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J.P. Morgan Healthcare Conference (January 2022)

(NASDAQ:MGTA)

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The Conversation about Stem Cell Transplant: We can do better

JACOB'S STORY

Jacob had acute lymphoblastic leukemia. After years of chemo treatments and a relapse, he underwent a stem cell transplant

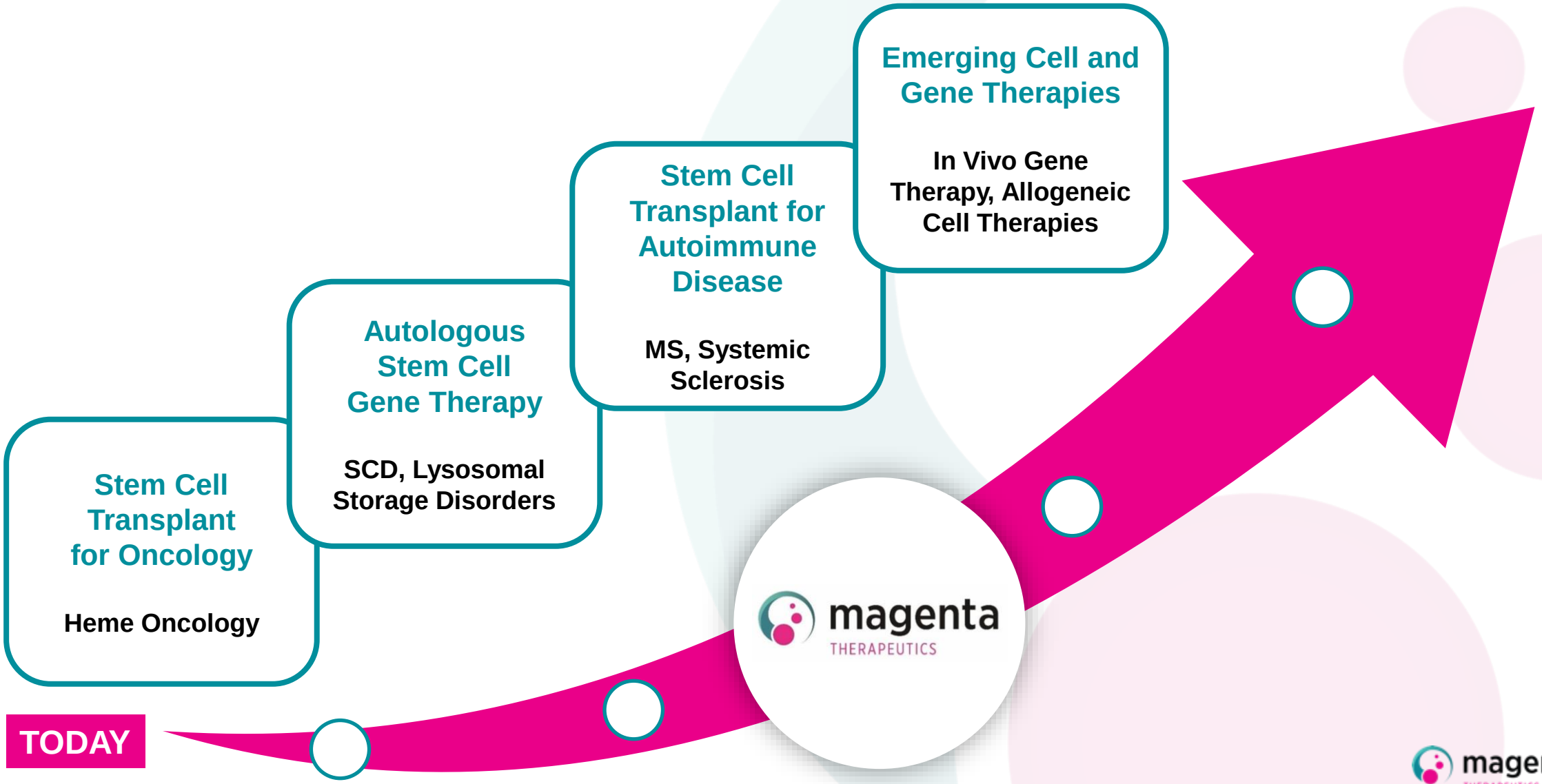
Here, during chemotherapy-based conditioning

More Patients Should Benefit from the Curative Potential of Stem Cell Transplant

Jacob post-transplant

Back in school
"life is pretty normal"

Stem Cell Transplant is a Platform for Advancing Cell and Gene Therapies



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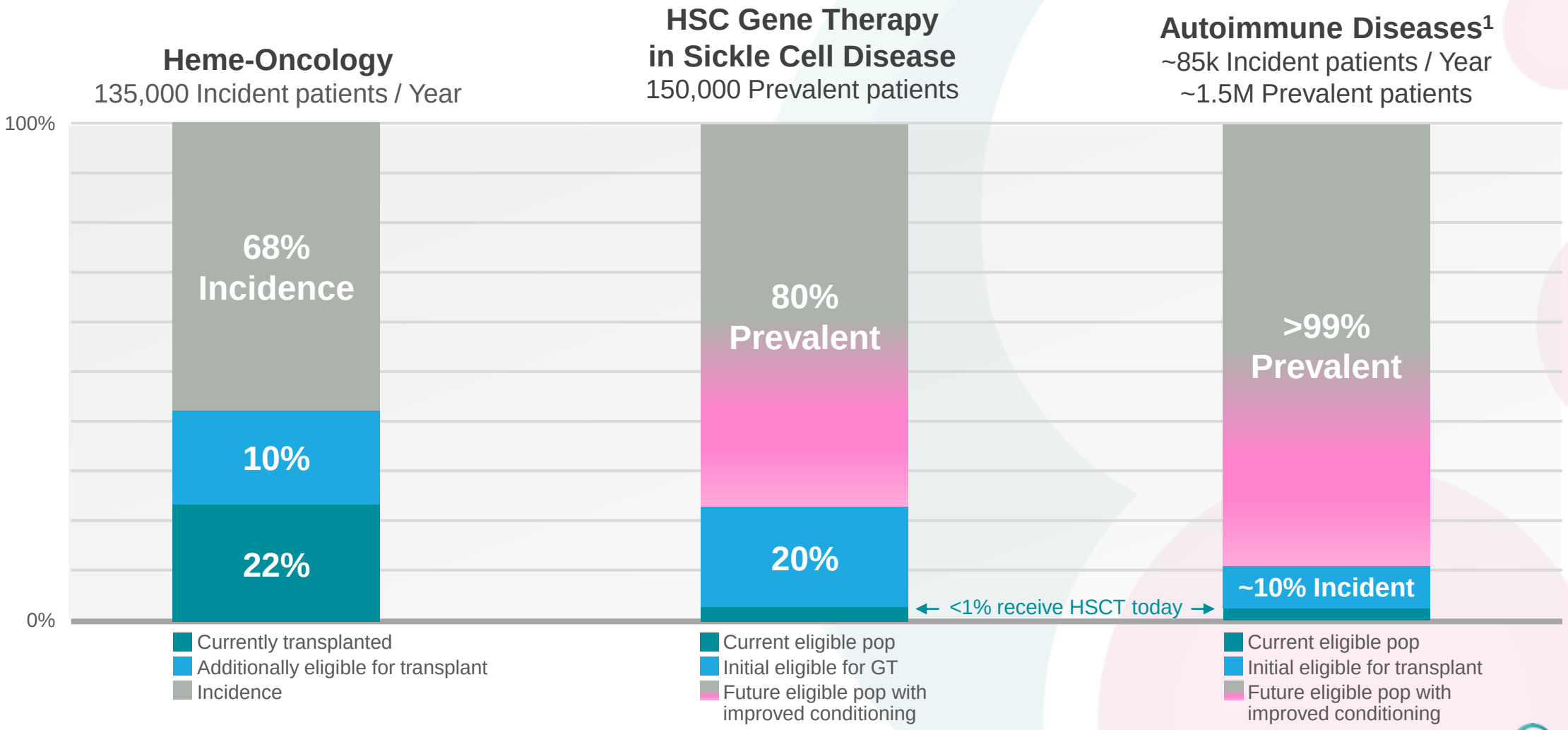
Large Existing Markets with Significant Remaining Unmet Medical Needs

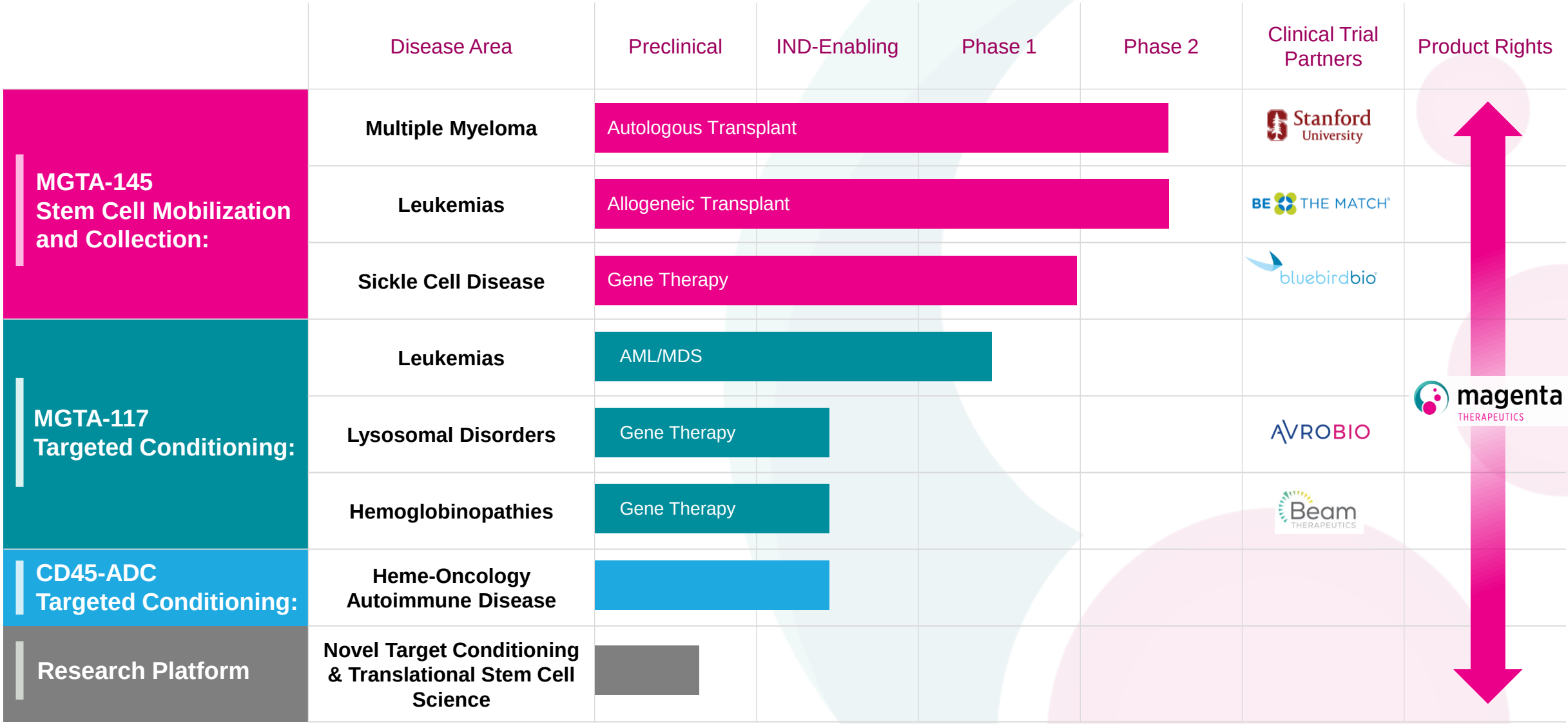
High unmet need to expand eligibility for stem cell transplants and gene therapies



Sources: Decision Resources Epidemiology, Magenta Market Research 2020, Transplant Volumes as reported by CIBMTR, EBMT, and APBMT

[1] Multiple Sclerosis and Systemic Sclerosis

The Magenta Pipeline



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Expected Value-Creating Data in 2022

MGTA-117

PHASE 1/2
Dose Escalation Study
(Relapsed/Refractory AML, MDS)

First-in-human clinical trial to evaluate (2022):

- Target engagement
- Potent cell depletion
- Rapid clearance
- Safety

MGTA-145

PHASE 2
Dosing & Administration Optimization
(Healthy Subjects)

Optimize product profile to inform further development (2H 2022):

- Improve collection yield
- Supplement existing positive data

PHASE 2
Stem Cell Mobilization Study
(Sickle Cell Disease)

Mobilization clinical trial to evaluate (2H 2022):

- Quantity and quality of mobilized and collected stem cells
- Gene modification of mobilized and collected stem cells

CD45-ADC

CD45-ADC IND-Enabling Studies

Preclinical evidence to evaluate (2H 2022):

- Conditioning of mice and primates for durable transplant
- Target engagement and cell depletion
- Preclinical toxicity profile

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TARGETED CONDITIONING

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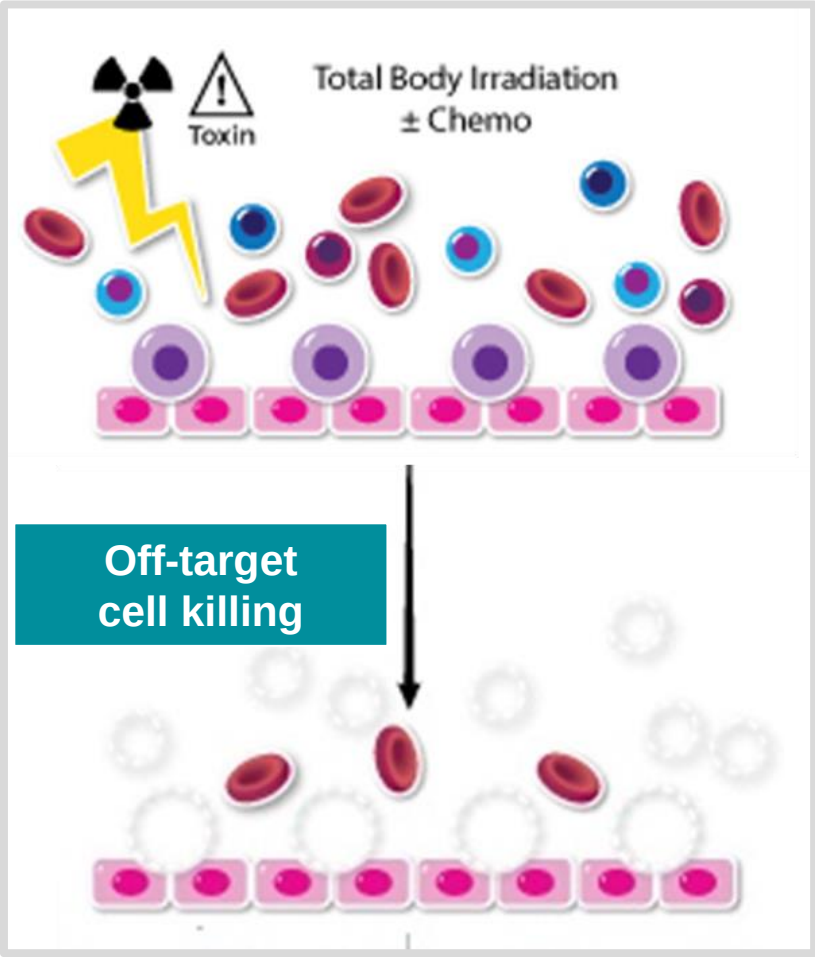
Toxicities of Current Transplant Conditioning

Chemotherapy- and Irradiation-based approaches



Commonly used Busulfan is a "Group 1" Carcinogen[1]

Acute toxicities can include:

- Neutrophil loss (infections)
- Platelet loss (bleeding)
- Anemia (fatigue)
- T-cell depletion (infection)
- Thymic damage (infection)
- Mucositis (inflammation)

Long-term toxicities can include:

- Cancer (AML)
- Organ damage
- Infertility

1 Carcinogenic properties of pharmaceutical agents evaluated in the IARC Monographs programme Carcinogenesis vol.12 no.10 pp. 1751 —1766, 1991

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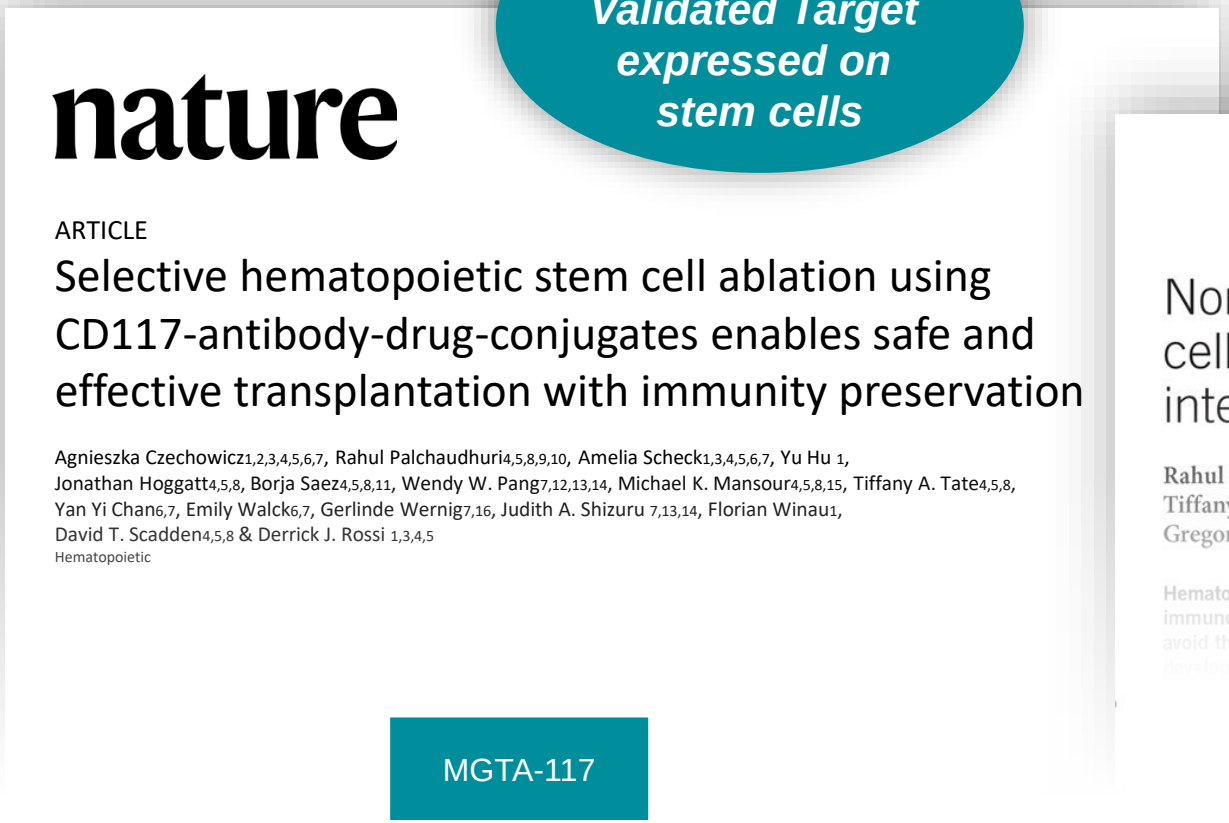
Targeted Conditioning Based on Validated Targets

CD117: Validated Target expressed on stem cells



nature

ARTICLE

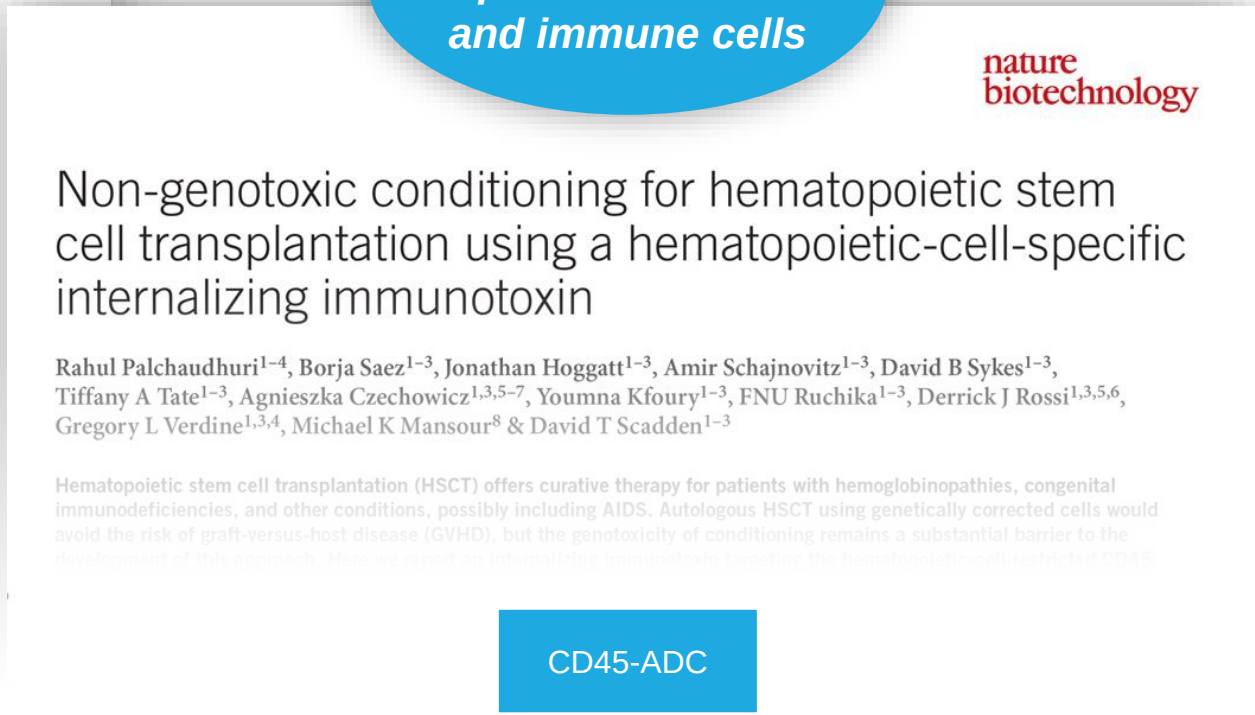
Selective hematopoietic stem cell ablation using CD117-antibody-drug-conjugates enables safe and effective transplantation with immunity preservation

Agnieszka Czechowicz[1,2,3,4,5,6,7], Rahul Palchaudhuri[4,5,8,9,10], Amelia Scheck[1,3,4,5,6,7], Yu Hu [1], Jonathan Hoggatt[4,5,8], Borja Saez[4,5,8,11], Wendy W. Pang[7,12,13,14], Michael K. Mansour[4,5,8,15], Tiffany A. Tate[4,5,8], Yan Yi Chan[6,7], Emily Walck[6,7], Gerlinde Wernig[7,16], Judith A. Shizuru [7,13,14], Florian Winau[1], David T. Scadden[4,5,8] & Derrick J. Rossi [1,3,4,5]

Hematopoietic

MGTA-117

CD45: Expressed on stem and immune cells



nature biotechnology

Non-genotoxic conditioning for hematopoietic stem cell transplantation using a hematopoietic-cell-specific internalizing immunotoxin

Rahul Palchaudhuri[1–4], Borja Saez[1–3], Jonathan Hoggatt[1–3], Amir Schajnovitz[1–3], David B Sykes[1–3], Tiffany A Tate[1–3], Agnieszka Czechowicz[1,3,5–7], Youmna Kfoury[1–3], FNU Ruchika[1–3], Derrick J Rossi[1,3,5,6], Gregory L Verdine[1,3,4], Michael K Mansour[8] & David T Scadden[1–3]

Hematopoietic stem cell transplantation (HSCT) offers curative therapy for patients with hemoglobinopathies, congenital immunodeficiencies, and other conditions, possibly including AIDS. Autologous HSCT using genetically corrected cells would avoid the risk of graft-versus-host disease (GVHD), but the genotoxicity of conditioning remains a substantial barrier to the

CD45-ADC

Sources: Czechowicz, A, Selective hematopoietic stem cell ablation using CD117-antibody-drug-conjugates enables safe and effective transplantation with immunity preservation. *Nature* 2019 Feb 6;10(1):617. Palchaudhuri, R, Scadden, D. Non-genotoxic conditioning for hematopoietic stem cell transplantation using a hematopoietic-cell-specific internalizing immunotoxin; *Nature Biotechnology.* **Vol 34 No 7**. 738-745 (2016)

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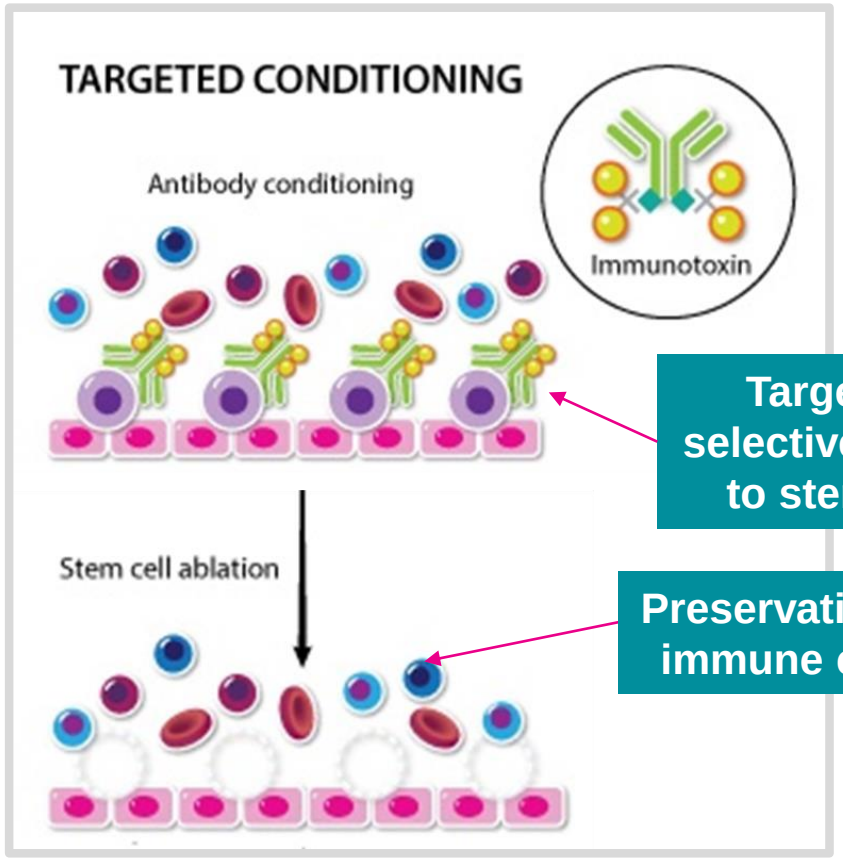
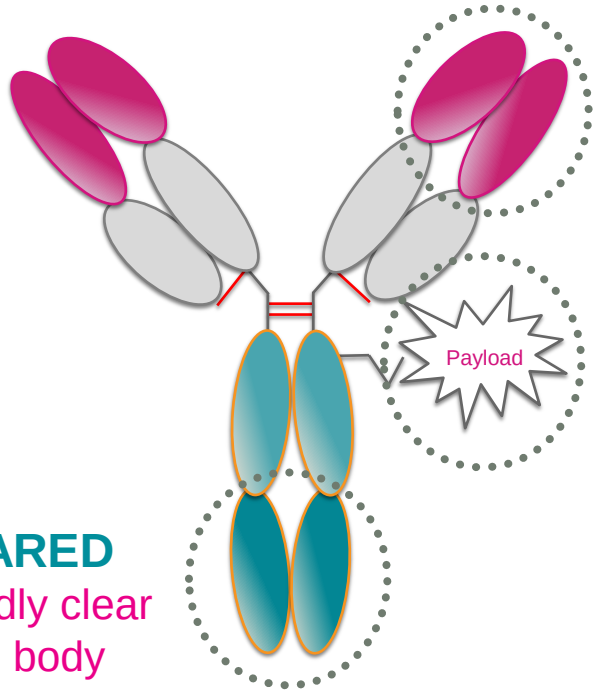
Improvements through Targeted Conditioning: MGTA-117 Designed to be Targeted, Potent and Well-Tolerated



Targeted & selective binding to stem cells

Preservation of immune cells

TARGETED
Selective binding to CD117 + target cells



POTENT
Amanitin Payload
Robust depletion of target cells

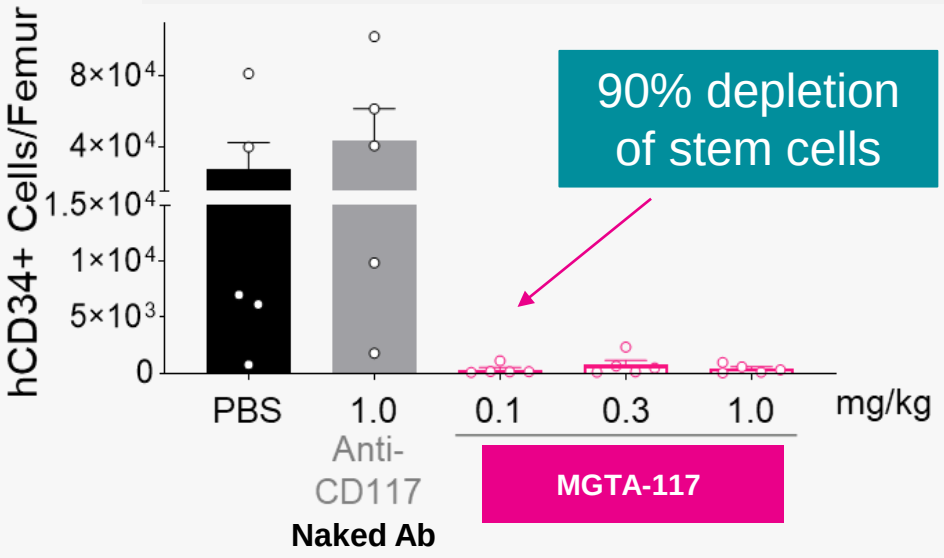
RAPIDLY CLEARED
Short half-life to rapidly clear the ADC from the body

Leads to potential for high efficacy with improved safety/tolerability for patients over current chemo-based conditioning

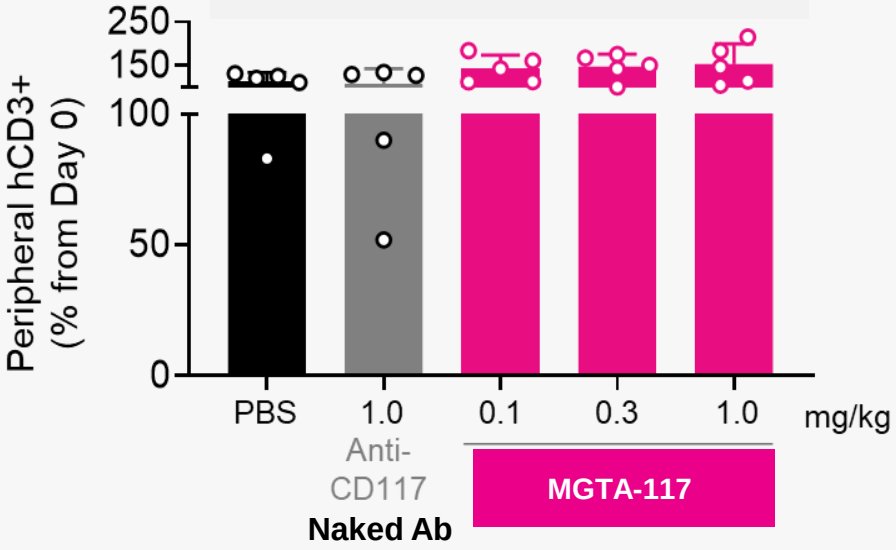
Preclinical Evidence of MGTA-117 Targeting and Selective Binding

A Single Dose of MGTA-117 Selectively Binds to and Depletes Human Stem Cells in the Bone Marrow of Humanized Mice

Potent depletion of Human Stem Cells . . .



. . . without T-cell depletion



✓ **Robust depletion** of stem cells in bone marrow **without** peripheral T-cell depletion

Sources: MGTA-117 Pre-Clinical Data on File

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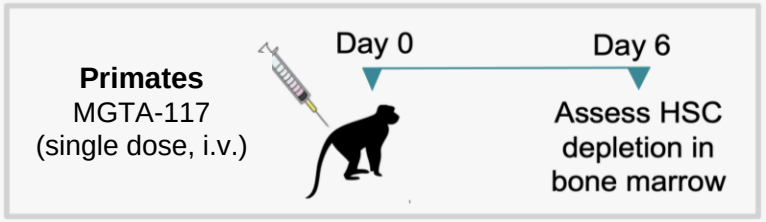
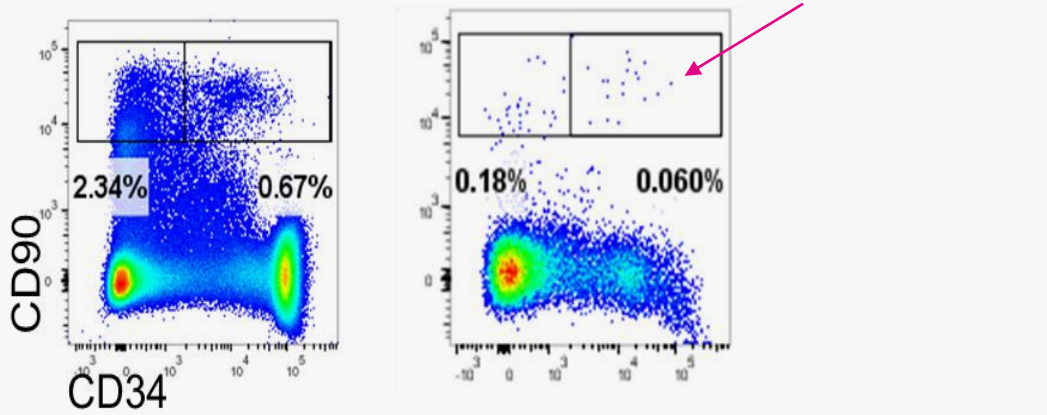
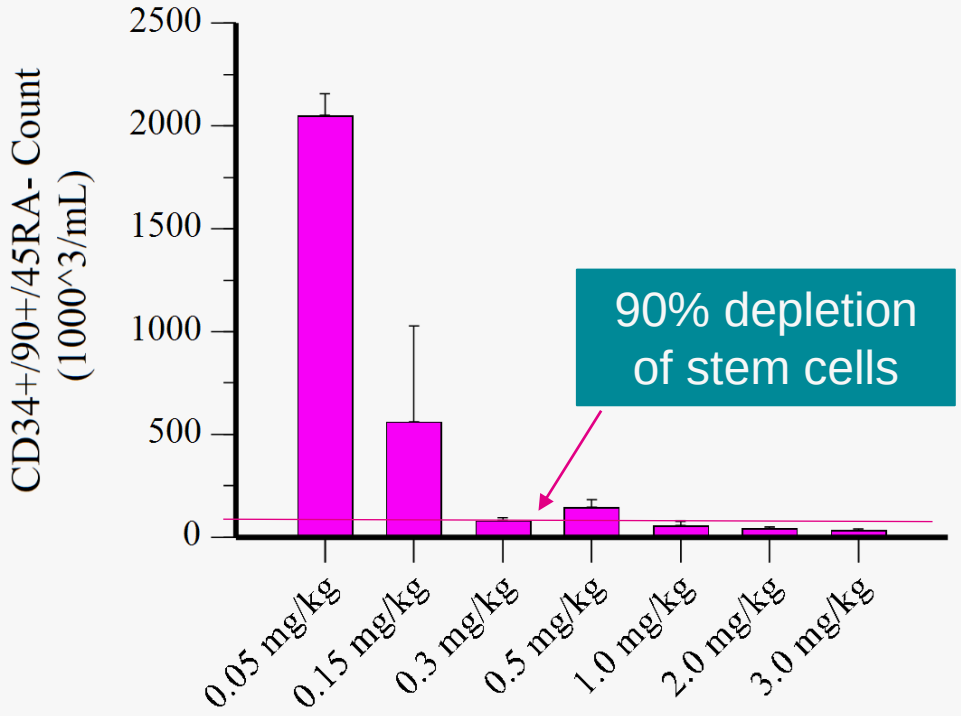
Preclinical Evidence of MGTA-117 Potency

Single Dose of MGTA-117 Selectively Depletes Stem Cells in Primates





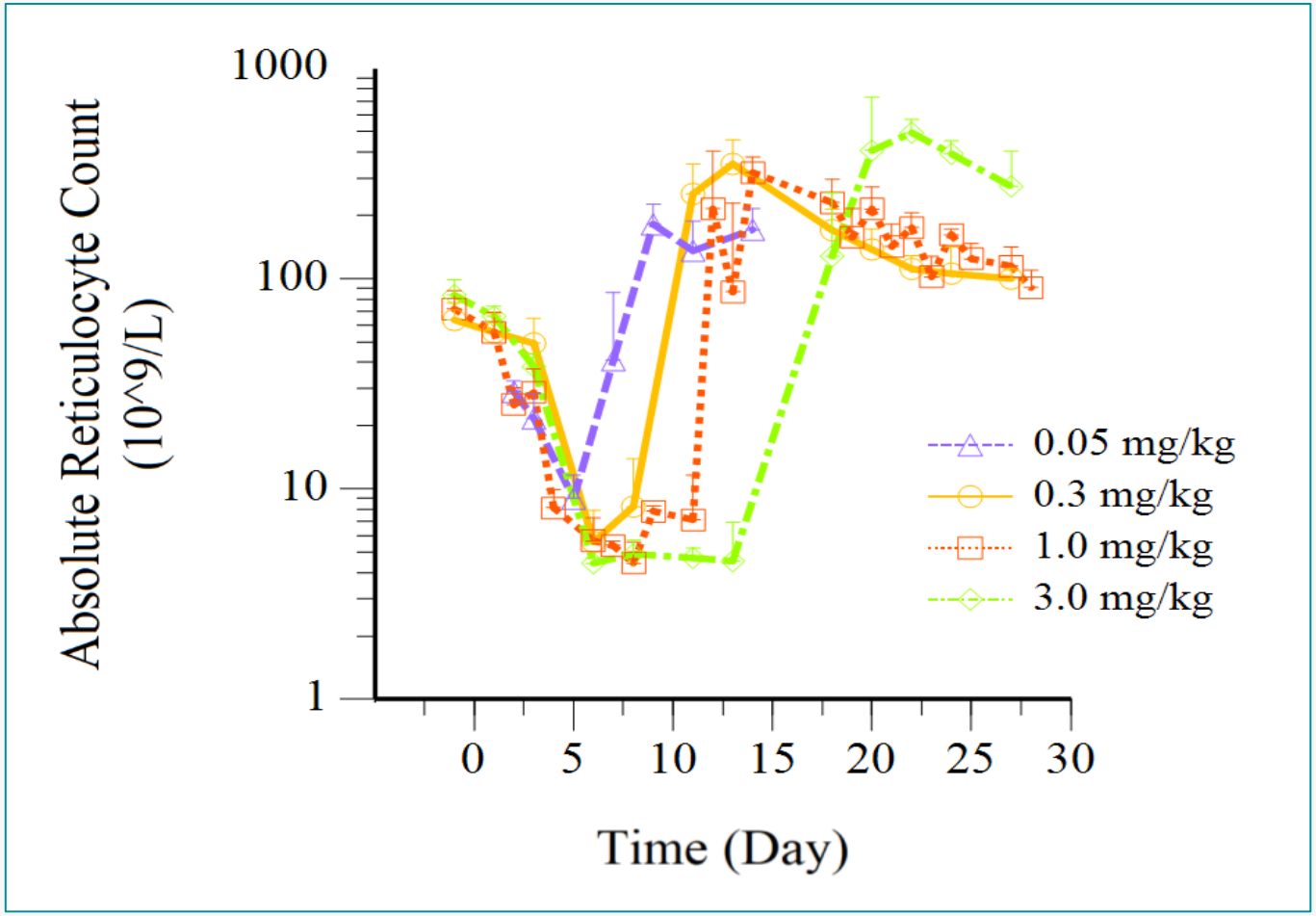


✓ **Robust depletion of** stem cells in primates at low doses

 Sources: MGTA-117 Pre-Clinical Data on File:

Preclinical Evidence of MGTA-117 Potency

Erythroid Progenitors in the Bone Marrow Express CD117 and are Depleted by MGTA-117 in Primates



- ✓ MGTA-117 led to dose-dependent **reduction of reticulocytes in days**
- ✓ *Reticulocytes are a sensitive and early biomarker for MGTA-117 depletion of stem and progenitor cells*

Source: MGTA-117 Pre-Clinical Data in primates. Data on file.

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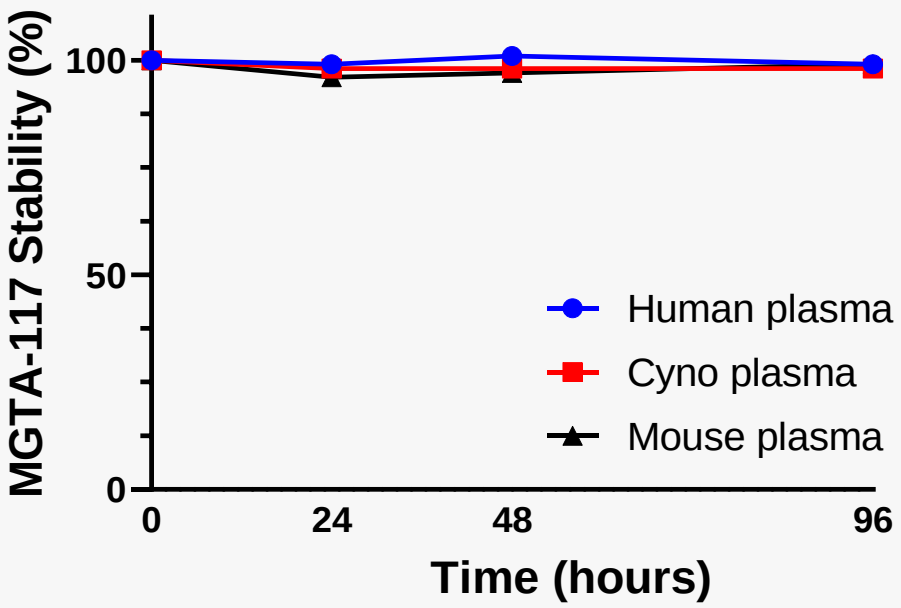
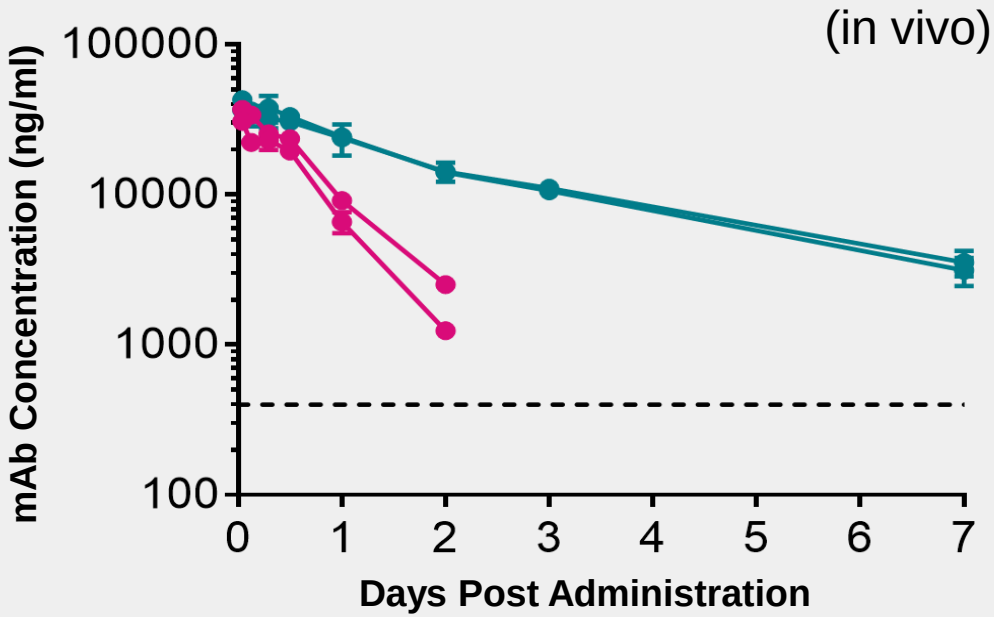
MGTA-117 Preclinical Evidence of Linker Stability and Short Half-Life

MGTA-117 is Stable in Plasma across Species



✓ MGTA-117 remains intact with no loss of payload in plasma, providing potential for improved tolerability and reduced safety risks

MGTA-117 has a Short Half-life and is Cleared Faster than Normal Antibody in Primates



Group	Half Life (Hours)
Engineered half-life IgG	11
Wild-type IgG	60

Source: Magenta preclinical Data on File

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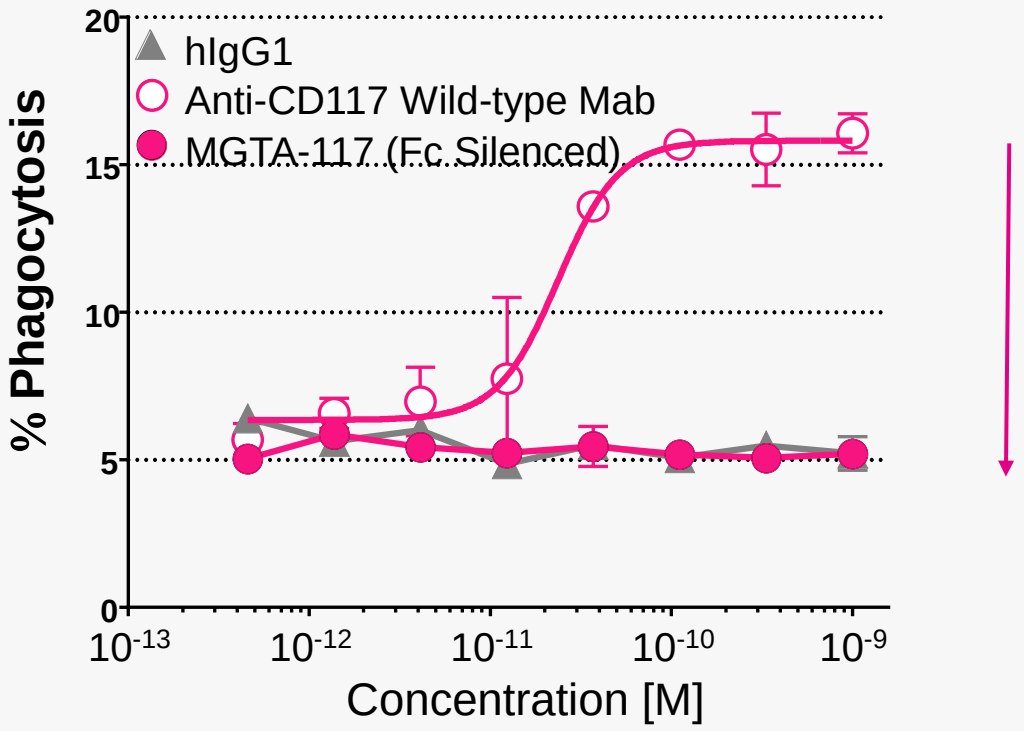
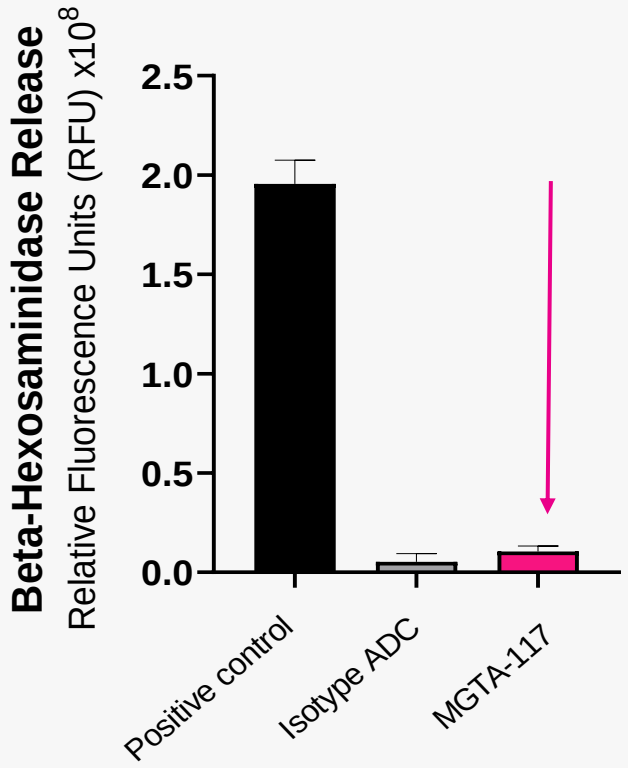
MGTA-117 Preclinical Evidence Supporting Tolerability

Fc Silencing Minimizes Effector Function



✓ MGTA-117 Fc design successfully silences phagocytosis, as a measure of immune activation

Anti-CD117-Mediated Mast Cell Degranulation is Minimized



✓ MGTA-117 avoids the potential of mast cell degranulation through the mutation of the Fc region

Source: Magenta Preclinical Data on File.

MGTA-117 GLP Toxicology Studies Key Conclusions

The expected effects of single dose MGTA-117 were observed in bone marrow at lower doses than seen in liver

- Primate GLP toxicology studies were done with a single dose of MGTA-117
- At the exposure (or the dose level) where 90% depletion of stem cells in the bone marrow was observed, MGTA-117 was well-tolerated with:
  - no evidence of injury to liver or reproductive organs
  - no clinical or histopathological effects on the immune system, kidney, neurologic, cardiovascular or pulmonary organs
- In the same primate GLP tox study, at higher dose levels, liver effects were observed as expected.

Source: Magenta Preclinical Data on File.

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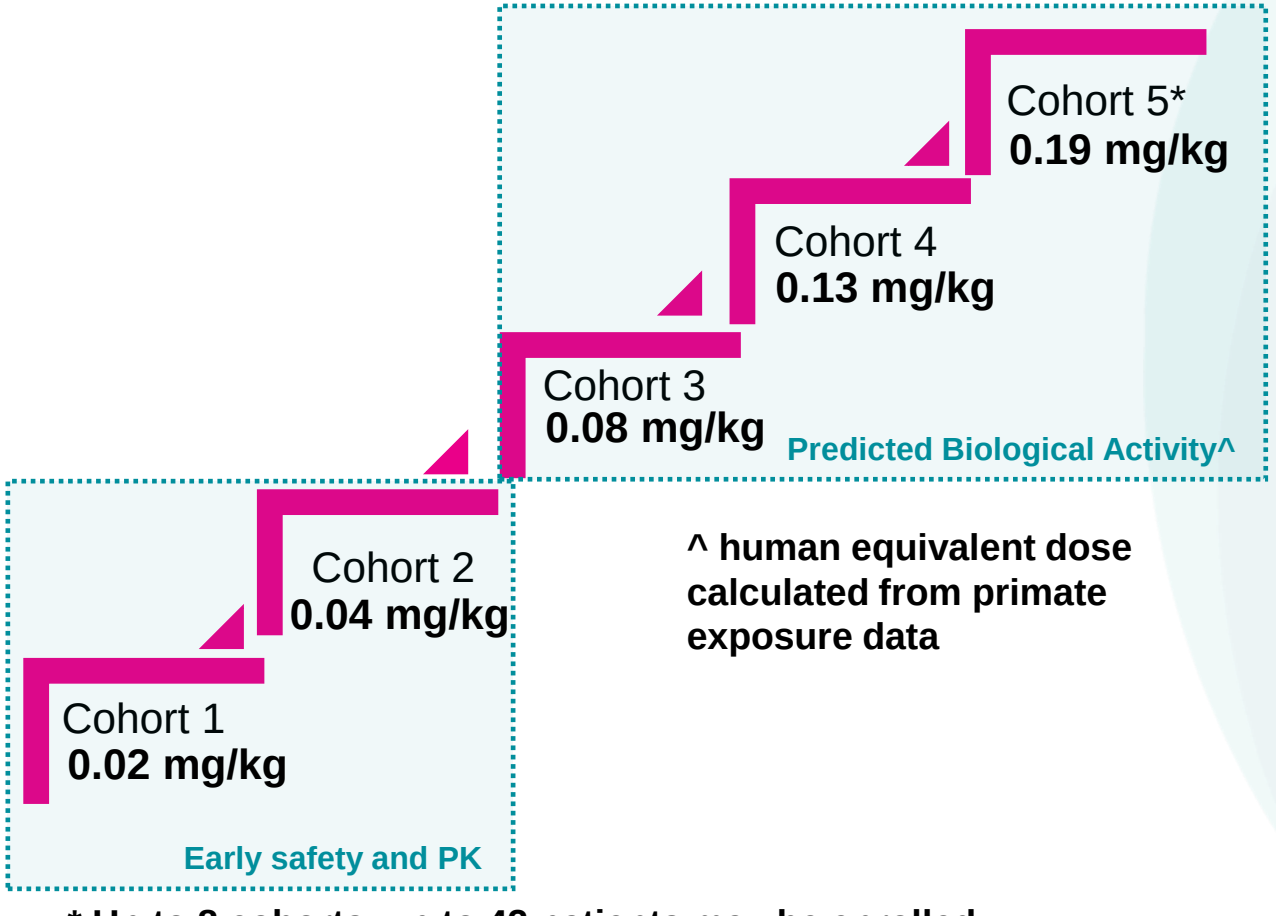
MGTA-117 Phase 1/2 Clinical Trial Design

Phase 1/2 Study in CD117+ patients with Relapsed/Refractory Acute Myeloid Leukemia (R/R AML) or Myelodysplasia with Excess Blasts (MDS-EB)



^ human equivalent dose calculated from primate exposure data

Study Design	• Multi-center, US Study • Open Label • Single Ascending Dose(s) • 3+3 cohort design • Modified Fibonacci Sequence for Dosing
Key Objectives	• Tolerability/Safety • Target engagement (RO) • Clearance (PK) • Potency with cell depletion (PD)

*** Up to 8 cohorts, up to 42 patients may be enrolled**
Doses: 0.02-0.40 mg/kg

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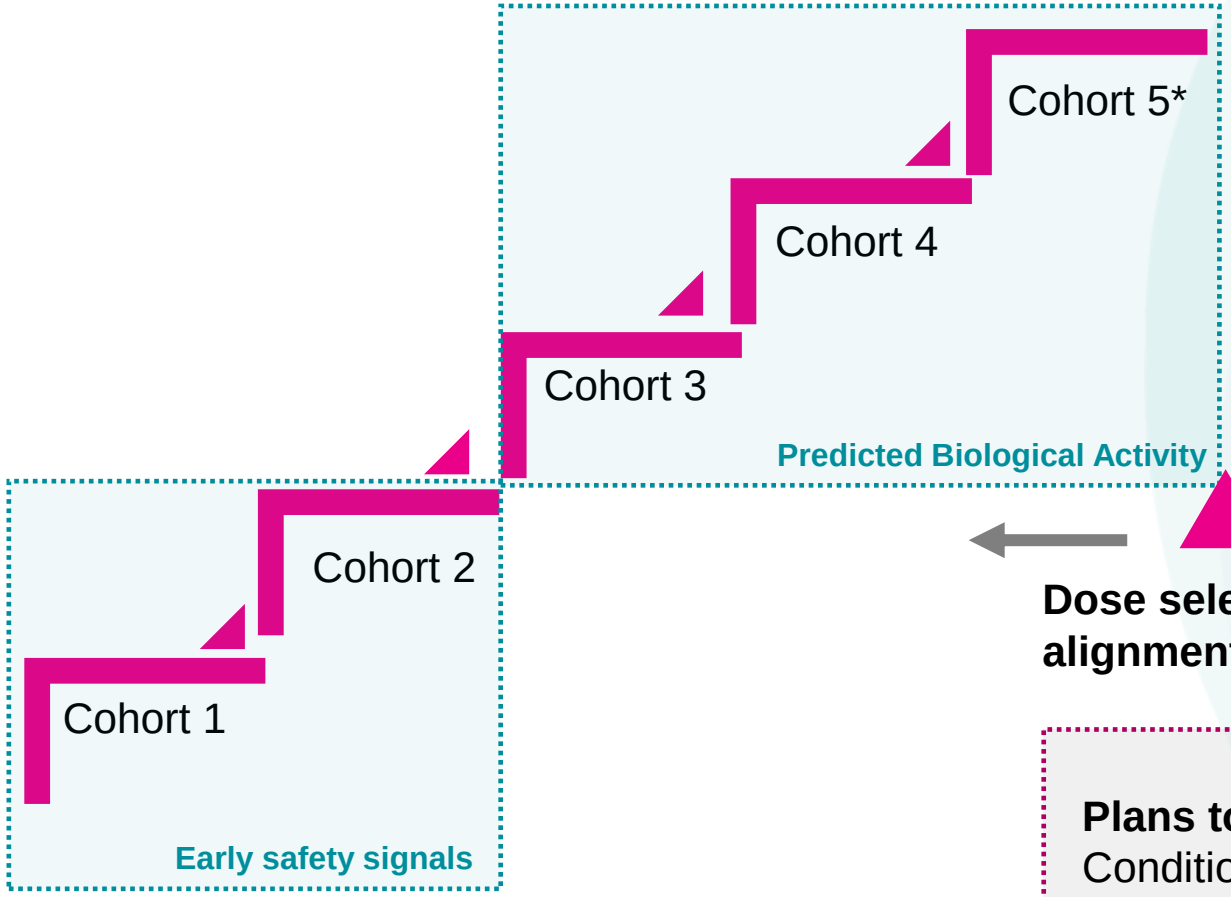
Further Development Anticipated in Transplant-Eligible and Gene Therapy Patients

Relapsed/Refractory Acute Myeloid Leukemia (R/R AML) or (MDS-EB)



Dose selection and alignment with FDA

Transplant-Eligible Patients & Gene Therapy Conditioning

Transition to Transplant-Eligible:
Allogeneic Transplant in AML with Reduced Intensity Conditioning (RIC)

Plans to Develop in Gene Therapy
Conditioning as monotherapy for Gene Therapy

- Clinical collaborations with partners

Beam THERAPEUTICS AVROBIO

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MGTA-117 Potential Improvements for Heme-Onc Patients: Ability to Choose Efficacy and Safety

MGTA-117 Value Proposition	MGTA-117	Chemo-based conditioning
Targeted to specifically deplete HSCs	✓	X
Potential to limit long-term risks and organ damage from high dose chemo	✓	X
Potential to improve risk-benefit, delivering high efficacy with reduced intensity chemo	✓	X
Potential fast clearance to enable move to transplant quickly, limiting immuno-compromised state	✓	X

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MGTA-117 has Potential to Drive Expansion of Patient Eligibility across Stem Cell Transplant and Gene Therapies

MGTA-117 Target market includes: Auto transplant for AML, MDS

Heme-Oncology **Incident Market**

100%

41k pts/yr diagnosed

Target market

8k pts/yr

Eligible patients but not transplanted

11k pts/yr*

Annual transplants for AML, MDS

0%

- Currently transplanted
- Eligible for transplant
- Disease incidence
  Potential to expand with improved conditioning

HSC Gene Therapy for Sickle Cell Disease **Prevalent Market**

~120k

~30k

- Currently transplanted
- Initially eligible for GT
- Future eligible pop with improved conditioning

Improved conditioning identified as key to unlocking expansion of HSC Gene therapies

Initial Target market = 30k Sickle cell patients (20% of pop) addressable by gene therapy with current busulfan conditioning

Sources: Decision Resources Epidemiology – AML,MDS in major global markets, Magenta Market Research 2020, Transplant Volumes as reported by CIBMTR, EBMT, and APBMT

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SECOND TARGETED CONDITIONING PROGRAM

CD45-ADC

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CD45-ADC: Potential Monotherapy for Autoimmune Diseases and All Allogeneic Transplant

Target
CD45

Cells Depleted
Stem Cells and Immune Cells

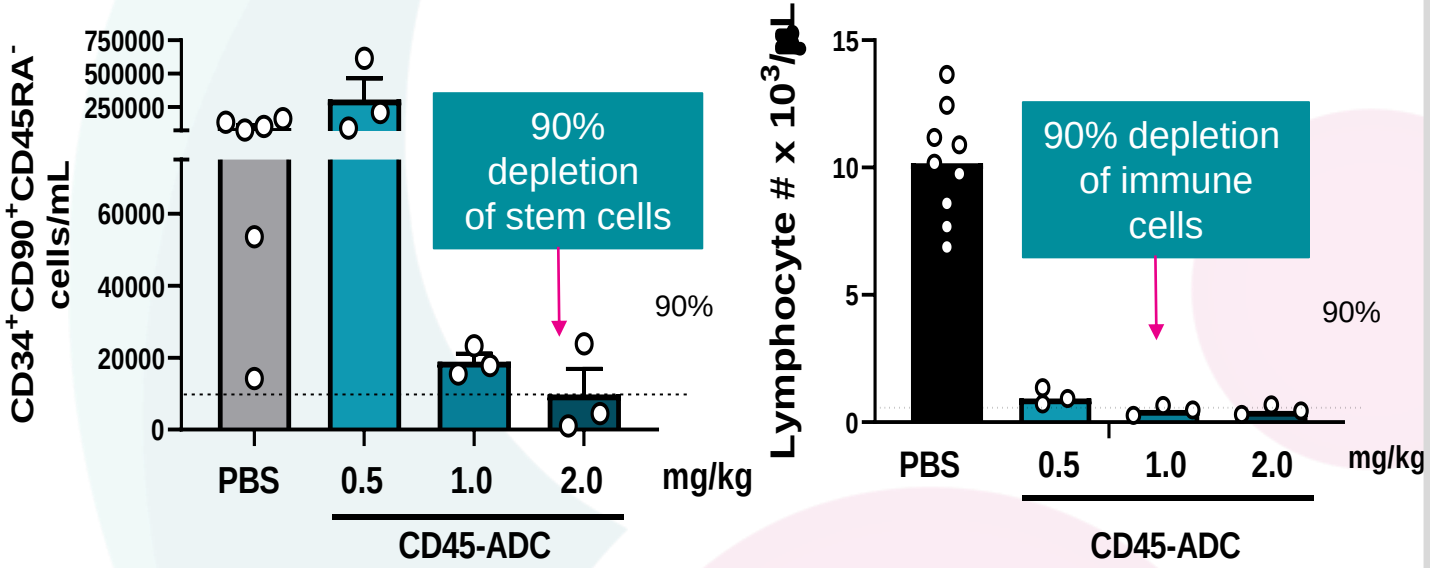
Diseases
Autoimmune Diseases, Heme-Oncology

Current Status

GMP manufacturing started

Advance toxicology studies

Stem Cell Depletion **and** **Immune Cell Depletion**



A single dose of CD45-targeted ADC depleted stem cells and immune cells in primates

Source: Magenta Preclinical Data on File

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HEMATOPOIETIC STEM CELL MOBILIZATION

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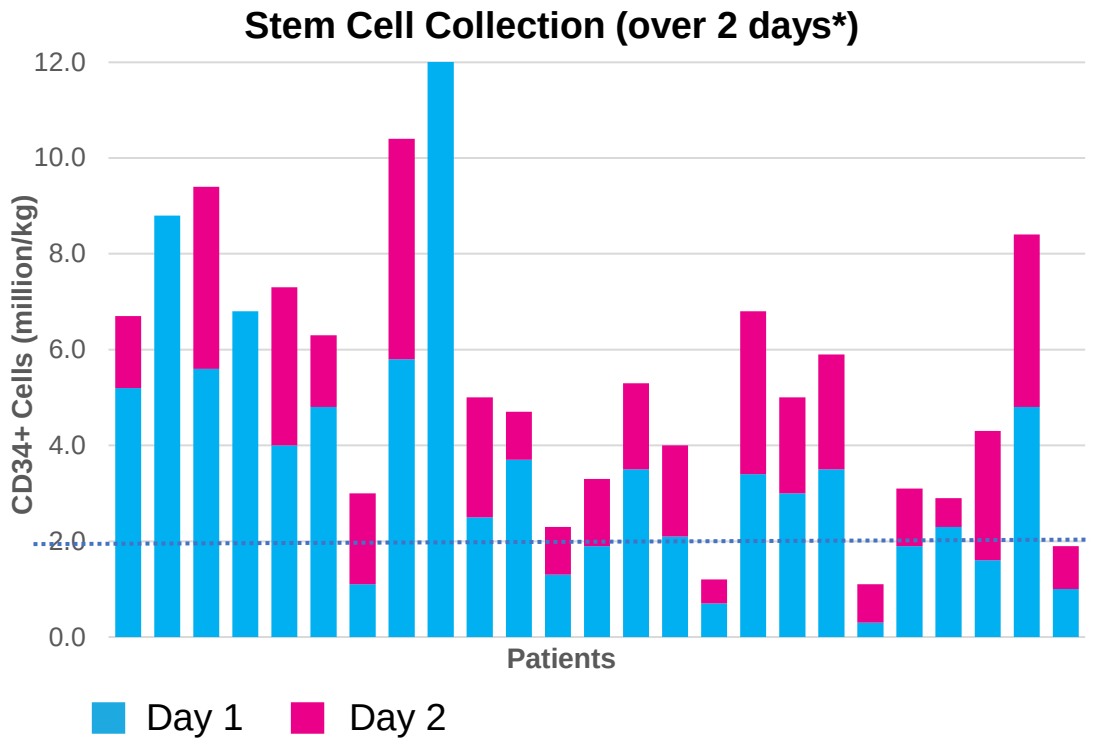
MGTA-145 Clinical Data Confirms Potential Clinical Benefit

MGTA-145 Progress in Multiple Myeloma from Single-Center Phase 2 Investigator-Initiated Trial (n=25 patients)

- Compelling mobilization and apheresis data
  - **88% of patients achieved 2M cells/kg**
  - **70% of patients achieved 4M cells/kg**
- Timely engraftment of MGTA-145 mobilized cells
- Well-tolerated
- Durable engraftment in 100% of patients



Engraftment Data (N=18)	
Engraftment (% patients)	**18/18 (100%)**
Days to Neutrophil engraftment (range)	12 (11-15)
Days to platelet engraftment (range)	17.5 (15-33)
Durable engraftment at day 100 post-transplant (% patients)	**13/13 (100%)**

Source: MGTA-145 + Plerixafor Provides GCSF-Free Rapid and Reliable Hematopoietic Stem Cell Mobilization for Autologous Stem Cell Transplant in Patients with Multiple Myeloma: A Phase 2 Study. Surbhi Sidana, M.D. ASH December 2021

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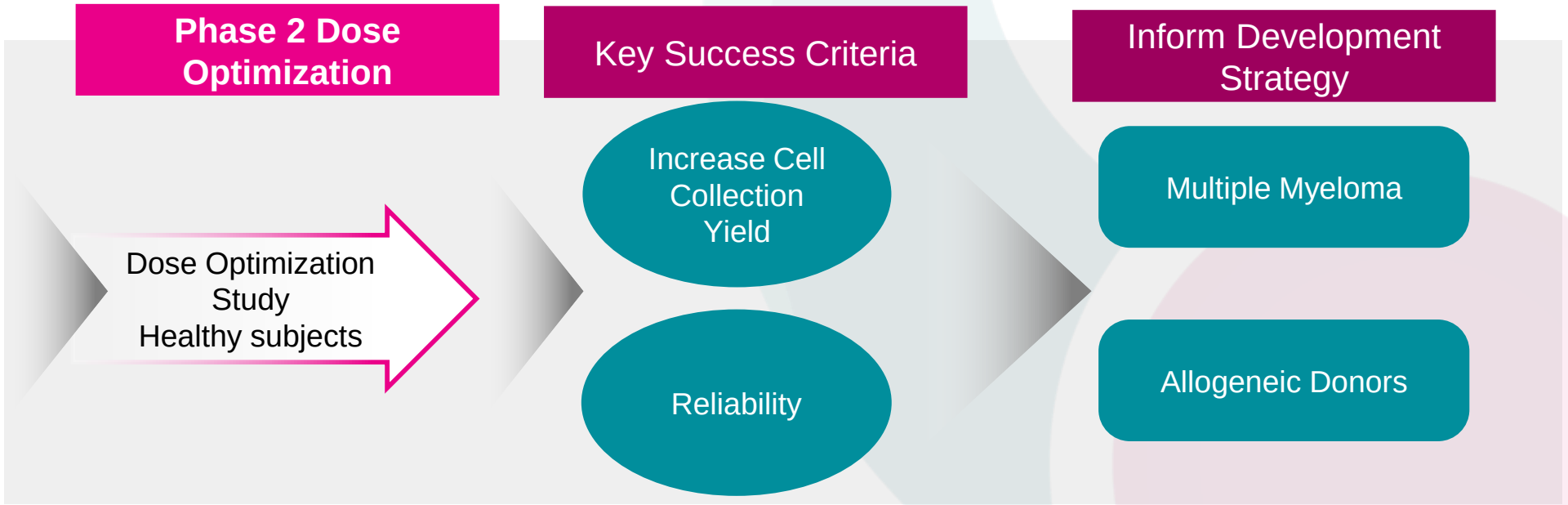
MGTA-145 Dosing Regimen Optimization Opportunities

Market feedback and internally identified adjustments guiding 2022 Development

- 2021 Market research confirms **value of non-GCSF regimen**
- HCPs target slightly higher cell yield and predictability
  - Majority of Health Care Professionals target **3-6M CD34+ cells/kg in >75% of patients**
- PK modeling highlights dosing/admin profile adjustment opportunity

2022 Development will provide data relevant to:

- Establish an optimized dosing regimen to achieve **improved cell yield**
- Inform and enable potential next steps in clinical development and registration path



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MGTA-145 Sickle Cell Disease Development

Phase 2 Signal Finding (Mobilization)	Key Success Criteria	Informed Development Strategy
Sickle Cell Disease bluebirdbio	Cell Collection Efficiency Safety	**Sickle Cell Disease** Gene Therapy Transplant

2022 Sickle Cell Development to Evaluate:

Mobilization efficacy and safety data in sickle cell patients

Ability to gene-modify MGTA-145-mobilized stem cells

Development and transition to gene therapy transplant study

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MGTA-145 can Address Significant Existing Markets with Growth Opportunities

Heme-Oncology*
Incident Market

***MGTA-145 Target Market includes**
Myeloma, AML/MDS and ALL

HSC Gene Therapy
for Sickle Cell Disease
Prevalent Market

100%

90k diagnosed/ year

14k/yr

New eligible patients/year but not transplanted

30k/yr

Annual transplants for Heme-Oncology

Target market

0%

~120k

~30k

Improved conditioning identified as key to unlocking expansion of HSC Gene therapies

Initial Target market = 30k Sickle cell patients (20% of pop) addressable by gene therapy with current busulfan conditioning

Currently transplanted
Eligible for transplant
Disease incidence

Currently transplanted
Initially eligible for GT
Future eligible pop with improved conditioning

Sources: Decision Resources Epidemiology in major Global Markets, Magenta Market Research 2020, Transplant Volumes as reported by CIBMTR, EBMT, and APBMT

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COMMERCIAL OPPORTUNITY FOR THE PIPELINE

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Our Portfolio can Address a Broad Spectrum of Diseases

We are developing a portfolio of immune and blood reset medicines intended to make cures possible for all patients who can benefit, including those with heme malignancies, rare genetic diseases, and autoimmune disease

Heme-Oncology*

Functional Cure via
Stem Cell Transplant

- MGTA-117
- CD45-ADC
- MGTA-145

Genetic Diseases

Functional Cure via
HSC Gene Therapies

- MGTA-117
- MGTA-145

Autoimmune diseases**

Curative Immune Reset via
Stem Cell Transplant

- CD45-ADC
- MGTA-145

Reliable Mobilization of Stem Cells with Robust Engraftment are Required for All Transplants

** Multiple Sclerosis, Systemic Sclerosis

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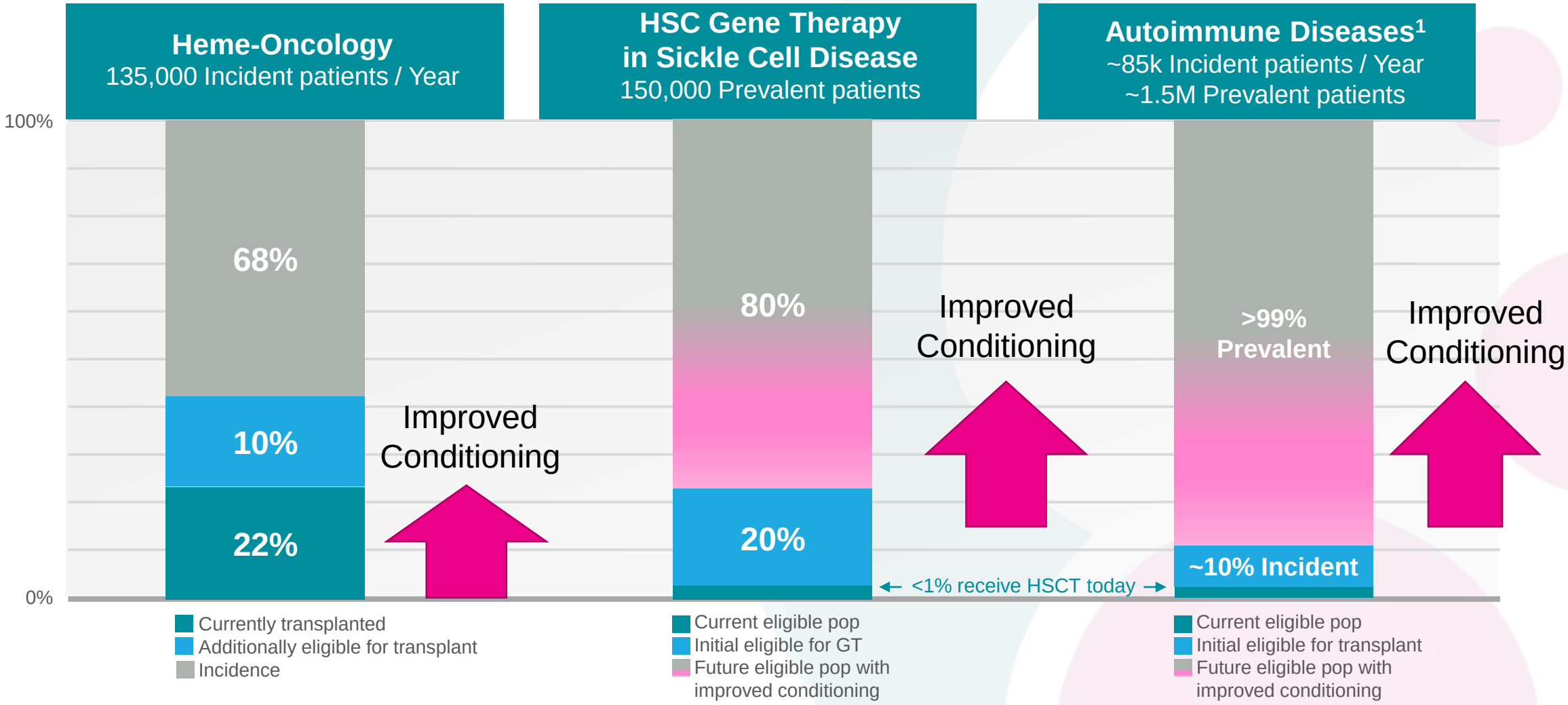
Across Portfolio: Existing Unmet Needs and Expansion of Patient Eligibility



Sources: Decision Resources Epidemiology, Magenta Market Research 2020, Transplant Volumes as reported by CIBMTR, EBMT, and APBMT

[1] Multiple Sclerosis and Systemic Sclerosis

LOOKING AHEAD

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Key Goals and Milestones Ahead in 2022

MGTA-117

- First clinical data for MGTA-117 in 2022

MGTA-145

- Dose and administration optimization data in 2H
- First clinical data in Sickle Cell Disease in 2H

CD45-ADC

- Advancing IND-enabling studies including toxicology study in 2H

Well-Capitalized

- Projected cash runway into Q4 2023

magenta THERAPEUTICS

The Power of Stem Cell Transplant

NANCY MCLANE

Longest living stem cell recipient with her sister and physician