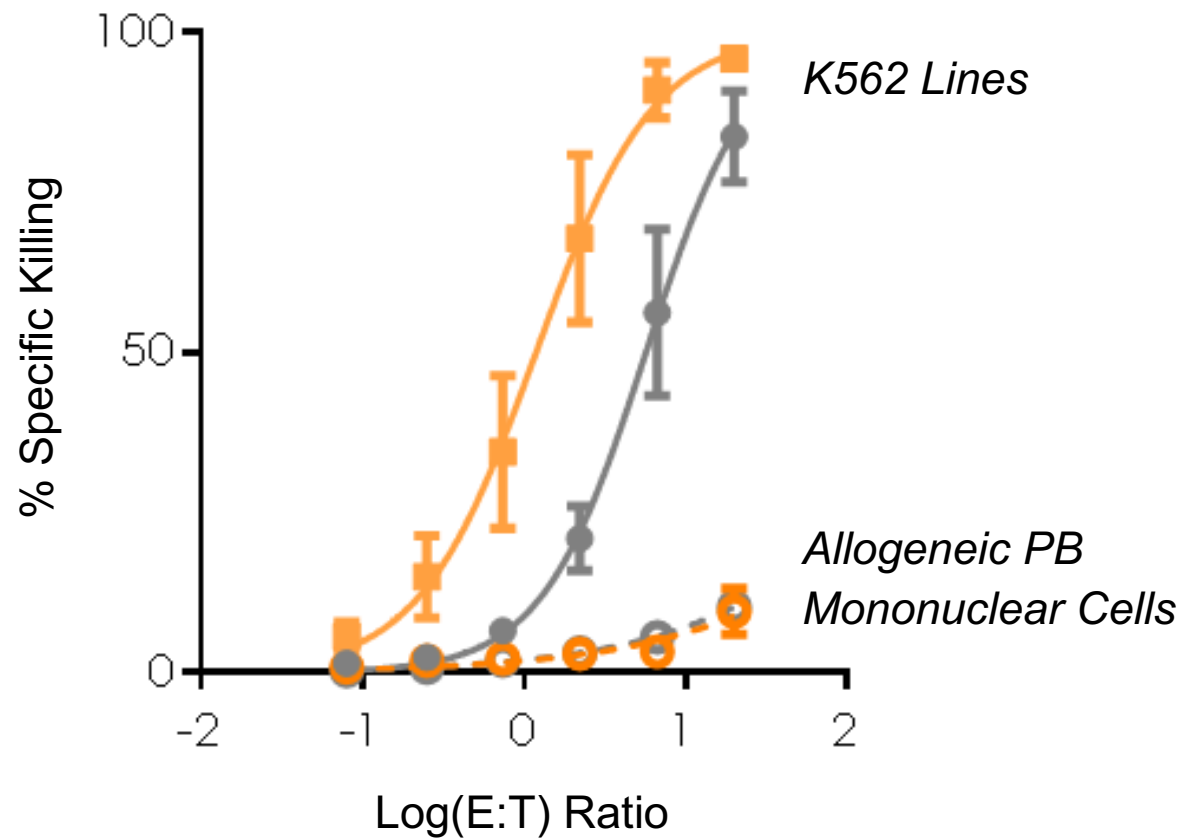


FATE-NK100

Tumor Cell-Specific Cytotoxicity



Multiplex Killing Assay



— FATE-NK100

— O/N Cytokine-induced

FATE-NK100

Potential Therapeutic Applications Across Cancer



Multifaceted Functionality Creates Opportunities Across Liquid and Solid Tumors

	Liquid	Solid
Monotherapy	<u>AML</u> <i>relapsed/ refractory front-line with 7+3 (MRD-)</i> <u>MDS</u> <i>relapsed/ refractory</i>	<u>Ovarian</u> <i>platinum-resistant (local)</i> <u>Lung Liver</u> <i>peripheral infusion (trafficking)</i>
	<u>Multiple Myeloma</u> <i>DARZALEX (anti-CD38 IgG1 mAB with ADCC MOA)</i> <u>Non-Hodgkin's Lymphoma</u> <i>RITUXAN (anti-CD20 IgG1 mAB with ADCC MOA)</i>	<u>Herceptin</u> <i>breast, gastric, colorectal</i> <u>Erbix</u> <i>head/ neck, colorectal</i>

FATE-NK100

Launch of Multi-pronged Clinical Development Strategy



VOYAGE *Refractory / Relapsed AML*

- IV infusion; accelerated dose-escalation; up to 4 dose levels
- 10-patient expansion at MTD
- Key read-outs: rates of CR and MRD; NK cell persistence
- Open for enrollment at UMN; initial data expected in 2H17

APOLLO *Recurrent Ovarian*

- IP administration; accelerated dose-escalation; up to 3 dose levels
- 10-patient expansion at MTD
- Key read-outs: tumor shrinkage by RECIST; NK cell persistence
- IND to be filed in 2Q17; FPI expected in 3Q17

DIMENSION *mAb Combination in Solid Tumors*

- IV infusion; accelerated dose-escalation; up to 3 dose levels
- 3 parallel arms: mono; trastuzumab combo; cetuximab combo
- Key read-outs: tumor shrinkage by RECIST; NK cell persistence
- IND cleared in May 2017; FPI expected in 3Q17

FATE-NK100

First-in-Class Adaptive Memory NK Cell Product Candidate



- **Builds on compelling clinical results with conventional NK cell therapies**
 - Compelling safety profile
 - Shown to be effective in treating AML and preventing relapse
- **FATE-NK100 has demonstrated unprecedented NK cell functionality**
 - Highly cytotoxic effector cell (maturation marker CD57; activating receptor NKG2C)
 - Checkpoint / immuno-suppressive cell resistant (myeloid-derived suppressor cells; regulatory T cells)
 - Enhanced persistence and durable effector function (“memory-like” marker CD45RO)
 - Enhanced antibody-dependent cellular cytotoxicity through CD16
- **Multi-pronged clinical development strategy launched**
 - VOYAGE: refractory / relapsed AML open for enrollment at Masonic Cancer Center, University of Minnesota
 - APOLLO: recurrent ovarian cancer IND filing expected in 2Q17
 - DIMENSION: advanced solid tumors in combination with trastuzumab or with cetuximab
- **Opportunity in 2017 to broadly establish leading NK cell clinical franchise**
 - Monotherapy: liquid and solid tumors
 - Combination: liquid and solid tumors with FDA-approved mAbs
 - Novel combinations with proteasome inhibitors, checkpoint inhibitors, BiKEs / TriKEs, etc.



Ushering in an Off-the-Shelf Cell Product Paradigm

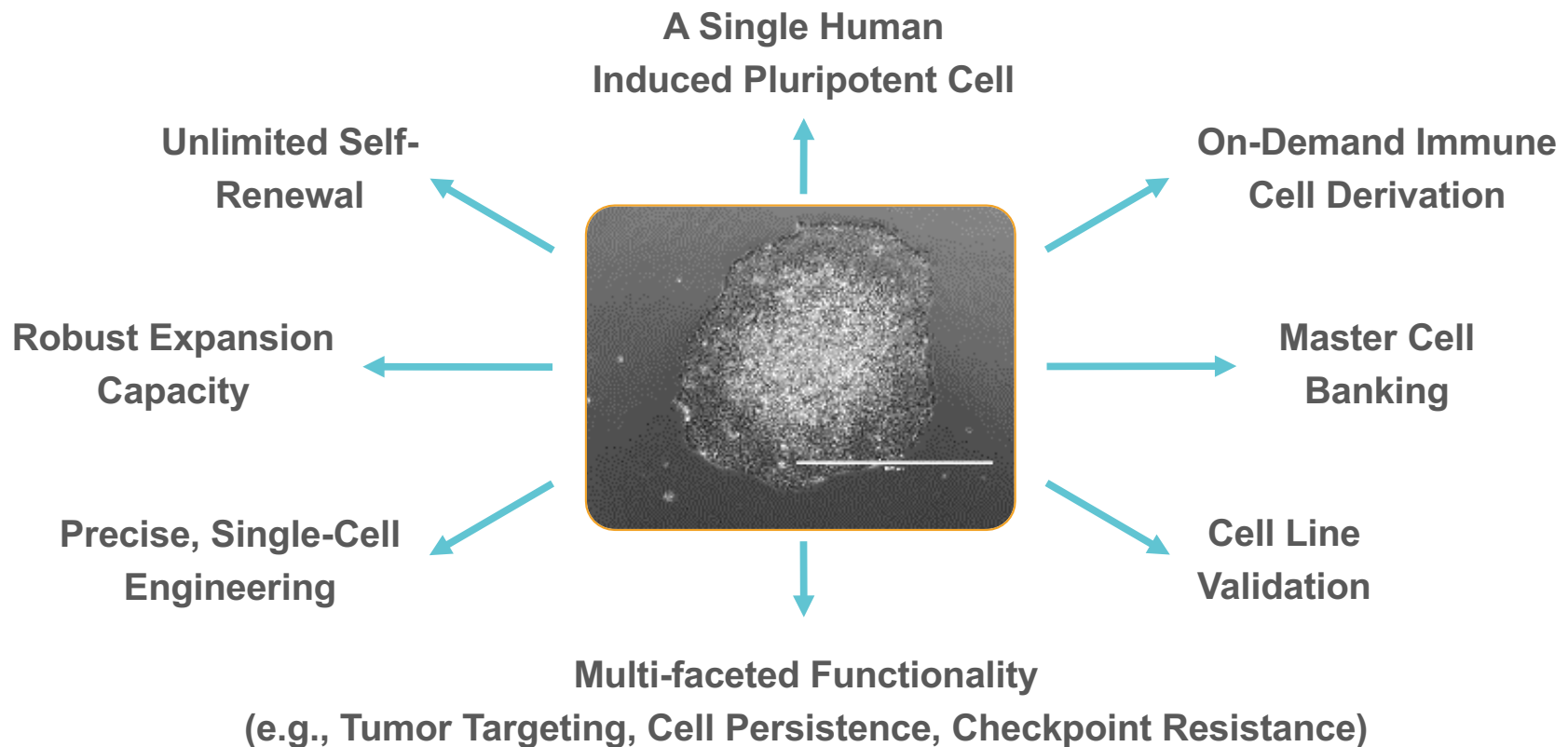
Key Features	Today	Tomorrow
Cell Source	Patient / Donor Cells	Master Cell Line
Genetic Engineering	Random & Variable	Precise & Complete
Manufacturing	Patient-specific	Off-the-Shelf
Product Consistency	Heterogeneous	Homogeneous
Therapeutic Functionality	Single MOA	Multiple MOA
Delivery	Delayed & Uncertain	On Demand
Dose-per-Patient	Single	Multiple
Overall Paradigm	Patient-centric	Product-centric

Human Induced Pluripotent Stem Cells

Renewable Source for Off-the-Shelf Cell Products

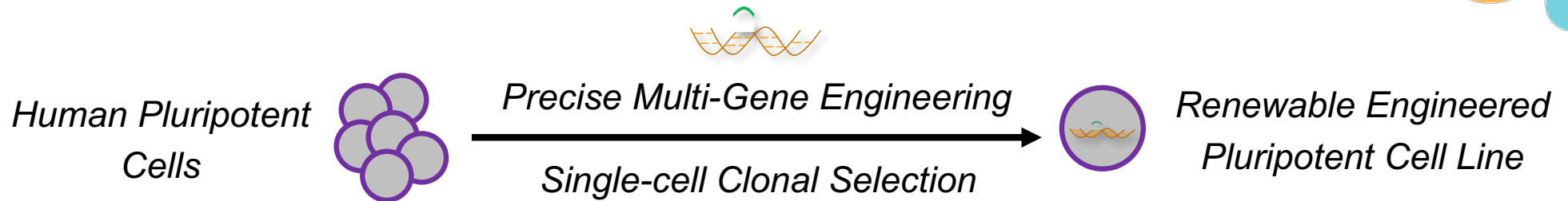


Using Engineered Pluripotent Cell Lines to Create NK Cells and T Cells

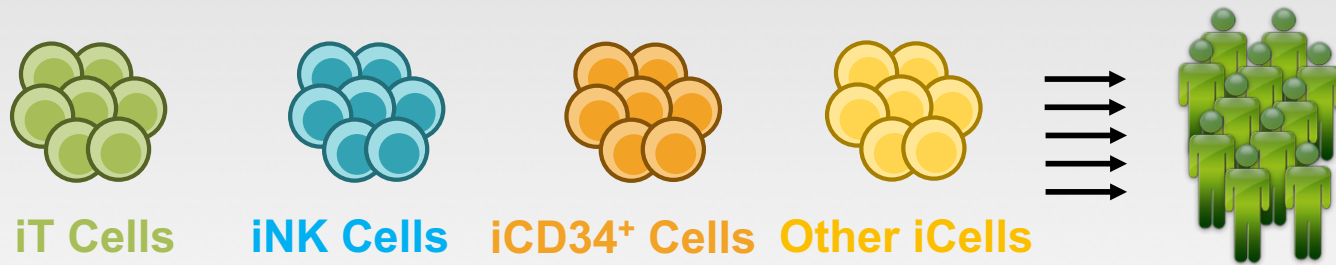


Renewable | Engineered | Clonal Cell Lines

Off-the-Shelf Cell Products Derived From Renewable Engineered Pluripotent Cell Lines



Off-the-Shelf | Homogeneous | Cell Products



Does not require patient-sourced cells *Off-the-shelf production of cells*

Consistent and reliable product forms *Unprecedented scalability*

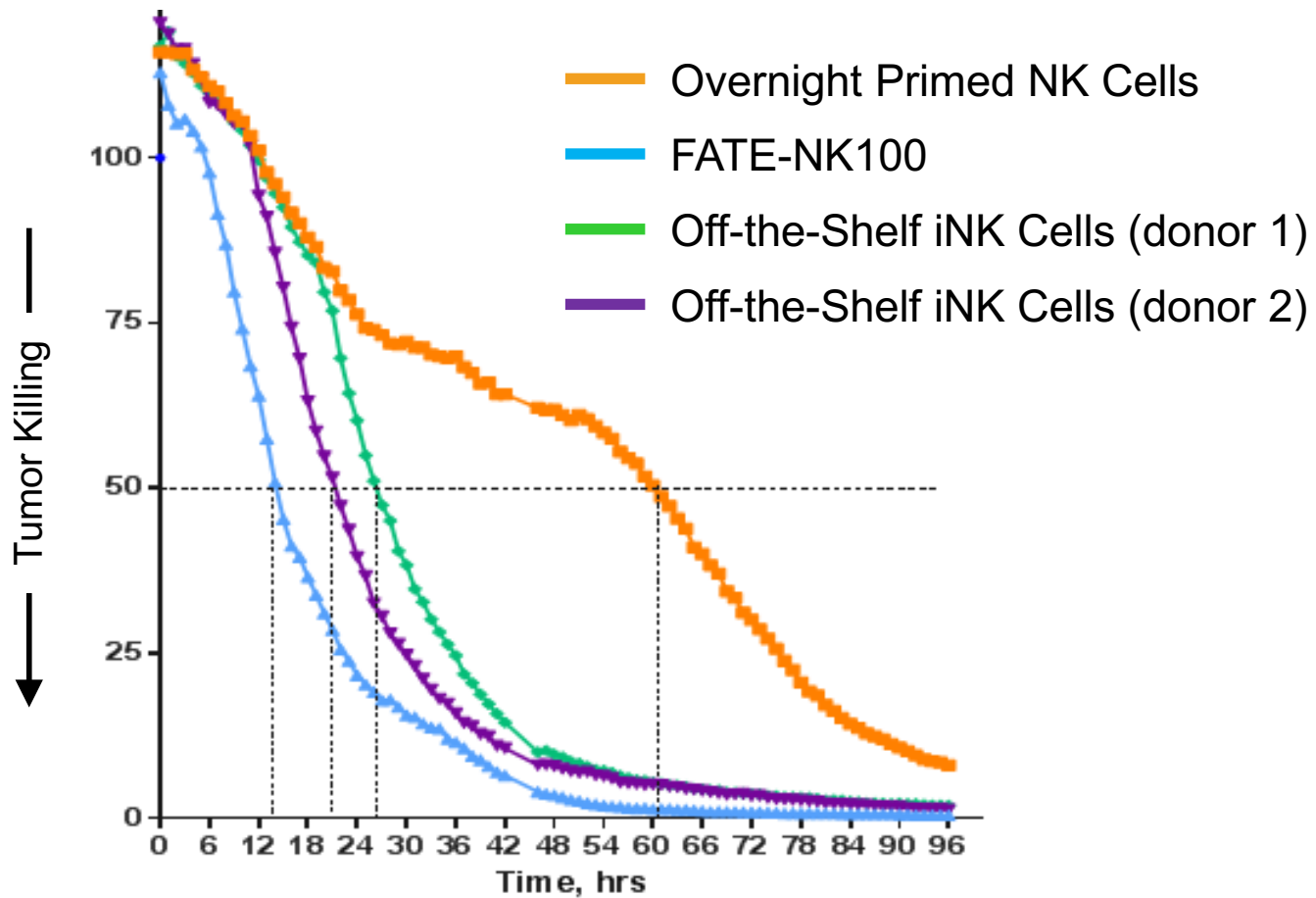
Addresses Critical Limitations of Patient-Sourced Cell Therapies

Off-the-Shelf iNK Cell Cancer Immunotherapy

Potent Direct Cellular Cytotoxicity



SKOV3 (Ovarian Cancer) Killing Assay



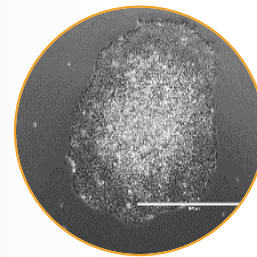
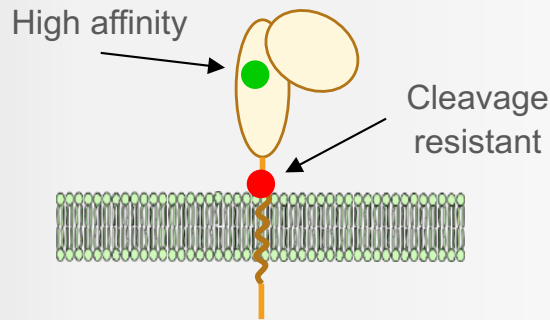
Engineered hnCD16 iNK Cell Product Candidate

Off-the-Shelf Cornerstone Approach for Solid Tumors



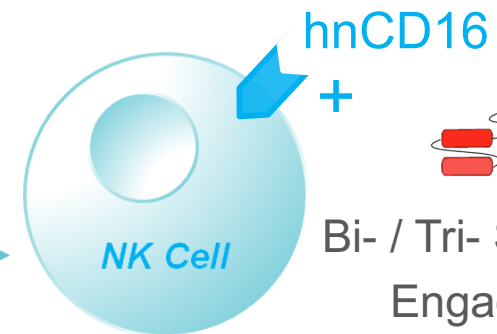
Engineered high-Affinity non-Cleavable CD16 Fc Receptor

Modified form of CD16a
IgG antibody-binding receptor
resists shedding upon activation



*Renewable Engineered
Pluripotent Cell Line*

FDA-approved
Monoclonal Antibodies



Bi- / Tri-Specific
Engagers

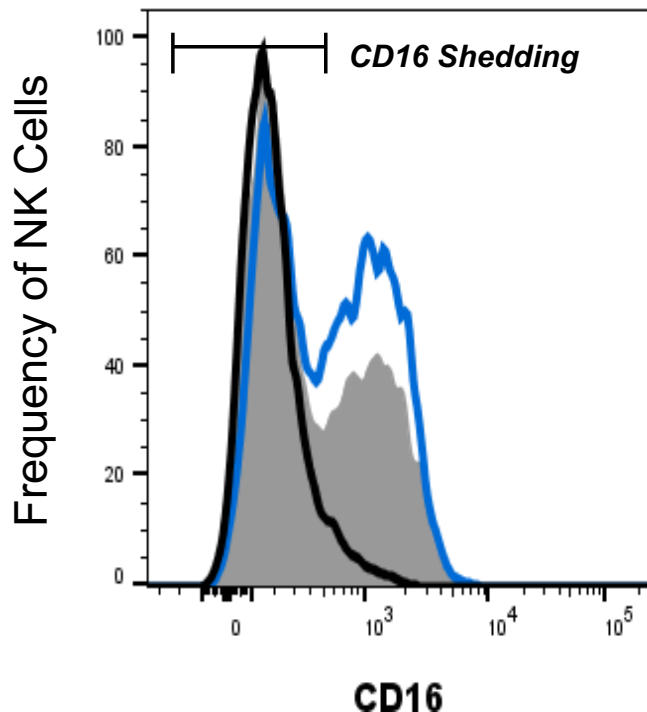
*Engineered hnCD16 iNK
Cells for ADCC*

Engineered hnCD16 iNK Cell Product Candidate

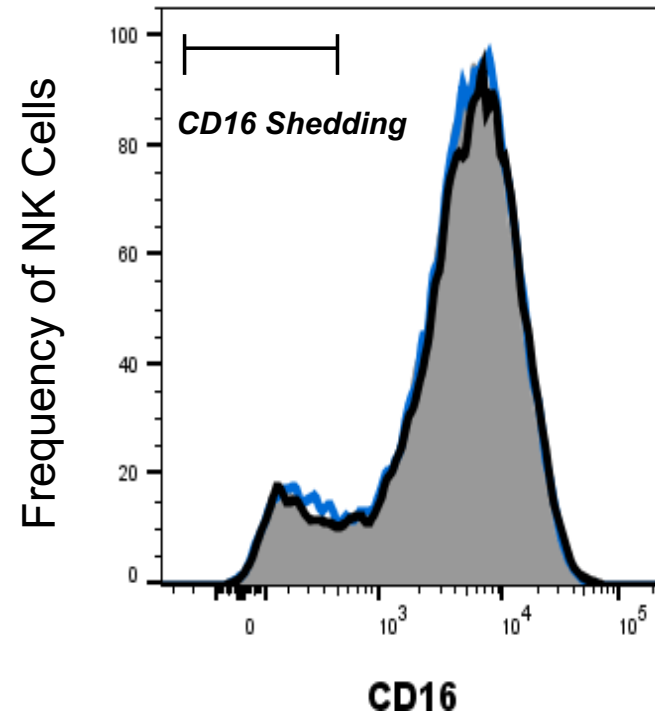
CD16 is Expressed and Continuously Maintained



Conventional NK Cells



hnCD16 iNK Cells



Control (homeostasis in culture)

Treated with TACE / ADAM inhibitor (inhibits CD16 cleavage)

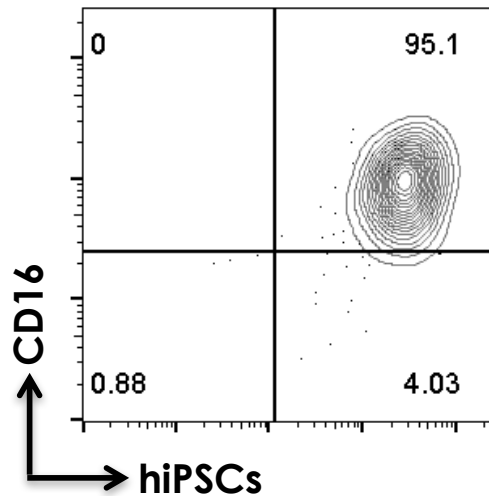
Activated with K562 (induces CD16 shedding)

Engineered hnCD16 iNK Cell Product Candidate

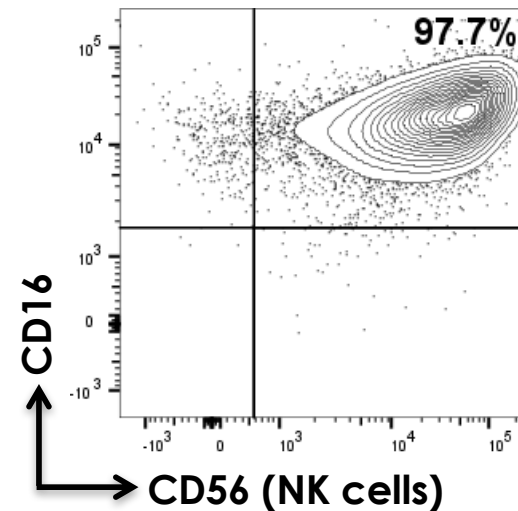
From a Single iPSC to a Clonal Effector Cell Population



*Renewable Engineered
Pluripotent Cell Line*



*Engineered hnCD16 iNK
Cells for ADCC*



1 iPSC

**Clonal
Expansion**



1M iPSCs

1×10^6 hnCD16 iNKs

1×10^{12} hnCD16 iNKs

Engineered hnCD16 iNK Cell Product Candidate

Augmented ADCC Response

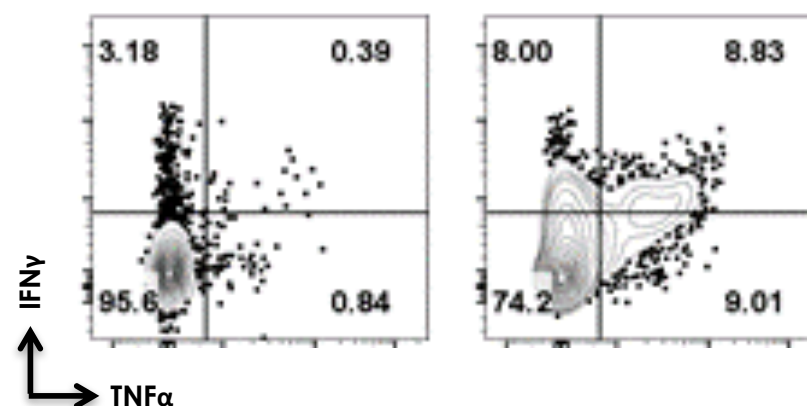
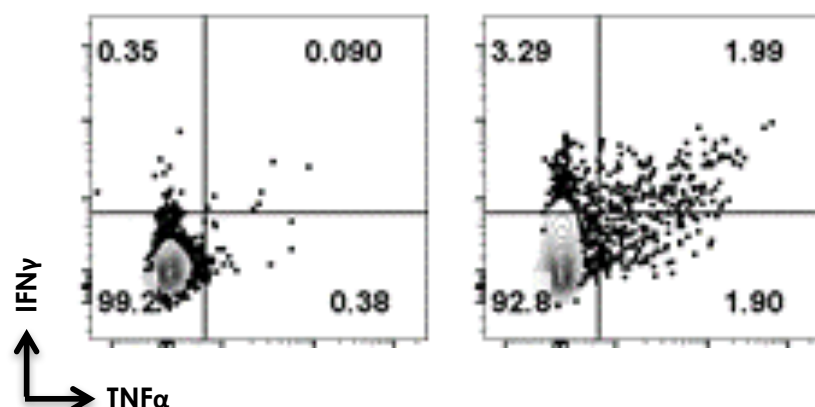


Cytokine Release

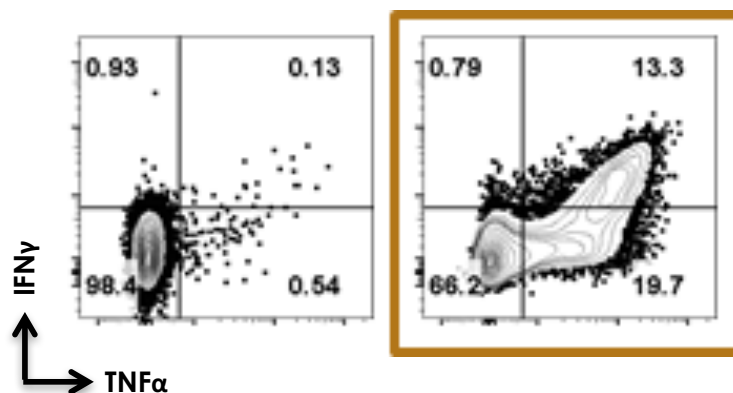
Unstimulated (left) vs. Anti-CD16 Stimulation (right)

Cord blood NKs

Peripheral blood NKs



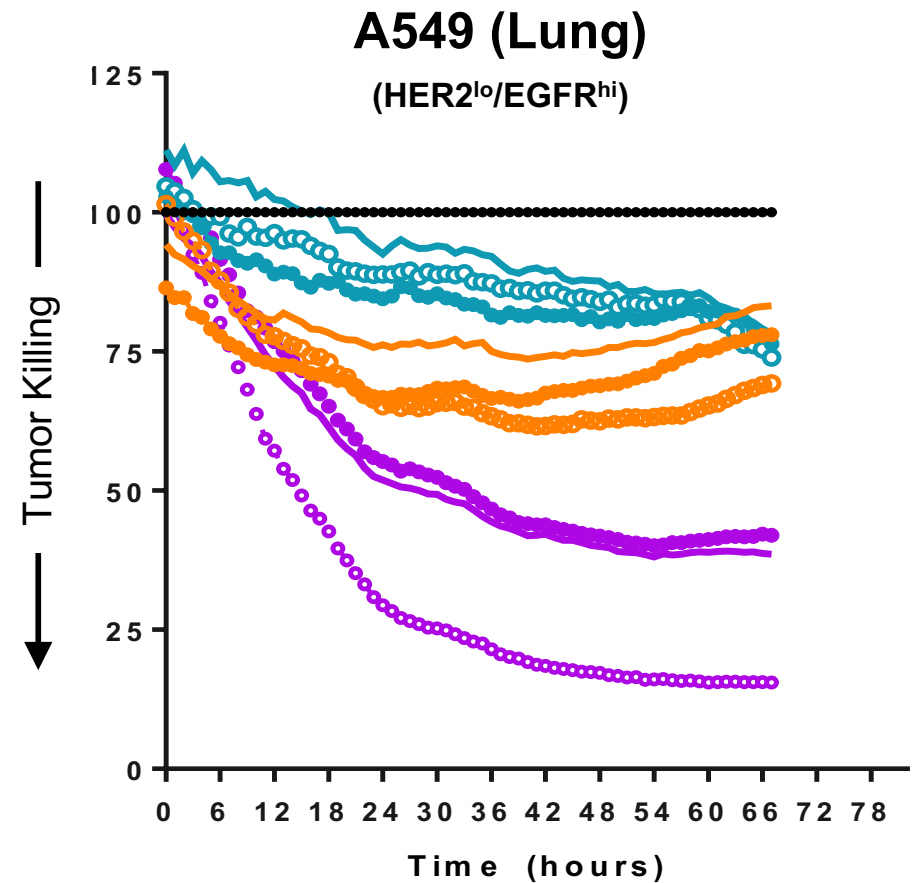
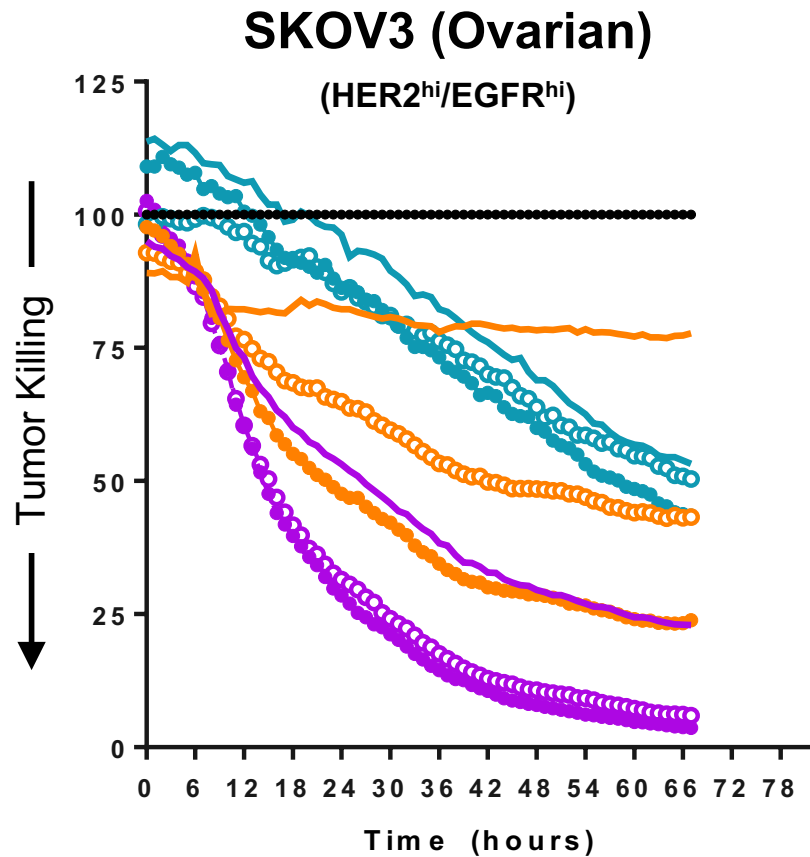
hnCD16 iNKs



Enhanced Cytokine Release

Engineered hnCD16 iNK Cell Product Candidate

In Vitro ADCC for Solid Tumors



Target cells only
pbNK (n=3)
Cord blood NK (n=1)
hnCD16 iNK (n=3)

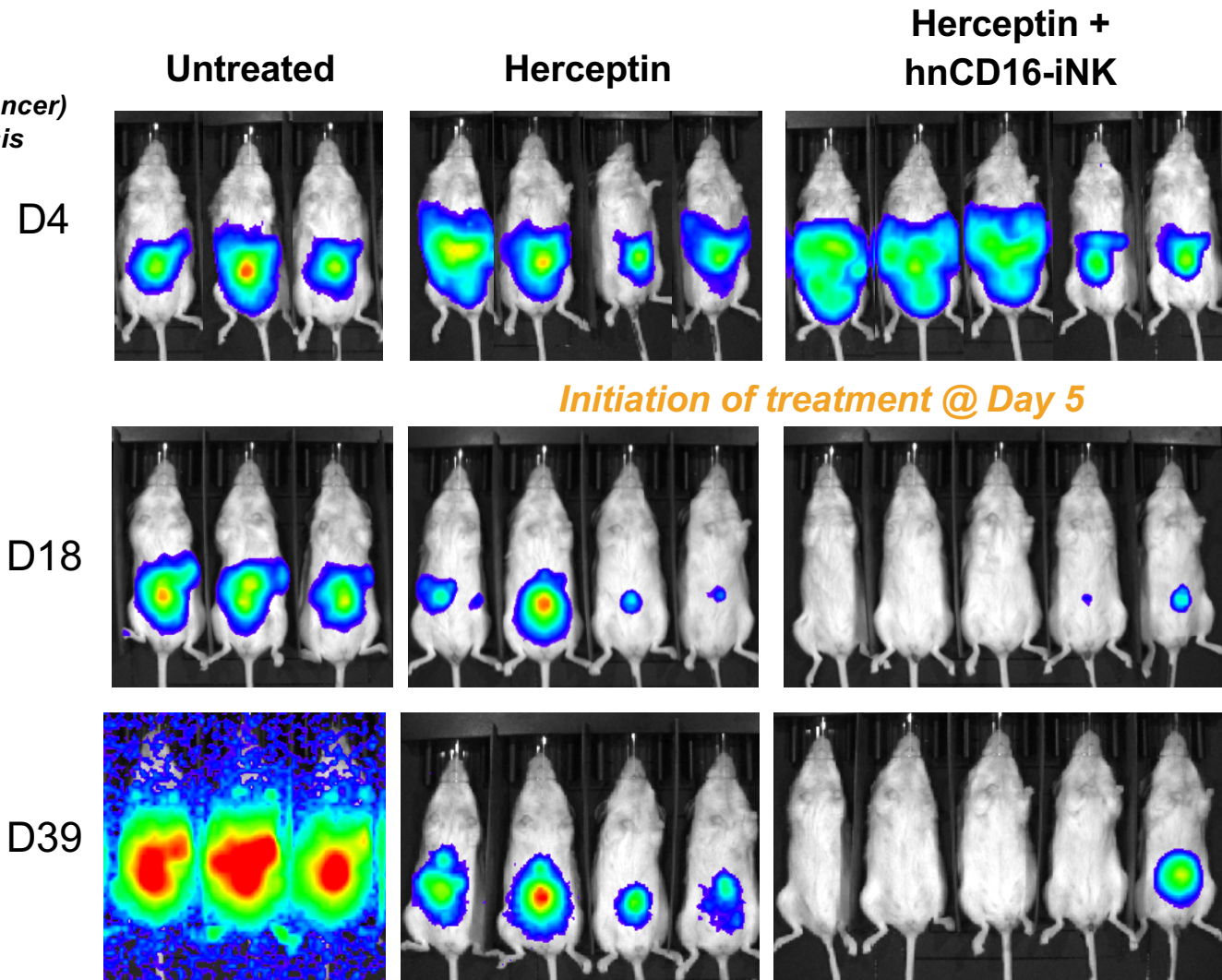
No antibody
Anti-Her2
Anti-EGFR

Engineered hnCD16 iNK Cell Product Candidate

Enhanced ADCC in Combination with Herceptin



*Luc-SKOV3 (Ovarian Cancer)
Tumor Image Analysis*

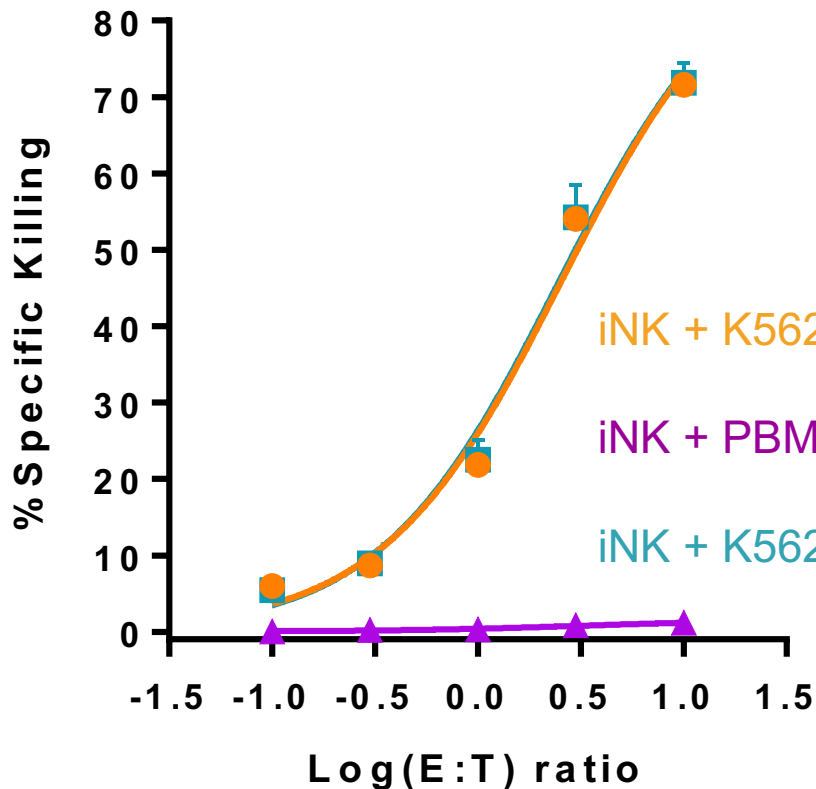


Engineered hnCD16 iNK Cell Product Candidate

Maintaining Inherent NK Cell Properties



iNKs (hnCD16 iPSC Line)



*Minimal Reactivity to
Allogeneic PBMCs while
Cytotoxic to Transformed Cells*

iNK + K562 (Measurement of Tumor Cytotoxicity)

iNK + PBMCs (Measurement of Target Specificity)

iNK + K562 + PBMCs (Measurement of Additive Specificity)

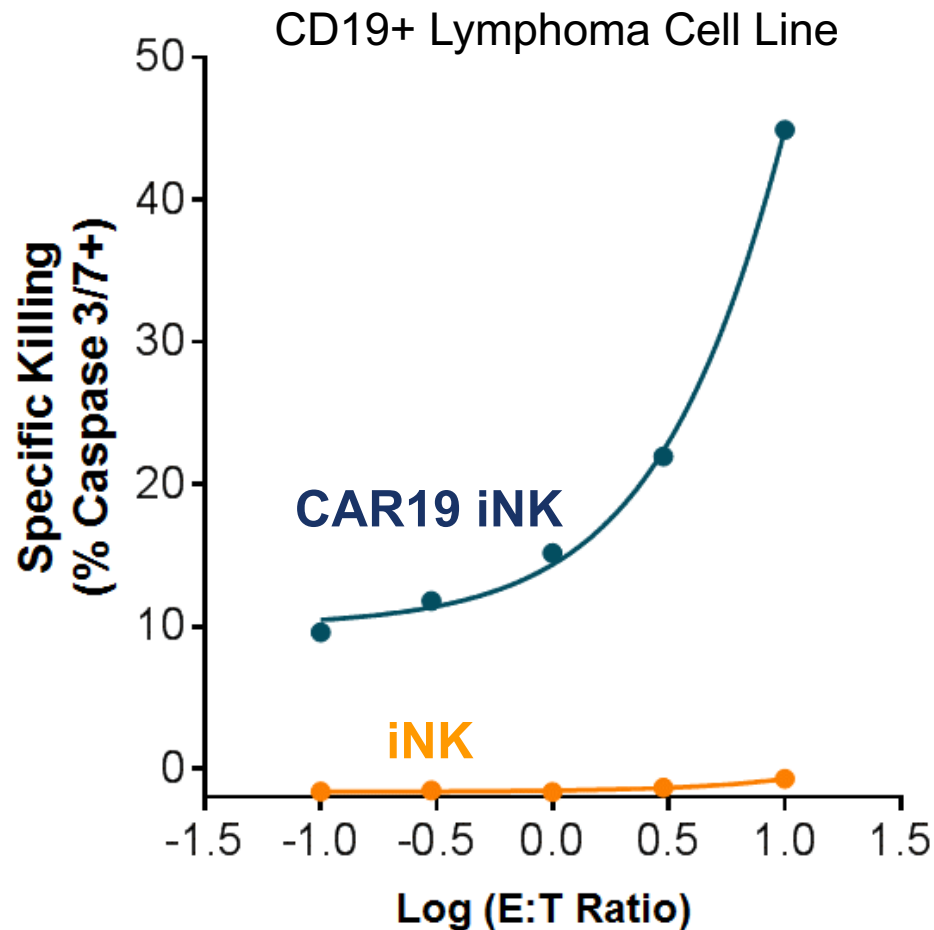
n=3 donor PBMCs in triplicate

hiPSC Platform Versatility

“Backbone” iPSC Line for Incorporating Other Functionality



Engineered CAR19 iNK Cells



Other Functionality

- ☐ Tumor-targeting strategies
 - ☐ CARs / TCRs
- ☐ Improved persistence
 - ☐ Cell autonomy
 - ☐ Overcoming histocompatibility (HvG)
 - ☐ Adaptive memory
- ☐ Resistance to checkpoint suppression
- ☐ Temporal control of gene expression

Off-the-Shelf iT Cell Cancer Immunotherapy

Memorial Sloan Kettering Collaboration



LETTERS

Generation of tumor-targeted human T lymphocytes from induced pluripotent stem cells for cancer therapy

nature
biotechnology

Cell Stem Cell
Perspective

New Cell Sources for T Cell Engineering and Adoptive Immunotherapy

Dr. Michel Sadelain, MD, PhD
Director, Center for Cell Engineering
Memorial Sloan Kettering Cancer Center

“Engineering therapeutic attributes into pluripotent cell lines is a breakthrough approach to renewably generate potent T-cell immunotherapies. This unique approach offers the prospect for off-the-shelf delivery of T-cell therapies with enhanced safety and therapeutic potential at the scale necessary to serve significant numbers of patients.”

Fate Therapeutics and Memorial Sloan Kettering Cancer Center Launch Partnership for Development of Off-the-Shelf T-Cell Immunotherapies

*Unite Cellular Immunotherapy Expertise to Accelerate Clinical Translation of
Off-the-Shelf Products Offering Broad Patient Access*

*Collaboration to Use Engineered Pluripotent Cell Lines to Renewably Generate
T-Cell Product Candidates*

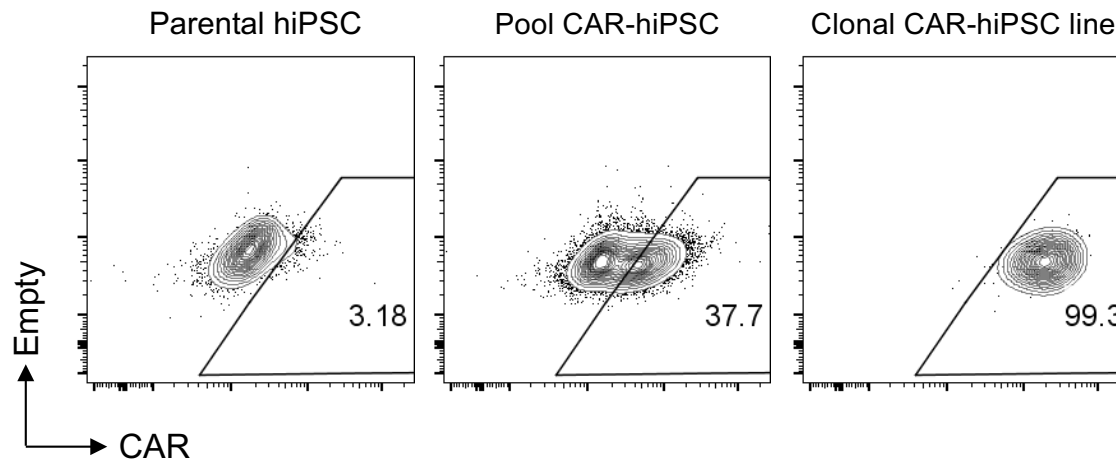
*Foundational Intellectual Property Covering Pluripotent Cell-derived Engineered T Cells
Exclusively Licensed to Fate Therapeutics*

Sadelain / Memorial Sloan Kettering Collaboration

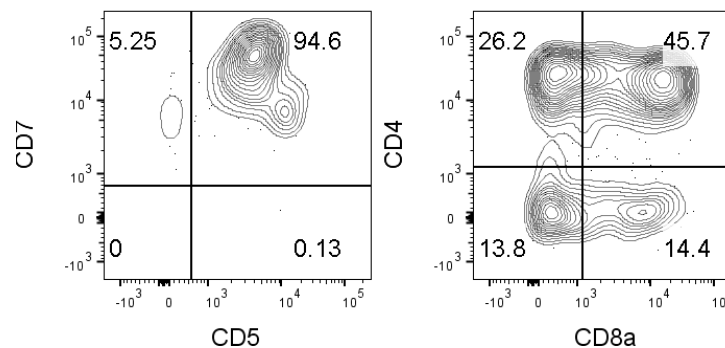
Creating Engineered T Cells



Master Engineered CAR Pluripotent Cell Lines



T-Cell Differentiation



Renewable Engineered Pluripotent Cell Platform

Our Foundational Intellectual Property



Over 60 Issued Patents and 90 Pending Applications



WHITEHEAD INSTITUTE



Memorial Sloan Kettering
Cancer Center™

Fote
THERAPEUTICS

- **Exclusive licenses from pioneers in the induced pluripotent cell field**
 - Drs. Rudolf Jaenisch (Whitehead Institute) and Sheng Ding (TSRI)
- **OCT4-based generation of pluripotent cells**
 - Broadly cover cell compositions expressing OCT4
 - Critical to inducing cells to pluripotent state
- **Small molecule-based pluripotent cell programming**
 - Broadly cover compositions / uses in pluripotent cell induction, maintenance and expansion
 - Critical for generation of clonal populations of cells

Off-the-Shelf Immuno-Oncology Partners

R&D and Translational Therapeutic Collaborations



UNIVERSITY OF MINNESOTA
Driven to DiscoverSM



UC San Diego



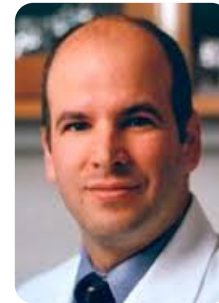
Memorial Sloan Kettering
Cancer CenterTM



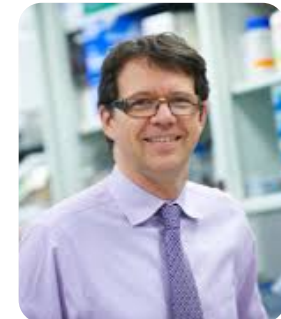
Jeffrey S. Miller, MD



**Kalle Malmberg,
MD PhD**



**Dan Kaufman,
MD PhD**



Michel Sadelain, MD, PhD

Engineered iNK Cells

*Off-the-shelf NK-Cell Therapy
using engineered pluripotent
cell lines*

FATE-NK100

*First-in-Class Adaptive Memory
Natural Killer Cell Therapy*

Engineered iT Cells

*Off-the-shelf T-Cell Therapy
using engineered pluripotent
cell lines*

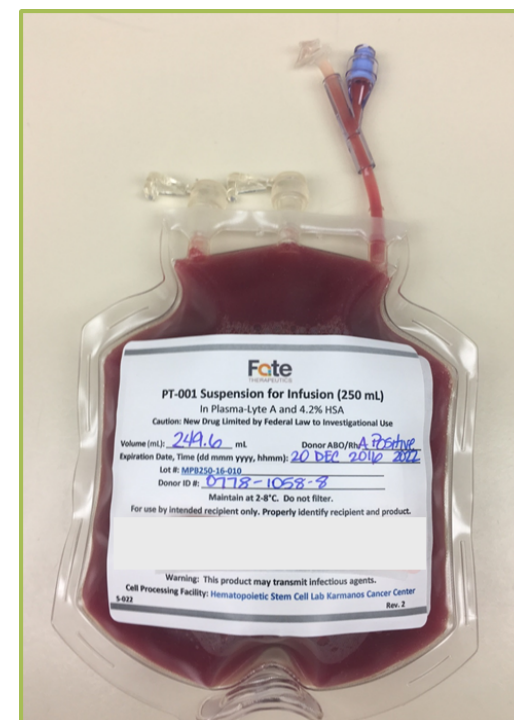


Immuno-Regulatory Programs



A Next-Generation Hematopoietic Cell Graft to Prevent Life-Threatening Complications in Allogeneic HCT Patients

- **HCT performed with curative intent**
 - Orphan hematologic malignancies (e.g., AML, ALL)
 - Rare genetic disorders (e.g., β -thalassemia, sickle cell, hurlers syndrome)
- **Attractive market opportunity**
 - ~30,000 allogeneic HCT procedures performed annually
 - Conducted at concentrated number of centers of excellence
- **Significant unmet medical need**
 - GvHD and severe infections are life-threatening complications
 - No FDA approved therapies for prevention



ProTmune™

*Small molecule programmed
mobilized peripheral blood graft*



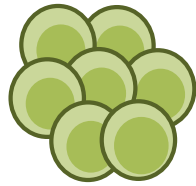
FT1050 + FT4145

Pathophysiology of T-Cell Mediated HCT Complications

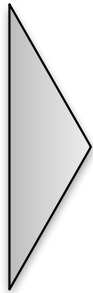
Life-Threatening GvHD, Viral Infections & Relapse



Donor

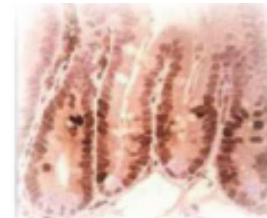


T Cells

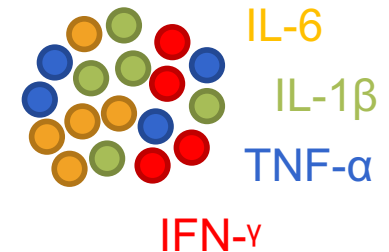


Conditioned
Patient

Tissue Damage

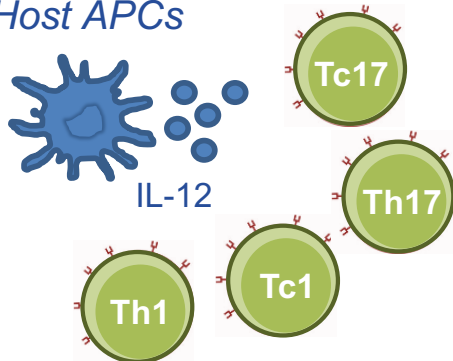


Cytokine Storm



Donor Allo-reactive T-cell Activation

Host APCs

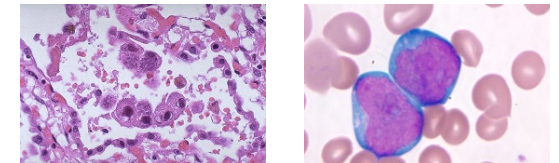


Assault on Patient Tissue



Acute GvHD (gut, liver, skin)
~50% D100 cumulative incidence

Immunosuppressive Agents



Severe Infections

~70% D100 cumulative incidence

Relapse

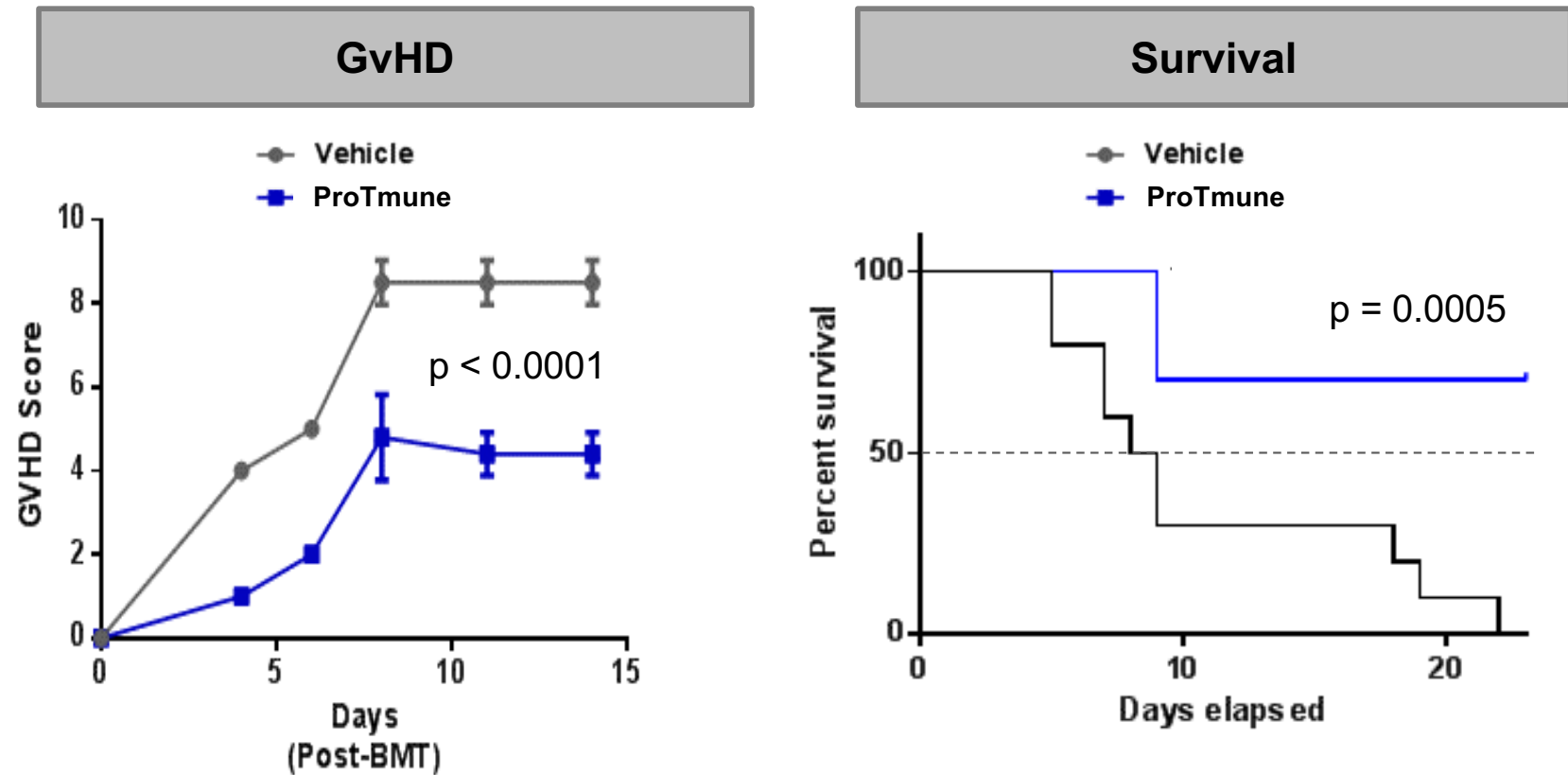
~35% 1YR cumulative incidence

ProTmune™

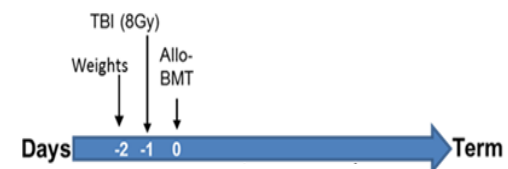
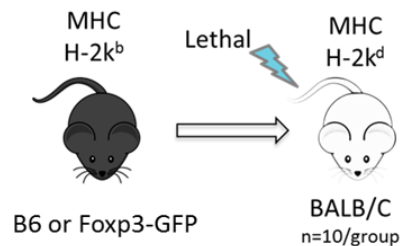
Attenuation of Graft-versus-Host Disease



In Vivo Efficacy of ProTmune



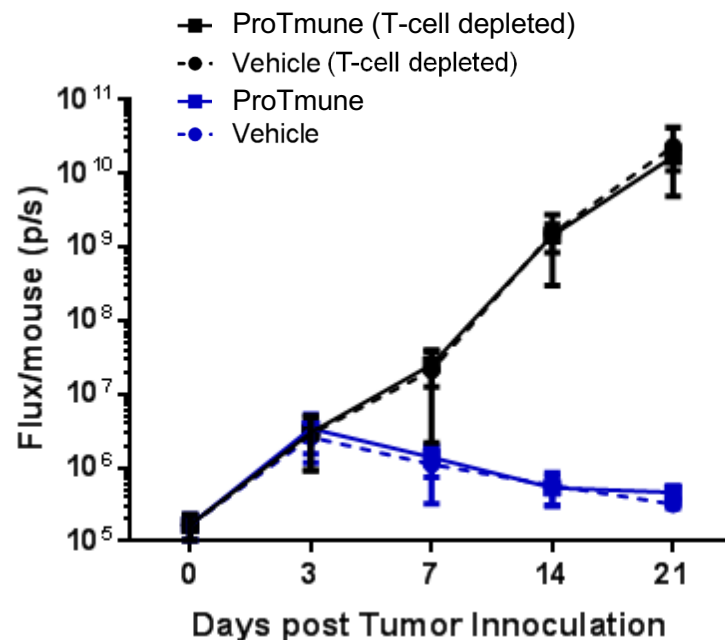
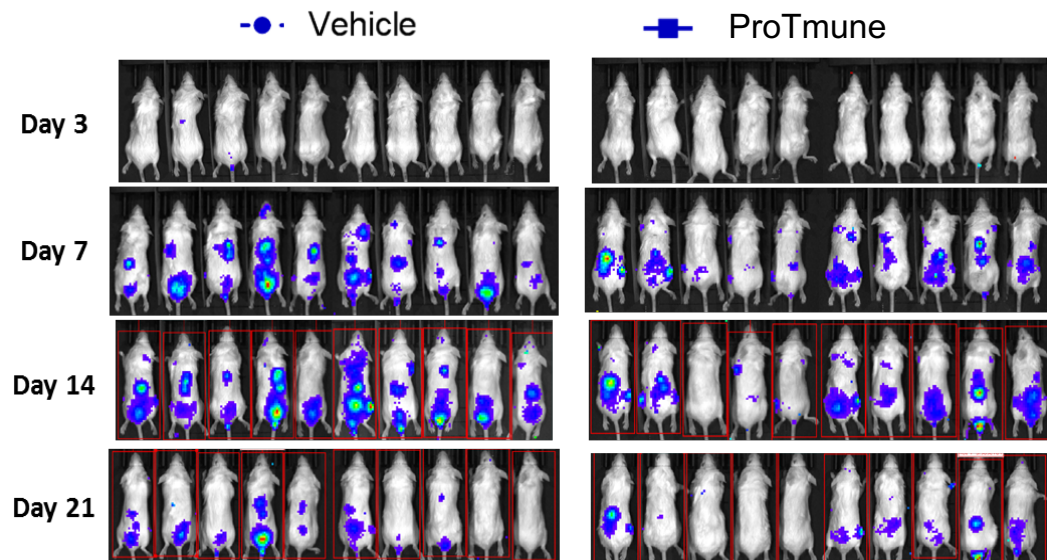
*Murine Allogeneic
Acute GvHD Model
(8 studies)*



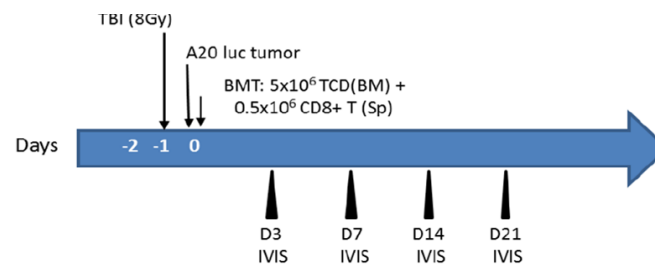
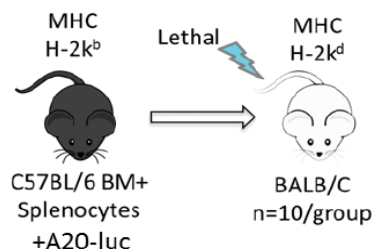


In Vivo Efficacy of ProTmune

Leukemic Cell Clearance



Murine Allogeneic GvL Model (6 studies)



ProTmune™

Highly-Differentiated Approach for Significant Unmet Need

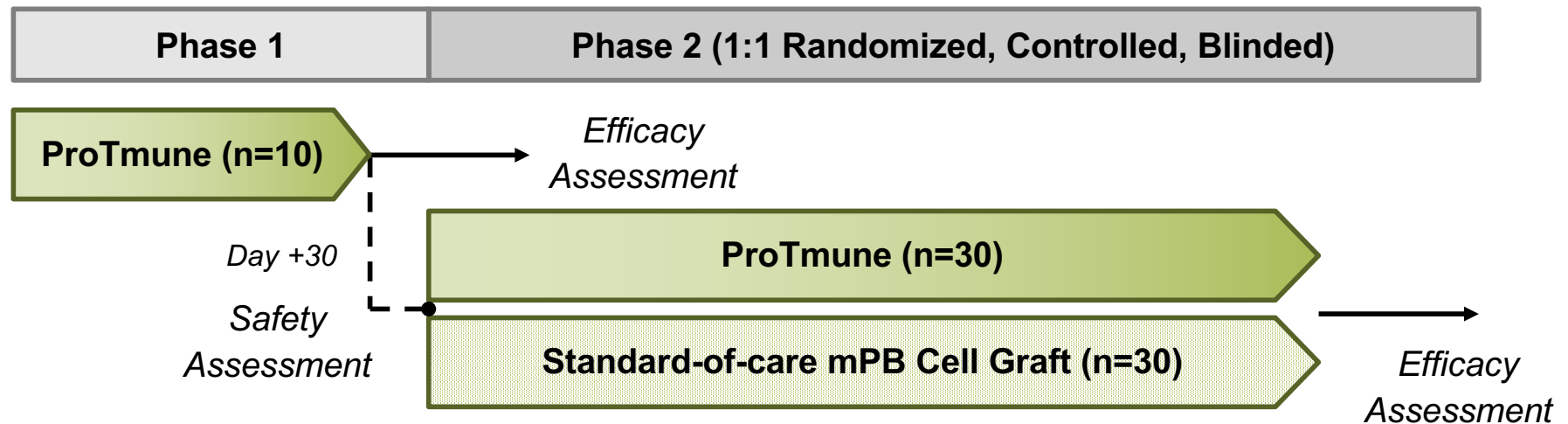


	FATE ProTmune™	Bellicum BPX-501	Kiadis Pharma ATIR™	Incyte Jakafi®	Abbvie Imbruvica®
Product Description	Small molecule modulated HCT graft	Engineered T cells w/ CaspaCIDE safety switch	Photo-depleted T cells	JAK 1 and JAK 2 inhibitor	Bruton's tyrosine kinase (BTK) inhibitor
Therapeutic Strategy	Prevention	Treatment	Prevention	Treatment	Treatment
Point of Intervention	HCT	Adjunctive	Adjunctive	Post HCT	Post HCT
Stage	Phase 1/2	Phase 1/2	Phase 2	Phase 2	Phase 1/2
Approval	Not approved	Not approved	Not approved	Label expansion	Label expansion
Regulatory Designations	US and EU ODD Fast Track	US and EU ODD	US and EU ODD	Breakthrough	Breakthrough



Design

- Multi-center, open-label Phase 1/2 clinical trial in US and EU
- Matched unrelated donor (MUD) mPB HCT with myeloablative conditioning
 - Standard of care GvHD prophylactic (Methotrexate / Tacrolimus)
 - No prophylactic CMV therapy



- **Primary:** cumulative incidence and severity of acute GvHD at Day 100
- **Exploratory:** severe infections; relapse; chronic GvHD; event-free survival



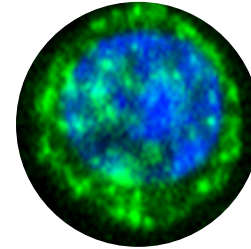
- **Highly-differentiated therapeutic paradigm**
 - Optimize biological properties of donor hematopoietic cells *ex vivo* using small molecules
 - Easily integrates into current clinical practice
 - Avoids costly and time-consuming measures (e.g., genetic engineering, cell expansion, cell separation)
- **Addresses leading life-threatening complications of a procedure that is proven curative**
 - Approximately 50% of patients undergoing HCT die or experience relapse within the first two years
 - Leading causes of non-relapse mortality are GvHD and severe infections
- **Strong commercial positioning targeting significant market opportunity**
 - Matched unrelated donor (MUD) for hematologic malignancies is predominant HCT setting
 - Composition of matter patents extending through 2032
 - Secured Fast Track in US and broad Orphan Drug Designations in US and EU
- **PROTECT study has potential to support accelerated registration and validate broader opportunity**
 - Phase 2 stage is randomized, controlled and blinded (investigator and subject)
 - Potential to expand into additional HCT settings (Haplo, MRD) and other disease (rare genetic disorders)

ToleraCyte™

Tolerizing the Immune System for Autoimmune Diseases



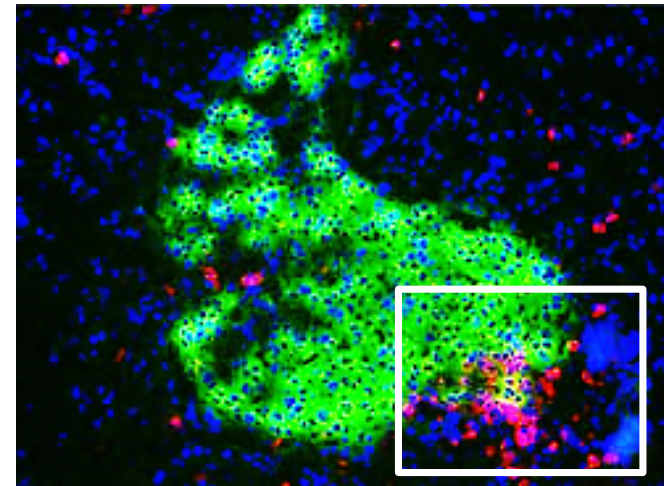
A First-in Class Immunoregulatory CD34⁺ Cell Product Candidate to Induce Immune Tolerance



ToleraCyte™

*Small molecule programmed
CD34⁺ cells*

- **Autoimmune disorders result from malfunction of the body's natural defense systems**
 - Adaptive immune system (e.g., autoreactive T cells) mistakenly recognizes healthy cells as foreign and attacks and destroys the body's own tissue
 - 80+ autoimmune disorders estimated to affect ~50M in U.S.
 - Most common disorders include rheumatoid arthritis, lupus, inflammatory bowel disease, multiple sclerosis and type 1 diabetes



*CD8⁺ T cells (red) attacking
pancreatic beta cells (green)*

Immunoregulatory CD34⁺ Cell Therapy

Proof-of-Principle in Type 1 Diabetes



Paolo Fiorina, MD, PhD
Assistant Professor of Pediatrics,
Harvard Medical School

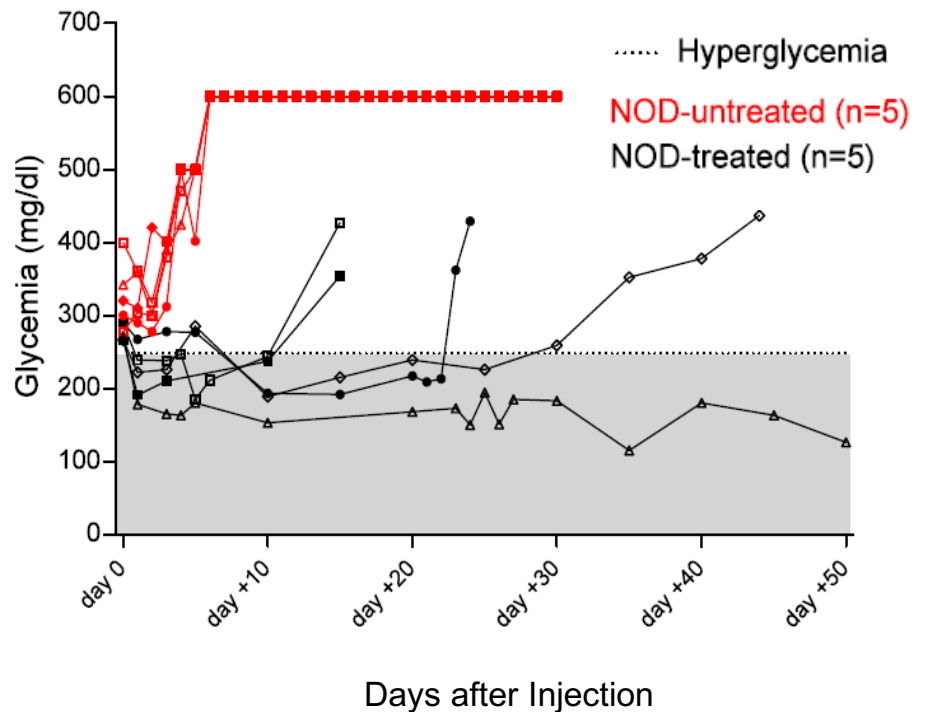


Boston Children's Hospital
Until every child is well™

- Extensive investigation into T-cell destruction of pancreatic beta cells
- Engineered PD-L1 hematopoietic cells to assess potential to exploit checkpoint axis
- Demonstrated that single administration of PD-L1+ cells revert hyperglycemia in preclinical model of T1D

Hyperglycemic Mice

Adoptive Transfer of PD-L1+ Hematopoietic Cells



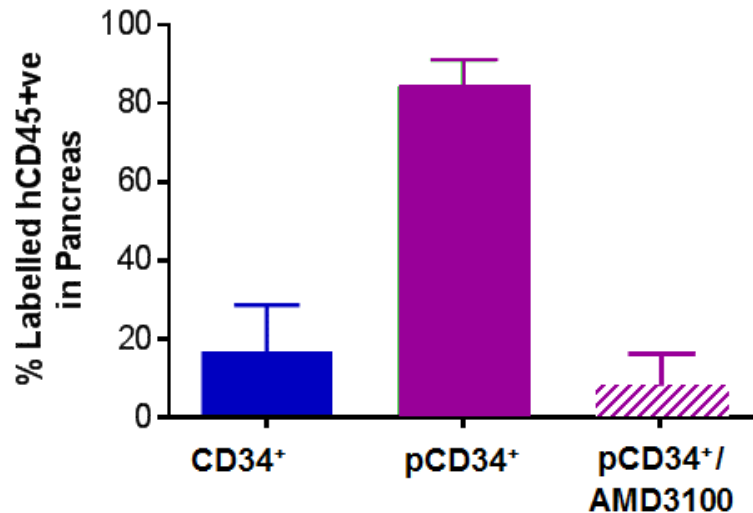
Immunoregulatory CD34⁺ Cell Therapy

Checking Autoreactive T Cells

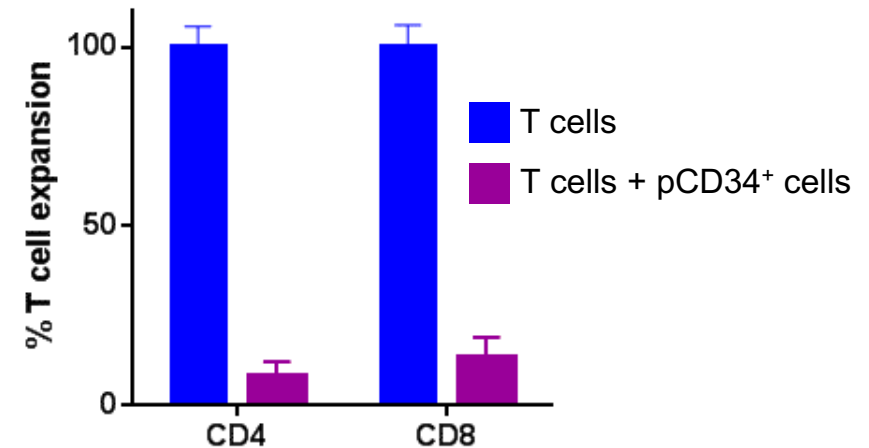


- **Small molecule-programmed functionality of ToleraCyte includes:**
 - Enhanced trafficking to sites of T-cell proliferation
 - Inhibiting T-cell effector function through expression / secretion of potent immunosuppressive factors (e.g., PD-L1, IDO1)

In Vivo Trafficking



In Vitro T-Cell Suppression



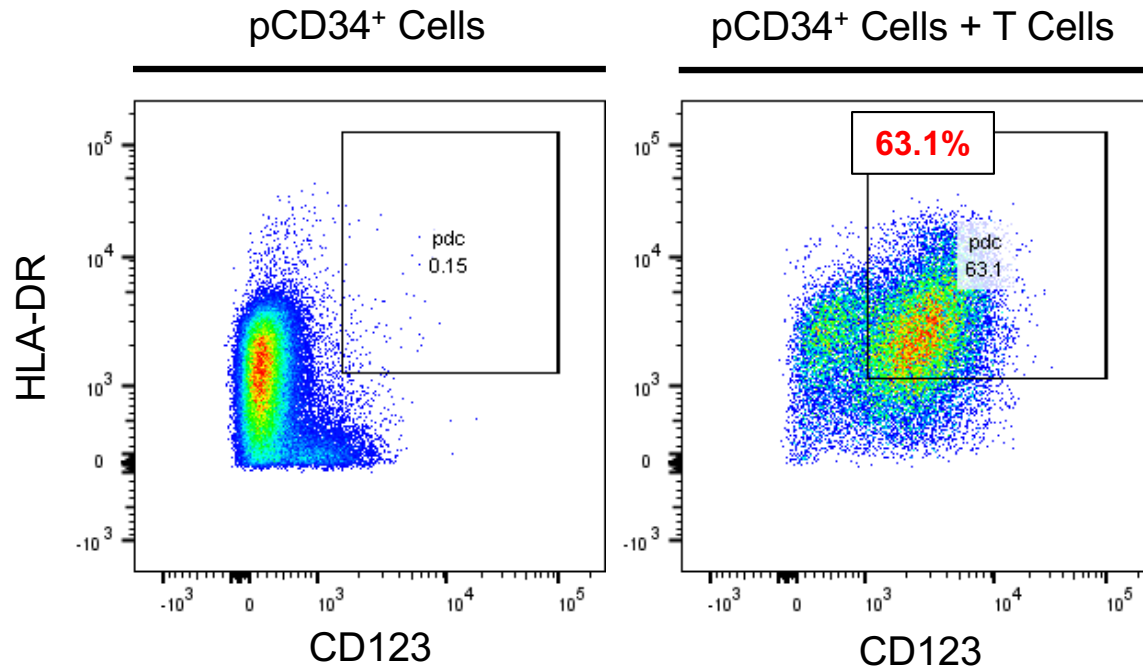
Immunoregulatory CD34⁺ Cell Therapy

Mechanism of Immune Tolerance Induction



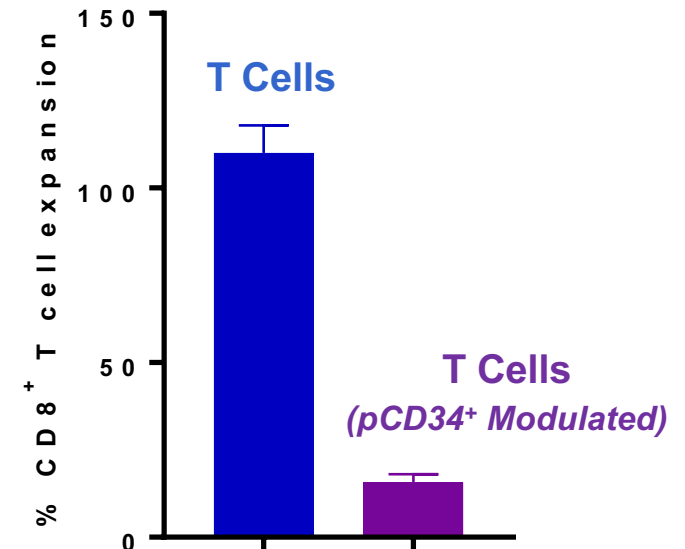
pCD34⁺ cells differentiate into immune tolerogenic dendritic cells expressing PD-L1 and IDO1

In Vitro CD34⁺ Cell Differentiation



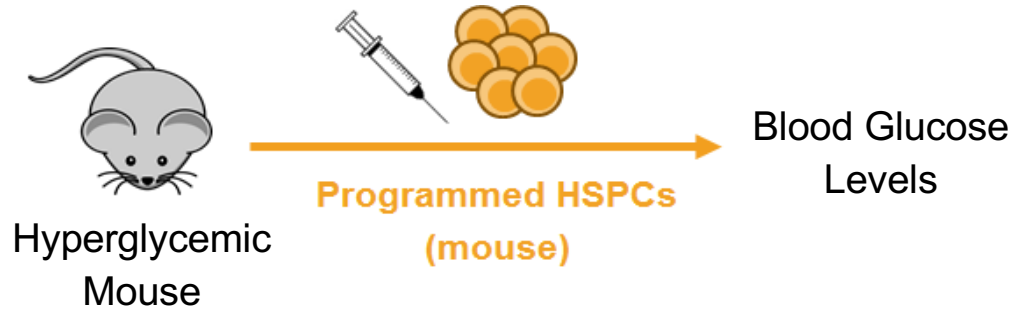
pCD34⁺ cells induce T-cell anergy (as assessed upon re-stimulation in absence of pCD34⁺ cells)

T-Cell Anergy

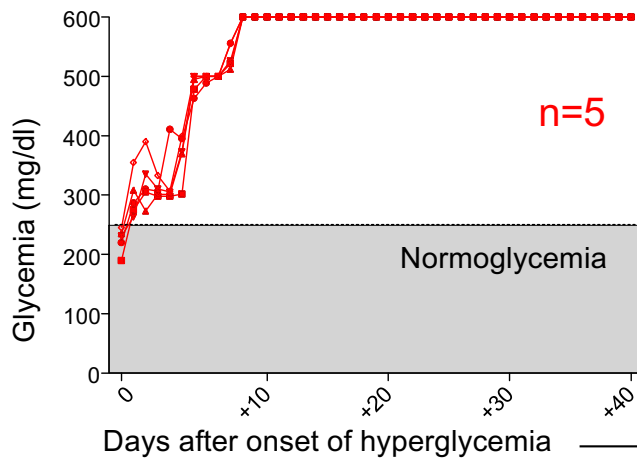


Immunoregulatory CD34⁺ Cell Therapy

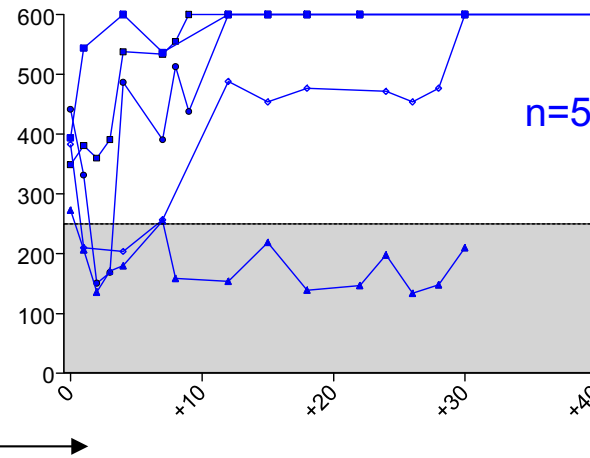
Durable Disease Correction in T1D Mouse Model



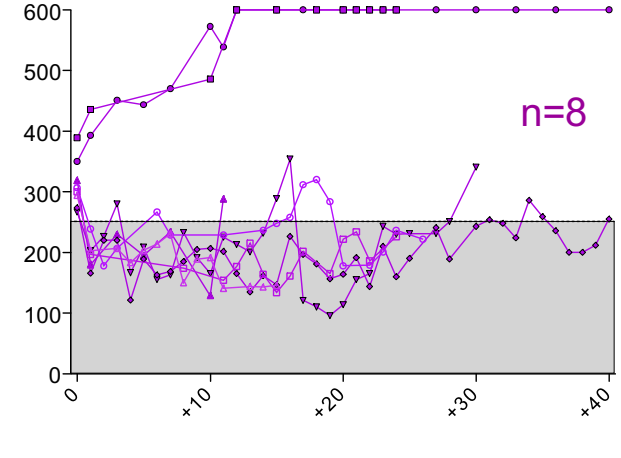
No Treatment



Vehicle-Treated HSPCs

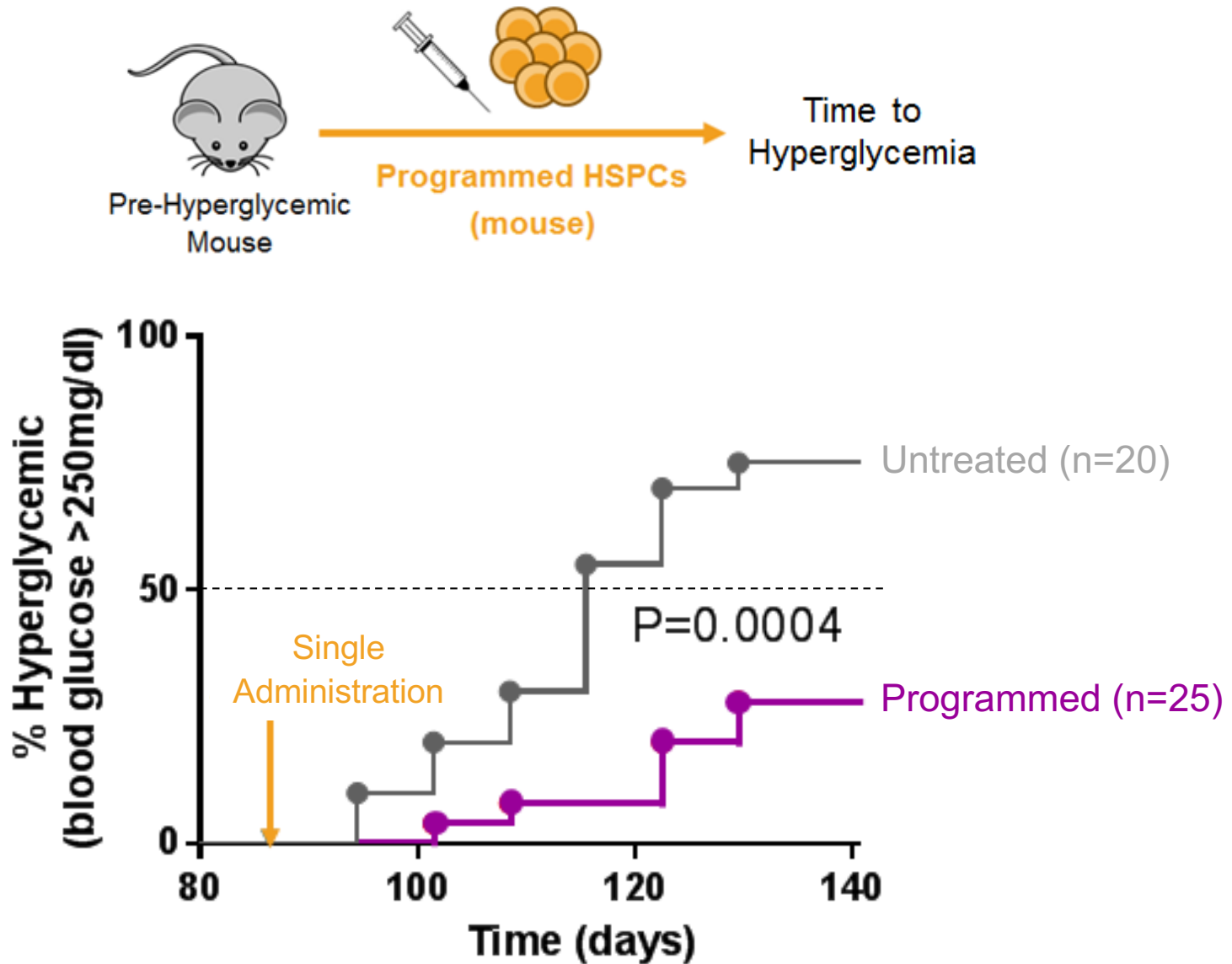


Programmed HSPCs



Immunoregulatory CD34⁺ Cell Therapy

Delayed Onset of Disease in T1D Mouse Model





- **Builds on clinical precedent suggesting role of CD34⁺ cells in regulating autoreactive T cells**
 - Sustained benefits across autoimmune disorders (e.g., T1D, MS, scleroderma) seen in HCT setting
 - Use of patient- and donor-sourced CD34⁺ cells in cell therapy field has well-established safety record
- **Unique immuno-regulatory mechanism of action**
 - T-cell targeting approach through enhanced homing of programmed CD34⁺ cells to sites of inflammation
 - Robust suppression of T cells through immune checkpoint pathways (e.g., PD-L1, IDO1)
 - Induction of immune tolerance (T-cell anergy)
- **Durable disease correction demonstrated in multiple models of immune disorders**
 - Single administration attenuates disease in murine model of type 1 diabetes
 - Single administration attenuates disease in murine model of multiple sclerosis
- **Successful pre-IND meeting supports clinical investigation**
 - Defined clear path to first-in-human testing in adult patients with T1D
 - Ongoing preclinical collaboration with leading US clinical site for T1D
 - Scientific and clinical rationale for testing ToleraCyte in multiple immune indications



Financial Summary & Milestones



Financial Summary

Three Months Ended March 31, 2017	
Revenue	\$1.0M
R&D Expense	\$8.0M
G&A Expense	\$3.0M
Adjusted Operating Expense ¹	\$9.6M
Cash & Cash Equivalents	\$82.3M
Employees	66
Total Shares Outstanding ²	55.5M



Top Investors

Investor	Amount ¹	% TSO
Redmile Group ²	15,516,803	28.0%
Franklin Advisers	6,076,879	10.9%
Fidelity Management	4,391,885	7.9%
EcoR1 Capital	2,537,026	4.6%
ARCH Venture Partners	2,473,187	4.5%
Venrock	2,473,187	4.5%
Polaris Venture Partners	2,473,187	4.5%
BVF Partners	1,945,245	3.5%
Kingdon Capital	1,711,958	3.1%
Vanguard Group	1,155,679	2.1%
		73.4%



First-in-Class Cellular Immunotherapy Pipeline

PROGRAM	PRECLINICAL	CLINICAL	RIGHTS
IMMUNO-ONCOLOGY			
FATE-NK100 – AML			Worldwide
FATE-NK100 – Solid Tumor mAb Combo			Worldwide
FATE-NK100 – Ovarian			Worldwide
Engineered hnCD16 iNK	OTS		Worldwide
Engineered CAR iT Cell	OTS		Worldwide
Ex Vivo T-Cell Modulation Collaboration			Milestones / Royalties
IMMUNO-REGULATION			
ProTmune™ – Graft-versus-Host Disease			Worldwide
ToleraCyte™ – Autoimmune Disorders			Worldwide
Engineered iCD34+ Cell	OTS		Worldwide

F^ote

THERAPEUTICS

Better Cells For Better Therapies™

