Kite Pharma



Building the Future of Cancer T-Cell Immunotherapy

Jefferies Global Healthcare Conference

November 20, 2014

Forward Looking Statements / Safe Harbor

To the extent statements contained in this presentation are not descriptions of historical facts regarding Kite Pharma, Inc. ("Kite," "we," "us," or "our"), they are forward-looking statements reflecting management's current beliefs and expectations. Forward-looking statements are subject to known and unknown risks, uncertainties, and other factors that may cause our or our industry's actual results, levels or activity, performance, or achievements to be materially different from those anticipated by such statements. You can identify forward-looking statements by words such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "will," "would" or the negative of those terms, and similar expressions that convey uncertainty of future events or outcomes. Forward-looking statements contained in this presentation include, but are not limited to, statements regarding: (i) the success, cost and timing of our product development activities and clinical trials; (ii) the ability and willingness of the National Cancer Institute (NCI) to continue research and development activities relating to our product candidates; (iii) our ability to obtain and maintain regulatory approval of KTE-C19 and any other product candidates; (iv) the ability to license additional rights relating to product candidates and to comply with our existing license agreements; (v) our ability to obtain funding for our operations and further development and commercialization of our product candidates; (vi) the commercialization of our product candidates, if approved; (vii) our plans to research, develop and commercialize our product candidates; (viii) future agreements with third parties in connection with the commercialization and supply of our product candidates and any other approved product; (ix) the size and growth potential of the markets for our product candidates, and our ability to serve those markets; (x) the rate and degree of market acceptance of our product candidates; (xi) our ability to attract and retain key scientific or management personnel; (xii) the accuracy of our estimates regarding expenses, future revenue, capital requirements and needs for additional financing; (xiii) our use of proceeds from this contemplated offering; and (xiv) our expectations regarding our ability to obtain and maintain intellectual property protection for our product candidates. Various factors may cause differences between our expectations and actual results. Except as required by law, we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise.

This presentation is made pursuant to Section 5(d) of the U.S. Securities Act of 1933, as amended ("test-the-waters"), and is intended solely for investors that are either qualified institutional buyers or institutions that are accredited investors (as such terms are defined under SEC rules) solely for the purpose of determining whether such investors might have an interest in a securities offering contemplated by us. Any such offering of securities will only be made by means of a registration statement (including a preliminary prospectus) filed with the SEC, after such registration statement is filed and meets the requirements of the U.S. Securities Act of 1933, as amended. No such registration statement has been filed, as of the date of this presentation. This presentation shall not constitute an offer to sell or the solicitation of an offer to buy these securities, nor shall there be any sale of these securities in any state or jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such state or jurisdiction.

Kite Pharma Overview

- Focus on Engineered Autologous Cell Therapy (eACT™)
- Founded in 2009
- Location: Santa Monica, CA
- 45 employees, including 28 R&D
- 20,000 sq. feet, including R&D labs
- Broad IP, dominant CAR technology estate
- Streamlined and rapid eACT ™ manufacturing process



Kite Pharma — Milestones

2008	2009	2010	2011	2012	2013	2014	2015
	KITE PHARMA FOUNDED			CRADA (NCI)	IP estate completed	IPO	Accelerated clinical development KTE-C19

- 2008: NCI First TCR Therapies
- 2009: NCI First CAR Therapy (anti-CD19)
- 2010: NCI CAR Clinical Data
- 2011: NCI TCR Clinical Data



Science 342: 1433, Dec 2013

Inventors & Clinical Pioneer - CAR T Cells



Zelig Eshhar, Ph.D. (Member Scientific Advisor Board)

- Chairman of Immunology Research, Sourasky Medical Center, Tel Aviv
- Professor Emeritus, Weizmann Institute of Science, Israel



Margo R. Roberts, Ph.D.

- Chief Scientific Officer, Kite Pharma, Inc.
- Inventor on 16 US patents and patent applications related to CAR T cell technology and tumor vaccine therapies

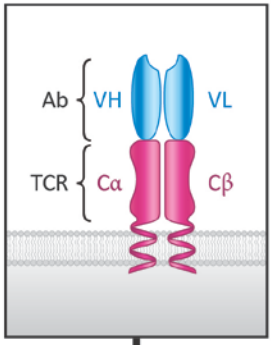


Steven Rosenberg, M.D., Ph.D.

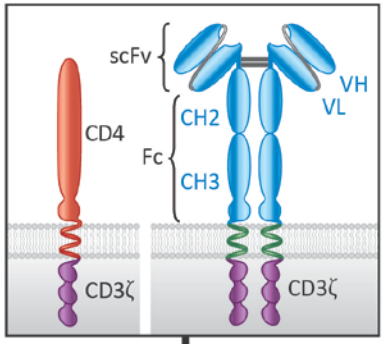
- Chief of Surgery, NCI
- Professor of Surgery, Uniformed Services University of Health Sciences and George Washington University School of Medicine and Health Sciences

Evolution of CAR Technology and its IP

Gross, 1989
Ab-TCR CAR



Roberts, 1994
1st gen anti-HIV CARs: preclinical study
CD4ζ scFv-based CAR

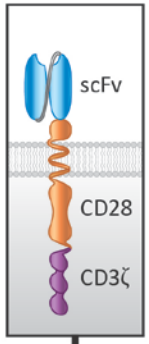


Kershaw, **2000**
Clinical trial with 1st gen anti-folate receptor CAR

Lamers, **2006, 2007**
Clinical trial with 1st gen CAR anti-CA-IX CAR

Walker, **1996**
Clinical trial with 1st gen anti-HIV CAR: CD4ζ

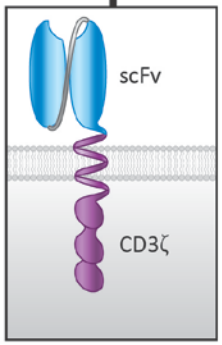
Kochenderfer, 2010
Clinical trial with 2nd gen CAR (α-CD19)



1989 1991 1993 1994 1995 1996 2010

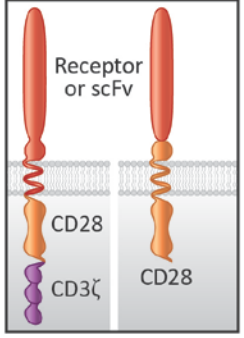
Irving & Weiss, **1991**
CD8ζ CAR: proof of concept

Romeo & Seed, **1991**
CD4ζ CAR: anti-HIV



Eshhar, 1993
scFv-CAR

Stancovski; Hwu; Gross, 1993
Anti-tumor CAR



Roberts, 1995
US 5712149 2nd gen CAR

Alvarez-Vallina & Hawkins, **1996**
scfv-CD28

Krause, **1998**: scFv-CD28;
Finney, **1998**: 2nd gen scFv-CAR

Kite Intellectual Property Estate

- Dominant IP position for CAR technology through 2027
- Broadest claims for all scFv-based CAR constructs
  - Patent estate consolidates the CAR IP from Z. Eshhar, Yeda-Weizmann, NCI, UCSF, and Cell Genesys and includes the two lead patents (Eshhar 7,741,465 and Roberts 5,712,149)
- Expanding portfolio of specific TCR/CAR products
- EGFRvIII, NY-ESO-1, SSX2, and others
- Optimized and closed system manufacturing processes

Leadership Team with Extensive Industry Expertise

Arie Belldegrun, M.D., FACS Founder, Chairman, President, CEO	UCLA, Teva, Arno, Cougar, Agensys, NCI
Cynthia M. Butitta, MBA COO and CFO	NextWave, Telik, Connetics
David D. Chang, M.D., Ph.D. EVP R&D, CMO	Amgen, UCLA
Helen S. Kim EVP, Business Development	NGM Biopharmaceuticals, Kosan, Onyx, Chiron
Margo R. Roberts, Ph.D. Chief Scientific Officer	University of Virginia, Cell Genesys
Jeffrey Wiezorek, M.D., M.S. VP, Clinical Development	Amgen, UCLA, California Institute of Technology
Marc Better, Ph.D. VP, Product Sciences	Boehringer Ingelheim, Amgen, Abgenix, XOMA

Kite Clinical Development Team

David D. Chang, M.D., Ph.D. Executive Vice President, R&D, CMO	Amgen, UCLA
Jeff Wiezorek, M.D., M.S. Vice President, Clinical Development	Amgen, UCLA, Caltech
Adrian Bot, M.D., Ph.D. Vice President, Translational Medicine	MannKind, Mount Sinai
Will Go, M.D., Ph.D. Senior Director, Clinical Development	Amgen, UCSD
Rajul Jain Senior Director, Clinical Development	Amgen, MD Anderson, Rockefeller
Jeff Aycock, B.A. Senior Director, Clinical Operations	Amgen, Pfizer
Lynn Navale Senior Director, Biostatistics	Amgen, Baxter Bioscience

Scientific Advisory Board: World Leaders in Cancer Immunotherapy

Owen Witte, M.D. – Chair

- Distinguished Professor of Microbiology, Immunology and Molecular Genetics, UCLA
- Howard Hughes Investigator
- Member, National Academy of Sciences

James Economou, M.D., Ph.D.

- Beaumont Professor of Surgery and Chief, Division of Surgical Oncology, UCLA
- Vice Chancellor for Research, UCLA

Donald Kohn, M.D.

- Professor of Microbiology, Immunology and Molecular Genetics & Pediatric Hematology/Oncology, UCLA
- Director, Human Gene and Cell Therapy Program, UCLA
- Member, Broad Stem Cell Research Center & Jonsson Comprehensive Cancer Center

Ronald Levy, M.D.

- Robert K Summy and Helen K Summy Professor of Medicine, Stanford University
- Director, Lymphoma Program, Stanford University
- Member, National Academy of Sciences

Antoni Ribas, M.D., Ph.D.

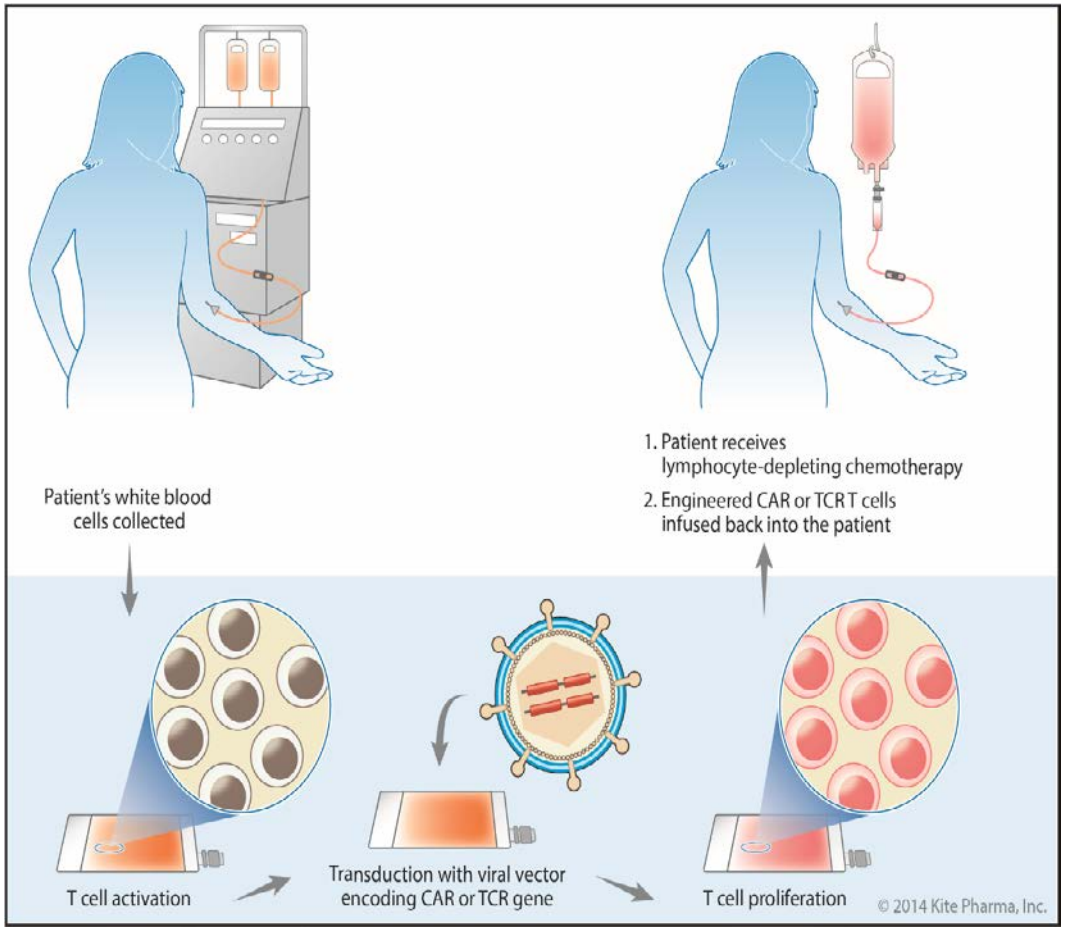
- Director, Tumor Immunology Program, Jonsson Comprehensive Cancer Care Center, UCLA
- Professor of Medicine, Hematology/ Oncology, UCLA

Inder Verma, Ph.D.

- Director, Helmsley Center for Genomic Medicine, Salk Institute
- Professor of Genetics, Salk Institute
- Member, National Academy of Sciences

Engineered Autologous T Cell Therapy (eACT™)

Transformational Cancer Therapy



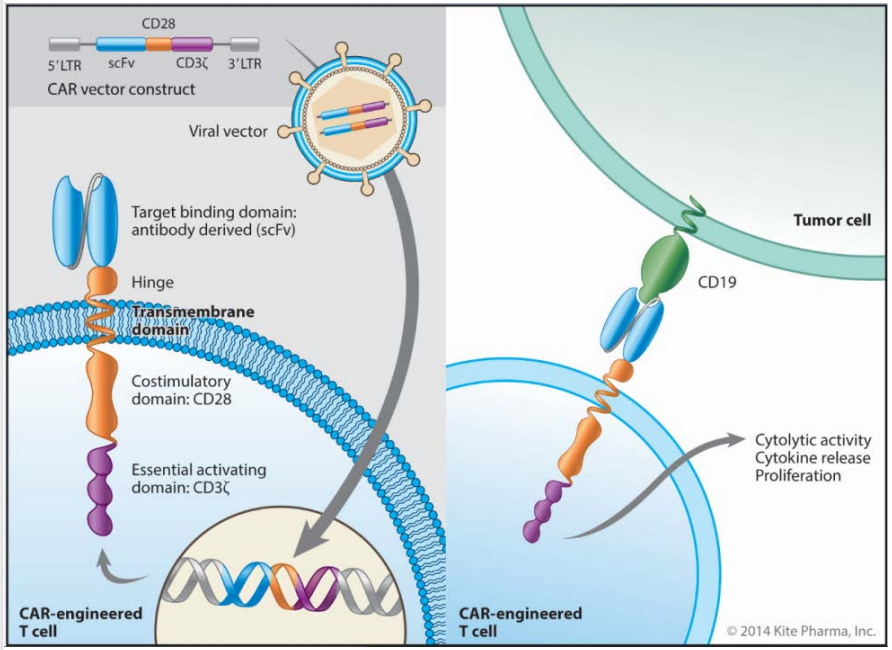
Key Advantages

- The ultimate personalized therapy
- Living treatment, expands in the body
- Durable remission with a single treatment
- CAR products combine the specificity of antibodies with the killing capacity of T cells
- TCR products directs T cells to intracellular tumor targets in a HLA specific manner
- Broad applications, including chemo-refractory tumors

Broad eACT™ Portfolio — Both CAR & TCR

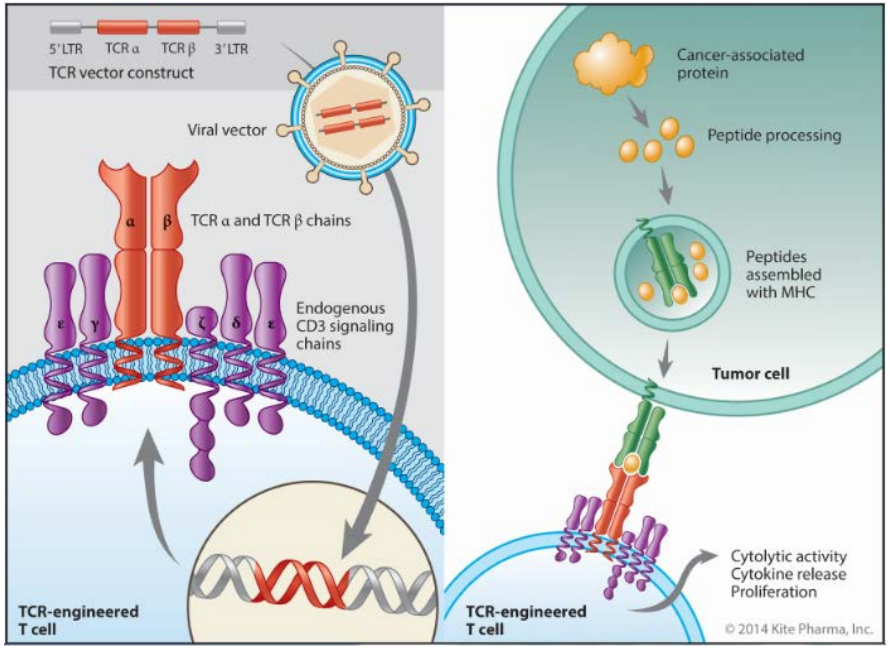
Chimeric Antigen Receptor (CAR) Products

Target molecules on cell surface



T Cell Receptor (TCR) Products

Target molecules are intracellular HLA-restricted



Exclusive CRADA with NCI



CRADA



- **Pioneering research**
- **Product & process design**
- **Early clinical evaluation**

Product Selection*



- **Manufacturing**
- **Clinical development**
- **Commercialization**



Why NCI Surgery Branch?

- Significant experience and leadership in T cell therapy; large and dedicated team
- Rich pipeline of CAR and TCR products
- Product selection based on human rather than mouse data

* Through right to negotiate license for IP related to products

Simple Manufacturing Process



Apheresis Product



T cell separation



Cell transfer to bag for growth



Viral transduction



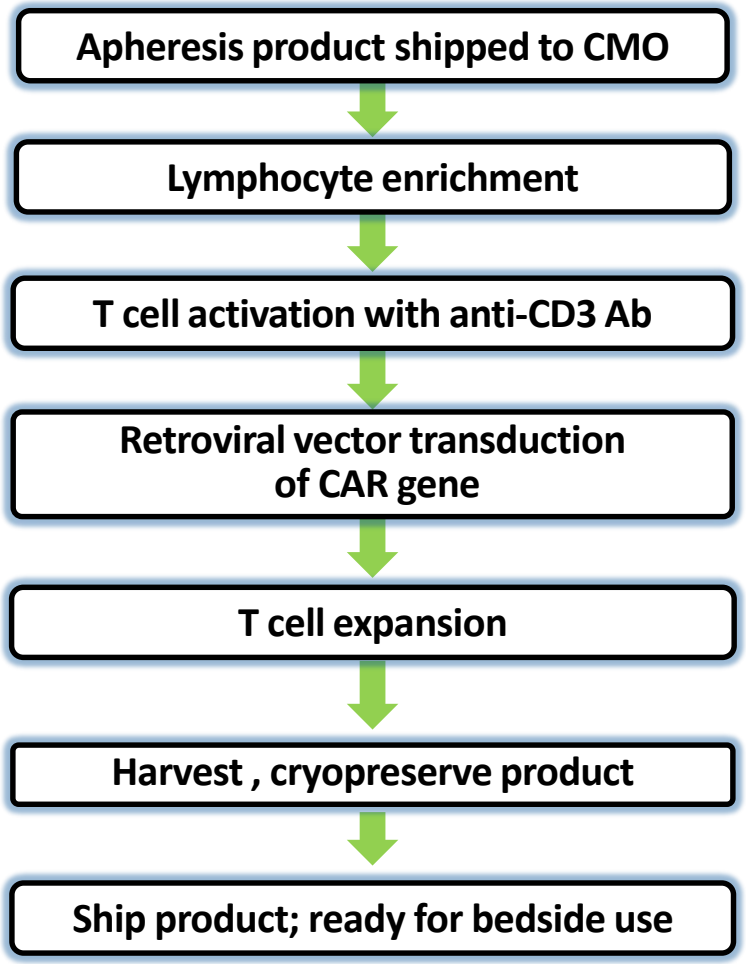
Expand cells

Wash, Concentrate & Freeze



Ready for bedside use

Streamlined and Rapid eACT ™ Manufacturing Process for anti-CD19 CAR T Cells



- Technology transfer to contract vendors complete
- Efficient T cell stimulation and growth **without anti-CD3 / anti-CD28 beads**
- Simple, closed system production, amenable to cGMP operations
- Progenitor Cell Therapy (PCT) and potentially other third parties will provide clinical supplies
- Transportation logistics arranged for multi-center trials

Kite Pipeline

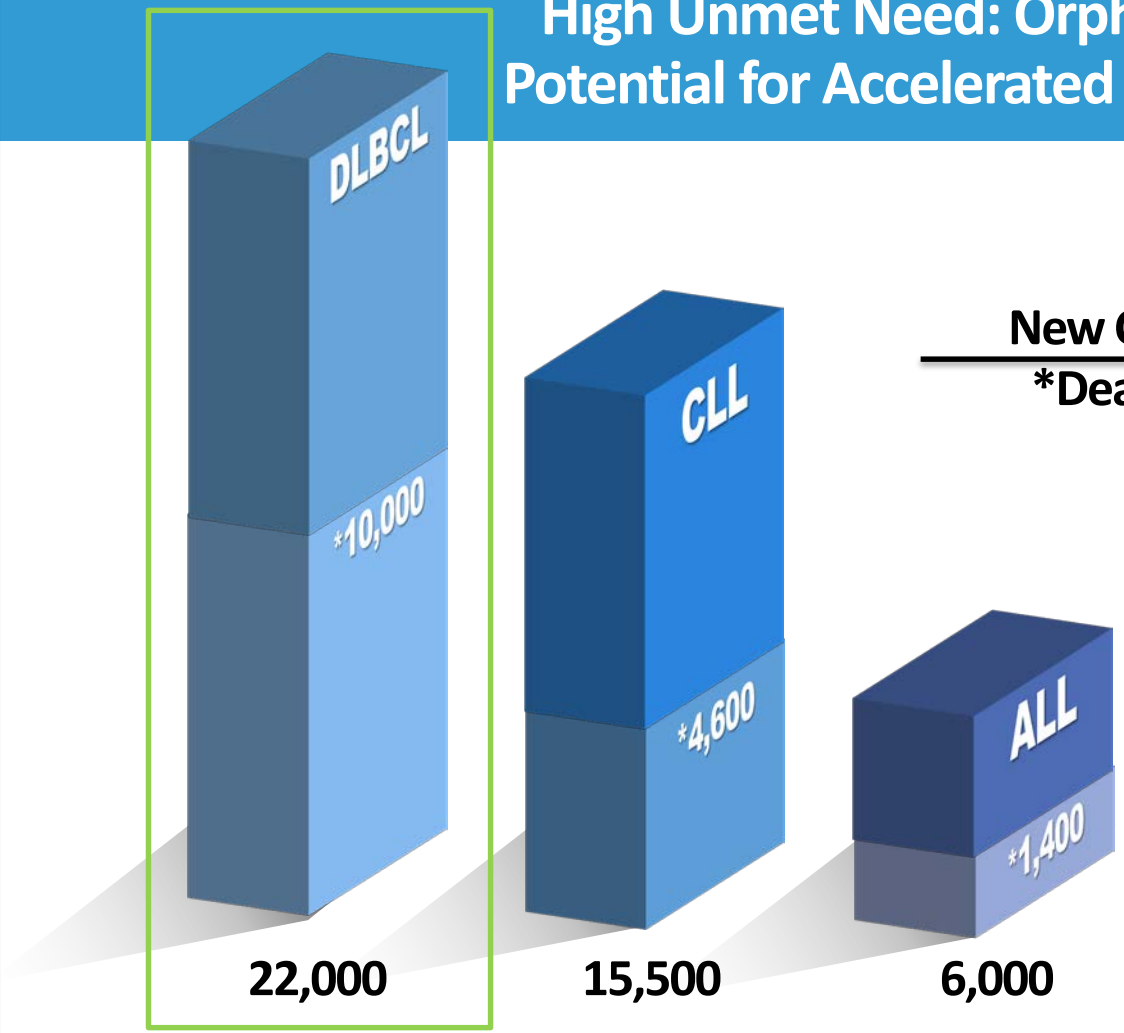
PROGRAM	INDICATION	PRE-IND	PHASE 1	PHASE 2	PHASE 3
Chimeric Antigen Receptor eACT™					
KTE-C19 CAR	B Cell Malignancies				
	NHL (DLBCL)				
	NHL (MCL)				
	CLL				
	ALL				
EGFRvIII CAR	Glioblastoma				
T Cell Receptors eACT™					
NY-ESO-1 TCR	Various tumors				
SSX2 TCR	Various tumors				
MAGE A3/A6 TCR	Various tumors				
MAGE A3 TCR	Various tumors				
TCR-1*	Various tumors				
TCR-2*	Various tumors				

Pivotal studies in 2015

* Target undisclosed

Lead and Follow-on Indications for Kite anti-CD19 CAR

High Unmet Need: Orphan Indication Potential for Accelerated Path to Market



New Cases per Year (US)[1,2]

***Deaths per Year (US) [2,3]**

1) American Cancer Society, 2013 Facts and Figures; 2) The Leukemia and Lymphoma Society, Facts 2013 1) Adv Immunol. 2005; 87: 163–208.

KTE-C19 Accelerated Development Plan: Launch 4 Pivotal Studies in 2015

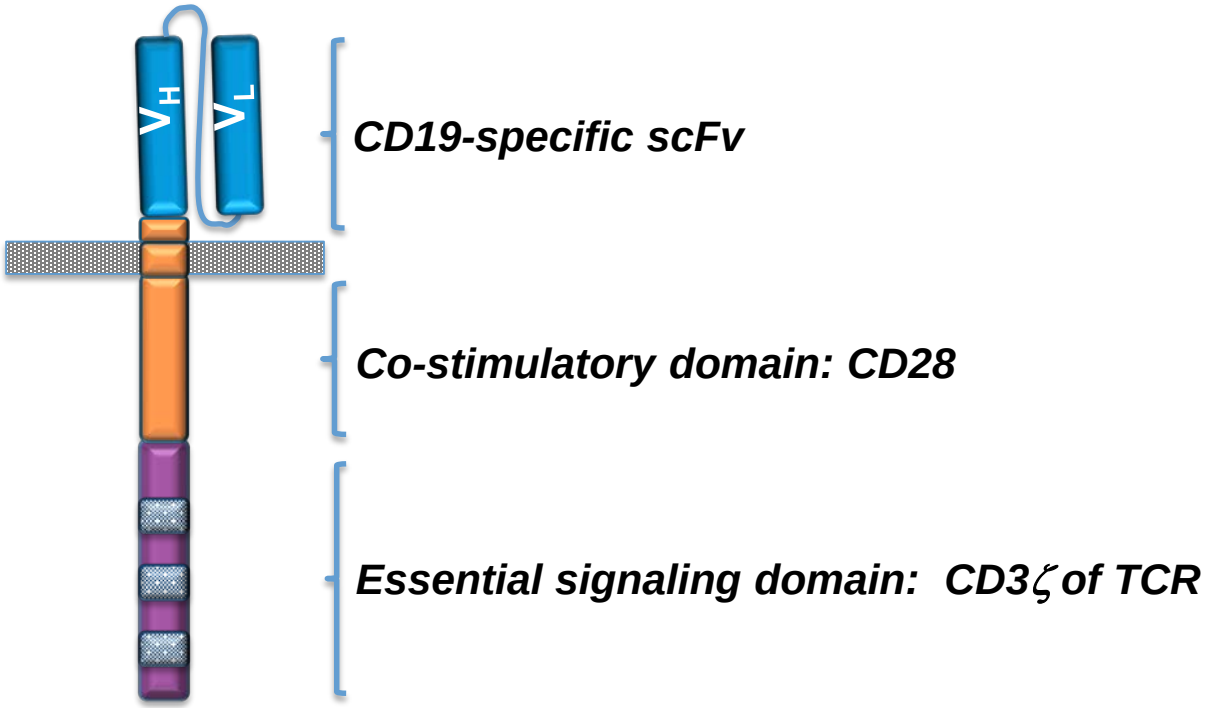
Indication	Population	Phase	First Subject Enrolled
DLBCL PMBCL TFL	Refractory or relapsed post transplant	2 (n=112)	1H 2015
MCL	Relapsed/refractory	2	1H 2015
CLL	Relapsed/refractory	2	2H 2015
ALL	Relapsed/refractory	2	2H 2015

Kite Pharma

KTE-C19 Overview

Kite/NCI Study of anti-CD19 CAR in Relapsed/Refractory B-Cell Malignancies

- Phase 1/2 study investigating safety, feasibility, and efficacy
- Refractory/recurrent disease incurable by standard therapy
- Evolving treatment protocol (conditioning/dosing)



Broad Anti-Tumor Activity Across Relapsed/Refractory B-cell Malignancies

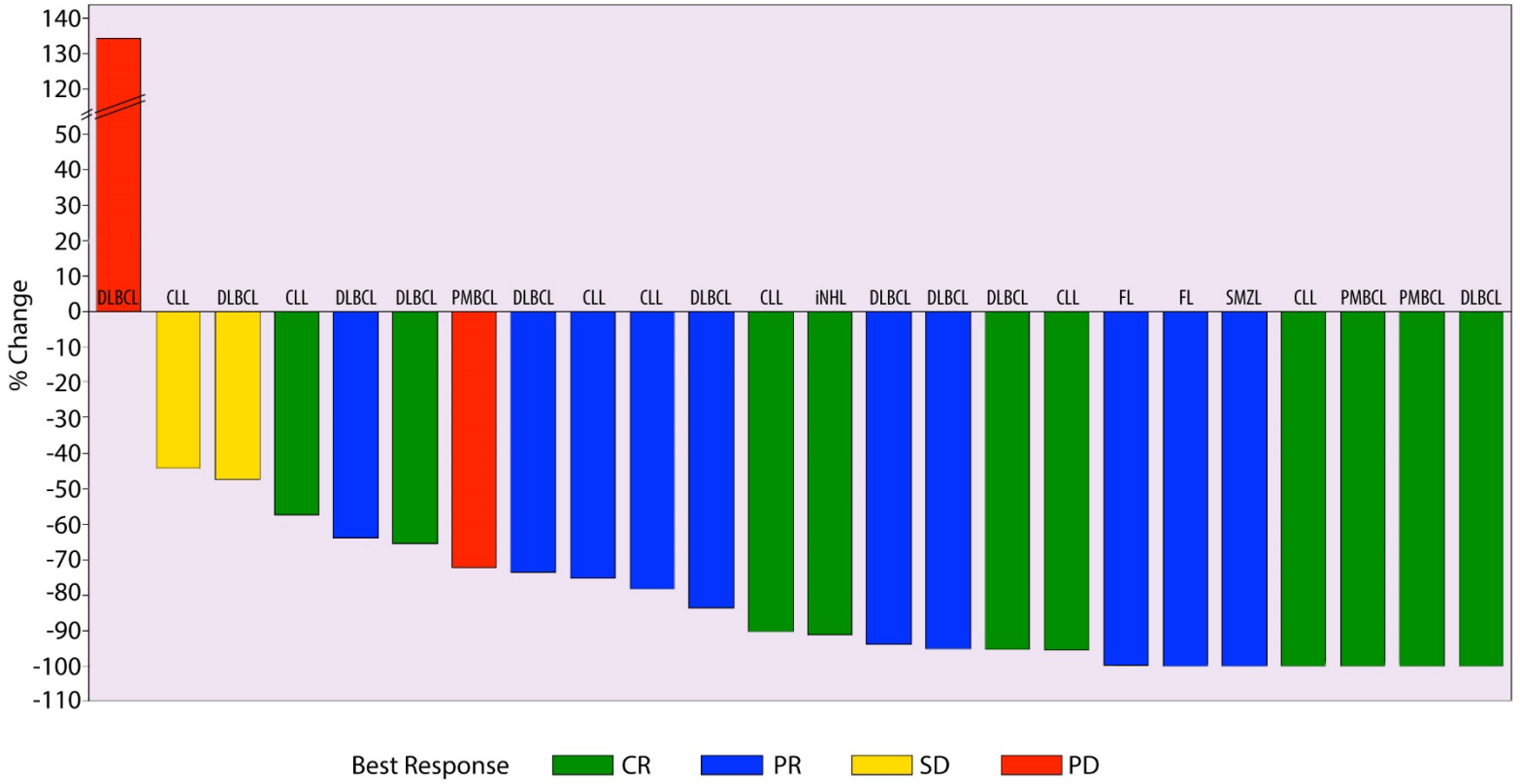
- 28 patients enrolled (24 evaluable), including largest dataset of anti-CD19 CAR in lymphoma

Tumor Type (n evaluable)	Overall Response Rate	Complete Response Rate
Any (24)	83%	42%
DLBCL/PMBCL (13)	77%	38%
CLL (7)	86%	57%
Indolent NHL (4)	100%	25%

- 16 patients still in response; 55% > 1 year
- 3 patients were re-treated after progression; all in ongoing response (16+ - 49+ months)

Kochenderfer Blood 2012; Kochenderfer JCO 2014

Best Response to anti-CD19 CAR



Kochenderfer Blood 2012; Kochenderfer JCO 2014 (in press); Unpublished as of June 2014

Summary of Adverse Events

- Prominent toxicities were related to transient cytokine release syndrome
  - Managed without steroids or IL-6 receptor inhibition
  - Generally resolved within 3 weeks
- Reversible neurotoxicity
- Two deaths within 30 days of treatment—deemed not related to the CAR T-cells
- Improved safety observed with lower dose conditioning chemotherapy

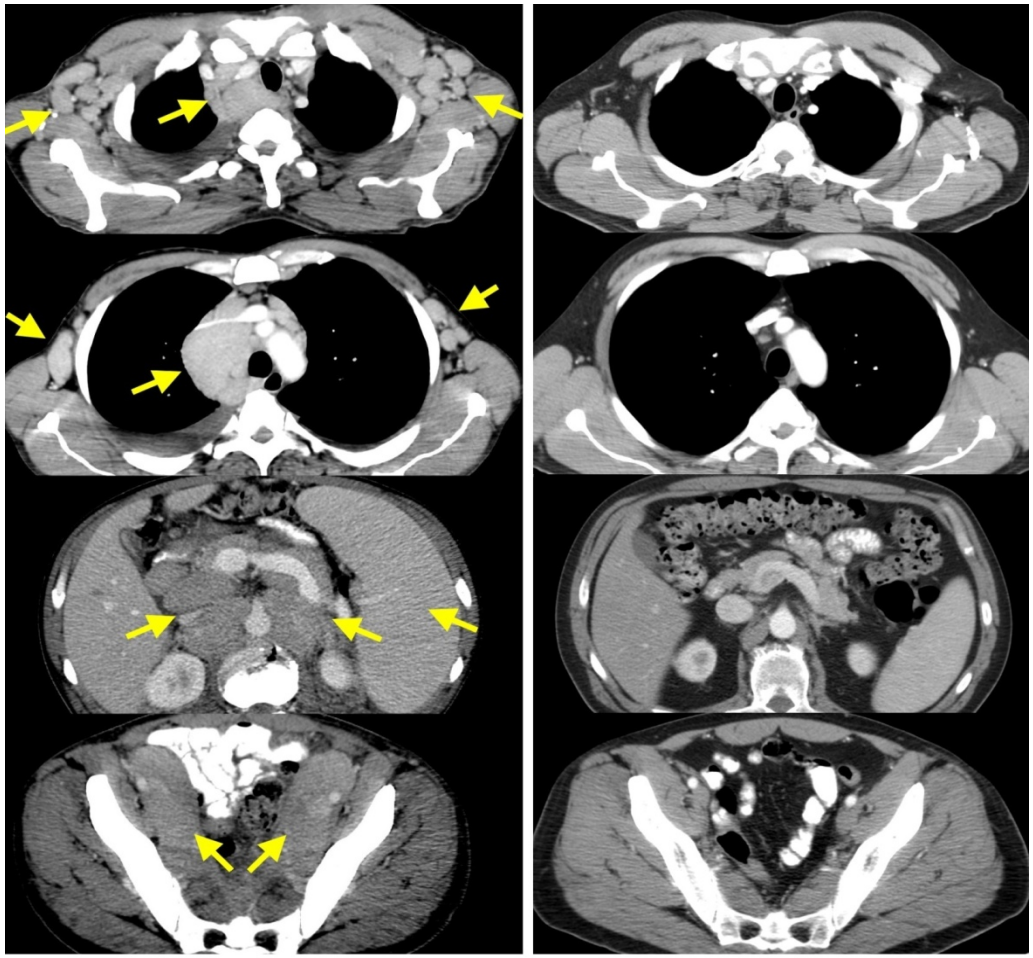
Kochenderfer Blood 2012; Kochenderfer et al, JCO 2014

Durable Response in a Patient with Follicular Lymphoma

First patient treated with eACT™, in June 2009

- Had a partial response, then progressed 7 months later
- Retreated with eACT in March 2010

Ongoing response 4+ years



Kochenderfer et al Blood 2010

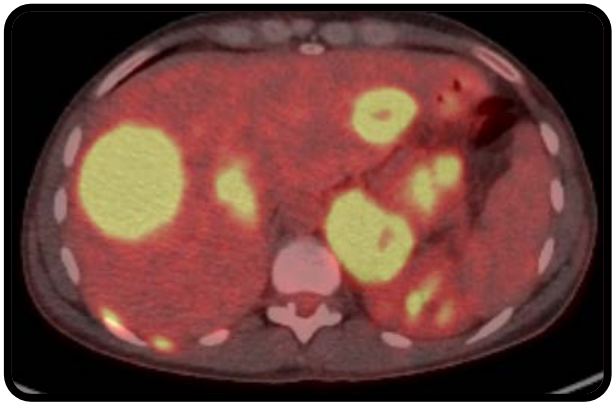
Complete Response in Patient with Chemotherapy Refractory PMBCL

Primary Mediastinal Large B-Cell Lymphoma

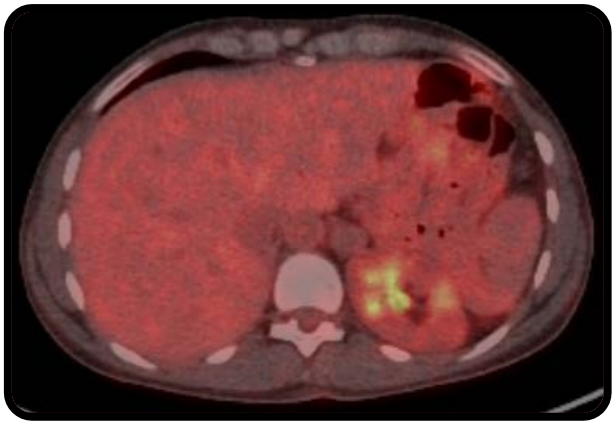
- Primary refractory
- Progressed on R-CHOP, R-ICE, and R-GDP
- Referred for progressive liver and other abdominal lymphoma

Ongoing Complete Response 12+ months

Prior to treatment



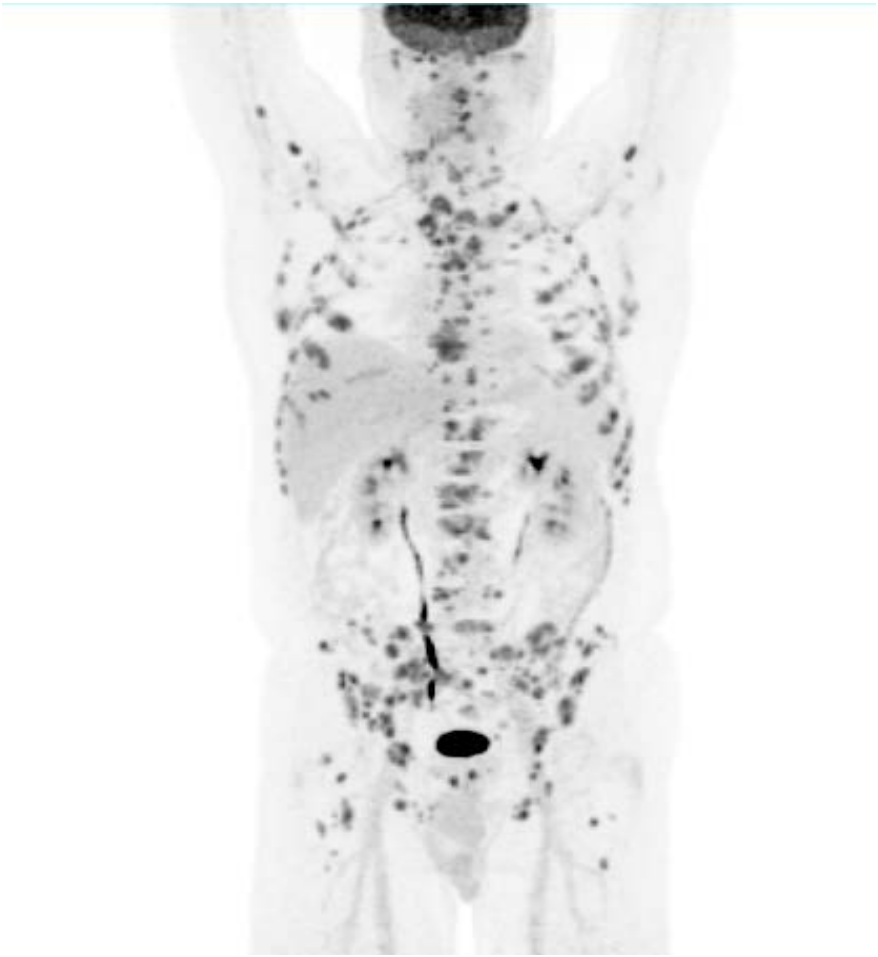
9 months post-treatment



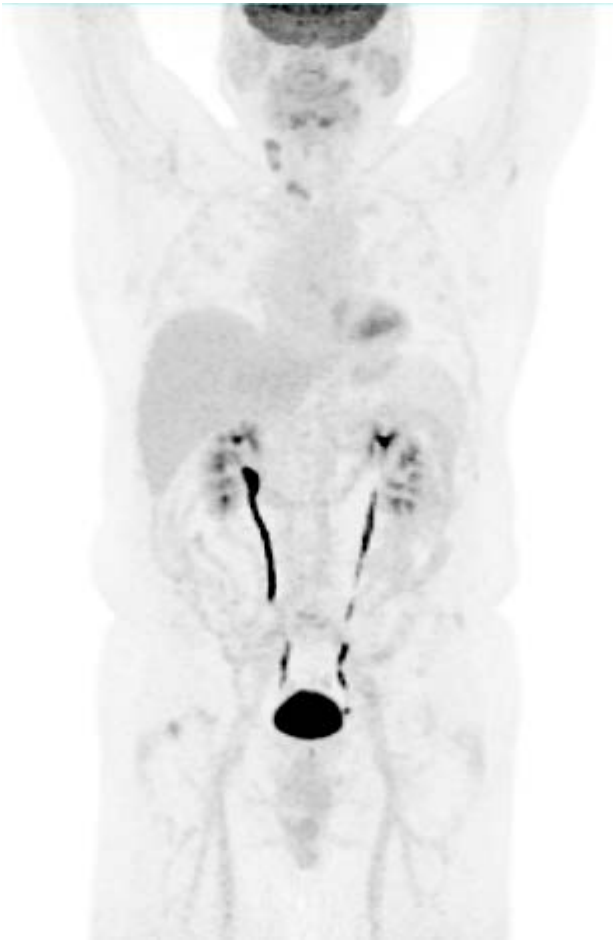
Scans from Dr. Rosenberg NCI

Patient with DLBCL Relapsed Post-ASCT

Before treatment



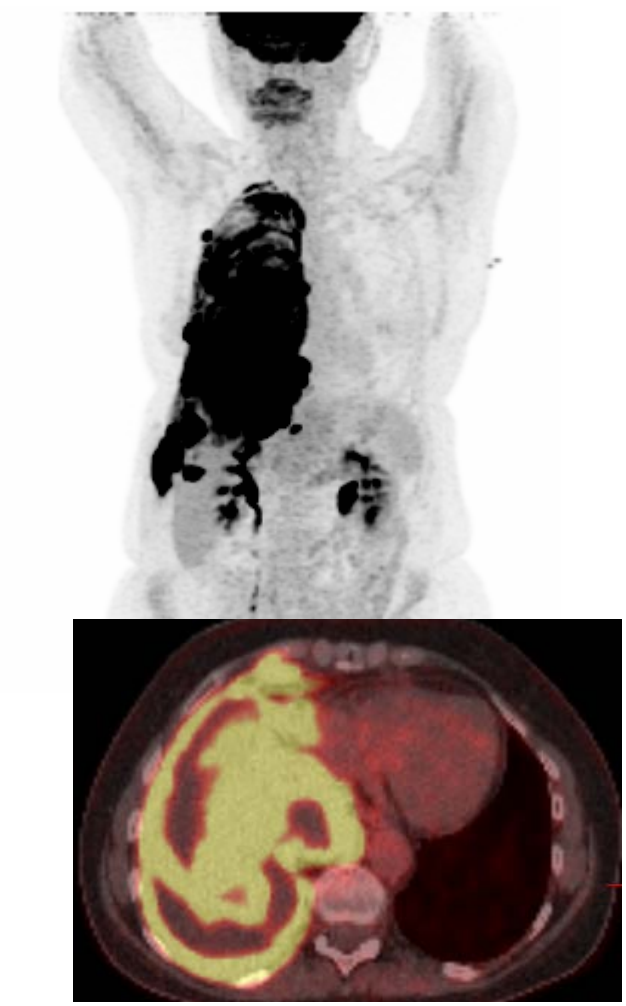
6 months after treatment



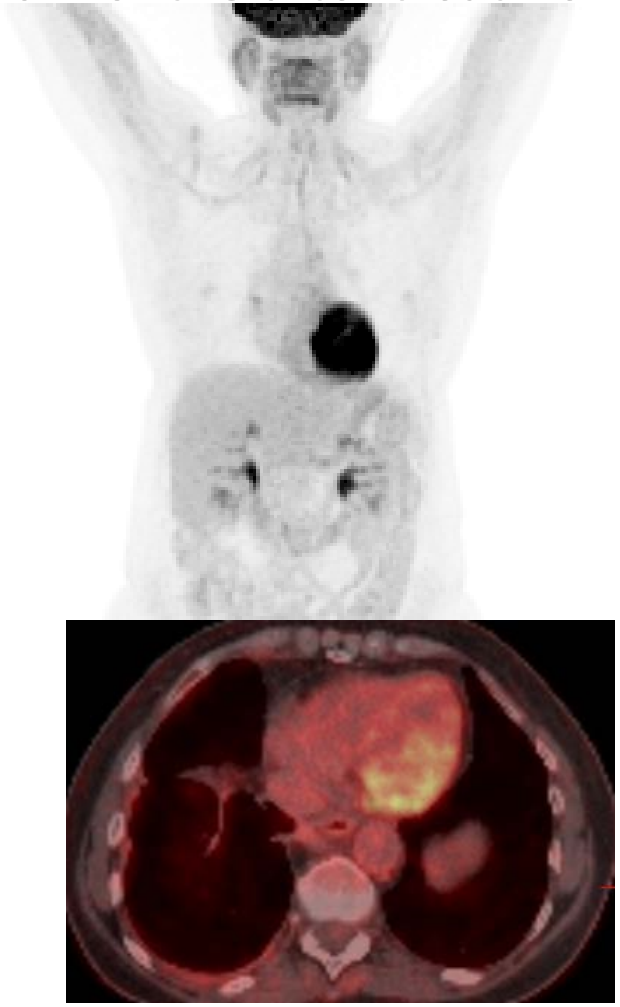
Scans from Dr. Rosenberg NCI

Ongoing Response in Patient with Refractory DLBCL

Before treatment



6 months after treatment



Scans from Dr. Rosenberg NCI

NCI Study of anti-CD19 CAR in Relapsed/Refractory Acute Lymphoblastic Leukemia

- Phase 1, dose-escalation study in children and young adults
- Primary objectives were to determine MTD, feasibility, and toxicity
- Key Eligibility Criteria
  - Age 1-30
  - CD19+ B-ALL or NHL
  - Refractory or refractory to standard therapy plus one salvage regimen
- Study Design
  - Utilized CAR developed by J. Kochenderfer
  - 11 day manufacturing process
  - Results presented from ITT analysis

Lee et al Lancet 2014

Anti-CD19 CAR Treatment Achieves Complete Responses in Heavily Pretreated ALL Patients

First Intention-to-Treat Analysis from Completed Clinical Study of CD19-CAR Therapy in ALL

	ALL (N=20)
Complete Response Rate	14 (70%)
MRD- Complete Response	12 (60%)
Allogeneic Transplant	10 (50%)
Relapse Post Allogeneic Transplant	0 (0%)

Lee et al Lancet 2014

NCI ASH Abstracts 2014

	NHL	Pediatric ALL
Design	Single arm phase 1/2 DLBCL, FL, CLL	Single arm phase 1
Patients	30; 9 low dose conditioning	21; 20 with ALL
Conditioning	Low dose Cy/Flu	Low dose Cy/Flu
CAR dose	1 x 10^6/kg	1 x 10^6/kg (level 1) 3 x 10^6/kg (level 2)
Response	27 evaluable; ORR 81% 9 low dose; ORR 67% 8 low dose DLBCL; ORR 63%-- 2 PR and 1 CR ongoing	20 evaluable ALL (ITT) CR 70%; (60% MRD-) 50% to allo-HSCT
Safety	9 evaluable; grades not described No vasopressors, intubation in low dose	21 evaluable MTD 1 x 10^6/kg (CRS) Grades not described
Reference	Kochenderfer et al, A550	Lee et al, A381

KTE-C19-101:
Phase 1/2 Trial in Aggressive Refractory NHL

Key Eligibility Criteria

- Refractory DLBCL, PMBCL, TFL
- Measurable Disease
- ECOG 0-1

Primary Endpoint

- Objective Response Rate

Operations

- First patient enrolled Q1 2015
- Multi-center study (20-25 sites)
- Phase 2 enrollment ~12 months
- Interim analysis (cohort 1) after 50 patients

Phase 2

Cohort 1: DLBCL (n=72)

Cohort 2: PMBCL and TFL (n=40)

DLBCL=Diffuse Large B-cell Lymphoma
PMBCL=Primary Mediastinal B-cell Lymphoma
TFL=Transformed Follicular Lymphoma

Kite Pipeline
EGFRvIII CAR & NY-ESO-1 TCR

Program	Indication	Pre-IND	Phase 1	Phase 2	Phase 3
Chimeric Antigen Receptor eACT™					
KTE-C19 CAR	B Cell Malignancies				
	NHL (DLBCL)				
	NHL (MCL)				
	CLL				
	ALL				
EGFRvIII CAR	**Glioblastoma**				
T Cell Receptors eACT™					
NY-ESO-1 TCR	**Various tumors**				
SSX2 TCR	Various tumors				
MAGE A3/A6 TCR	Various tumors				
MAGE A3 TCR	Various tumors				
TCR-1*	Various tumors				
TCR-2*	Various tumors				

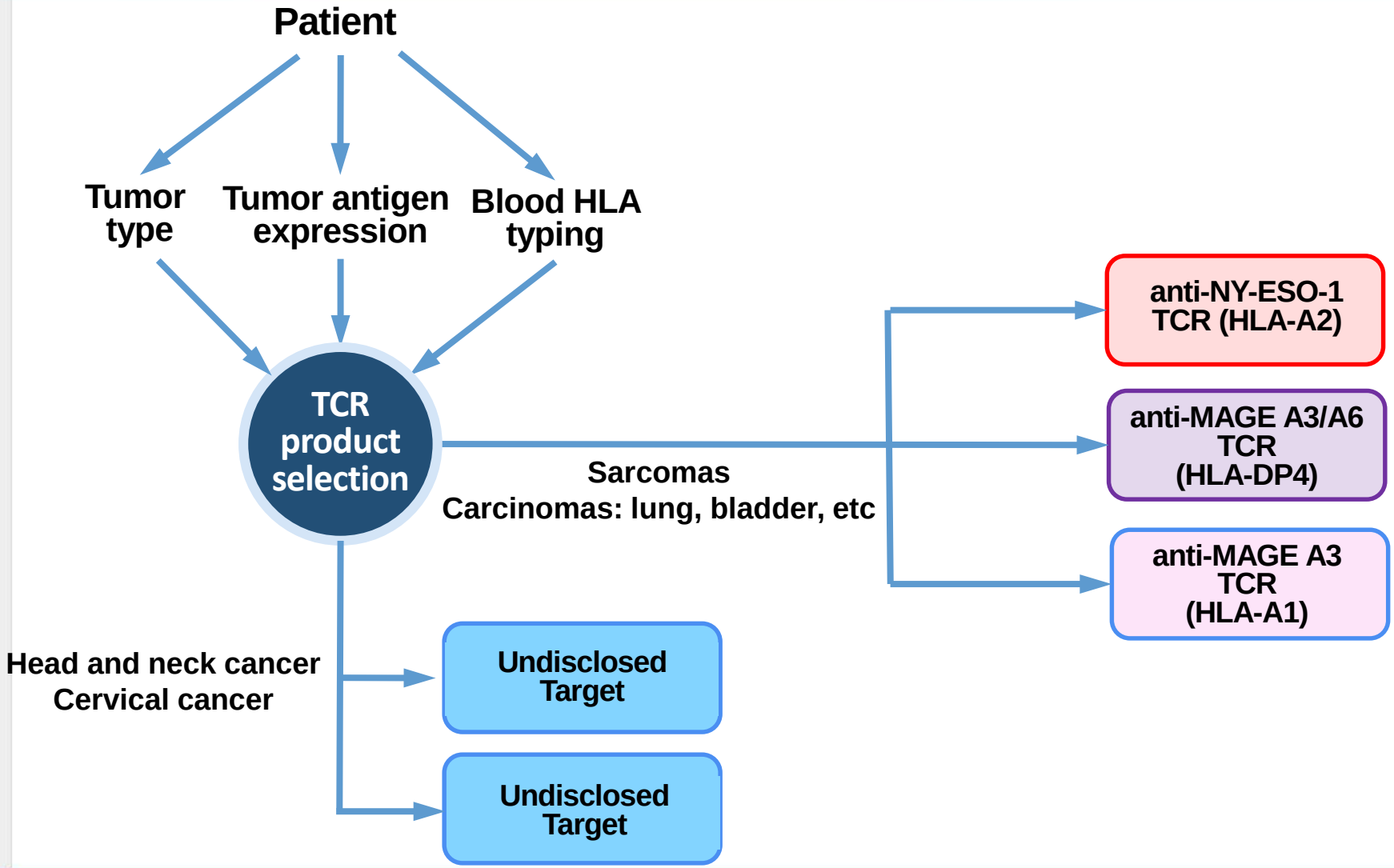
Pivotal studies in 2015

* Target undisclosed

Overview of EGFRvIII CAR Program

- Tumor specific antigen expressed in ~30% of glioblastoma
  - No known expression in normal tissue
- 3rd generation CAR created at NCI
  - Both CD28 and 4-1BB co-stimulatory domains
- Phase 1/2 clinical trial in relapsed glioblastoma
  - Dose escalation is ongoing
- Potential in other EGFR-amplified tumors (e.g. head and neck cancer; lung cancer)

Kite Clinical TCR Programs



Overview of NY-ESO-1 TCR Program

- Cancer testes antigen expressed in a variety of solid tumors
  - ~90% of synovial sarcomas, and one third of melanoma, lung, bladder, ovarian, and others
- Objective responses (50-60%) in melanoma and synovial sarcoma in a phase 1-2 trial of human NY-ESO-1 TCR
- Murine NY-ESO-1 TCR demonstrated comparable or superior preclinical activity to human NY-ESO-1 TCR
  - Avoids mixed TCR dimers and nonspecific reactivity
- Murine NY-ESO-1 TCR Phase 2 clinical trial is currently ongoing

Next 12 Months - Key Milestones

- ASH presentation with updated anti-CD19 CAR clinical data
- File IND for KTE-C19 in December 2014
- Initiate KTE-C19 DLBCL pivotal study in 1st quarter 2015
- Initiate additional KTE-C19 studies (MCL, ALL, CLL)
- Obtain Breakthrough Therapy Designation in DLBCL
- Obtain Orphan Drug Designation for DLBCL in Europe
- Secure commercial manufacturing capacity
- Submit second product IND by end 2015

Financial Profile

- Raised net proceeds of $134.1 million in IPO of 8,625,000 shares of common stock in June 2014
- 38.3 million shares outstanding as of June 30, 2014
- Trading on the NASDAQ under the symbol “KITE”
- Cash Balance as of June 30, 2014 was $203.4 million
- Cash is sufficient to fund our KTE-C19 program to BLA filing and initiation of other clinical programs
- No Debt

Kite Pharma:
Building the Future of Cancer Immunotherapy

