



## The future of cell therapy

### ASEBIO MARZO 2019

Regina Quiroga, MD  
Cell Therapy Medical Lead - Spain

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# 2018 ASCO: Key Messages

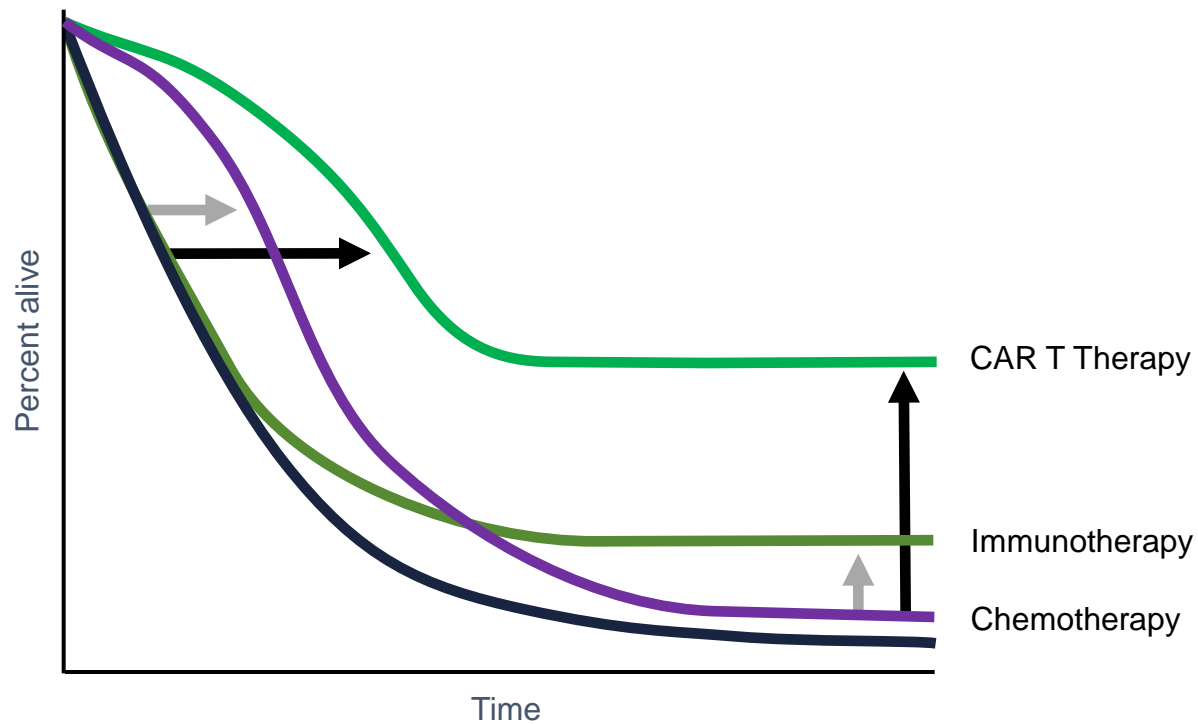


**“Precision medicine is transforming cancer care** in profound ways and is a focus of this year’s meeting. I firmly believe that the number of patients who benefit from precision medicine will continue to increase as treatments become more effective.”

**Dr. Bruce Johnson**  
*President, ASCO*

**CAR T-cell therapy named ASCO’s ‘Advance of the Year’**

# CAR-T: Hope of a cure



# Cancer innovation through the decades

1940s

First chemotherapy  
approved

1990's

First targeted antibody  
therapy approved

2017-18

First CAR T therapy  
approved  
(in US and Europe)

Chemotherapy

Indiscriminate – kills cancer cells  
and healthy cells

Targeted Therapies

Target receptor/molecular  
oncogenic drivers

Cell Therapy

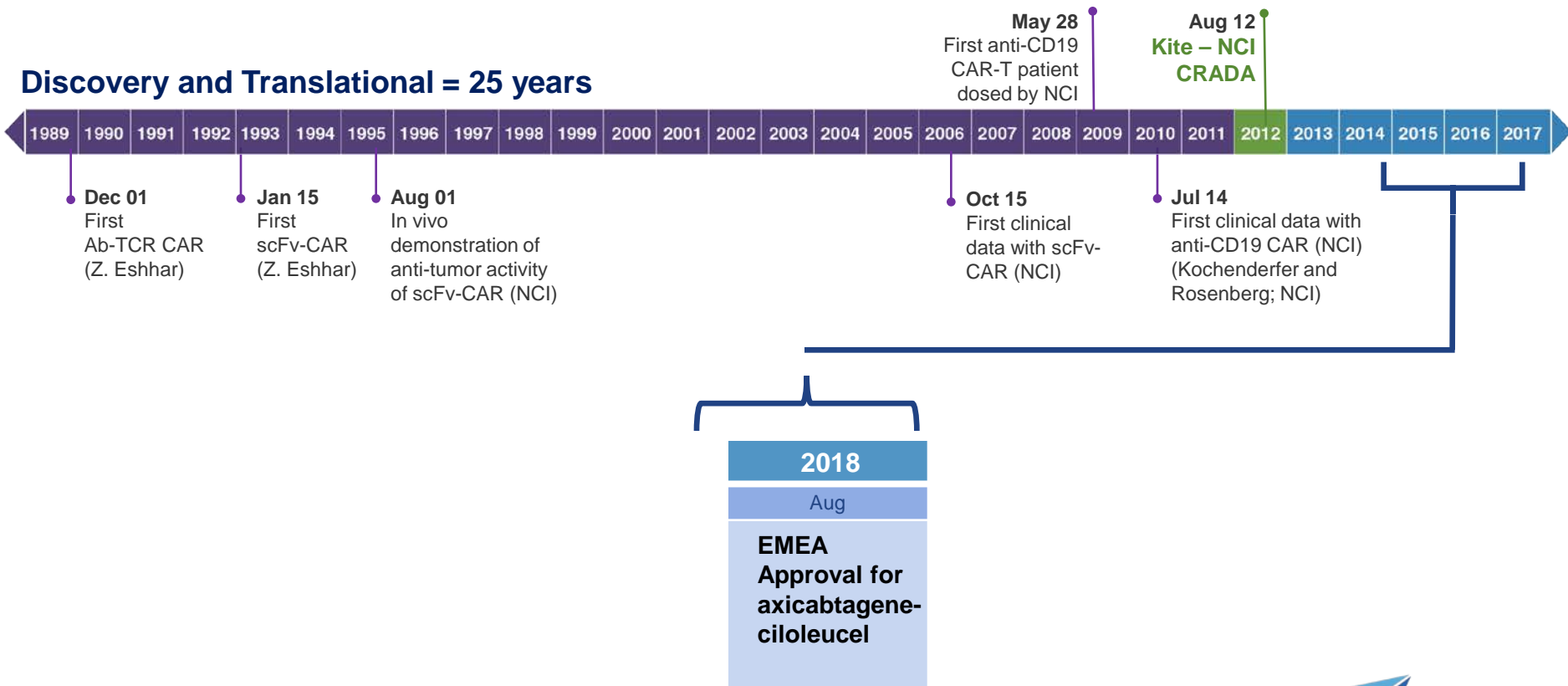
Engineered T-cells

# Kite – A Little Background

- Kite was founded in 2009 with the goal of changing the paradigm of cancer treatment through autologous cellular therapy
- Collaborated with NCI under a CRADA for the initial development of axicabtagene ciloleucel
- Kite was acquired by Gilead Sciences on October 3, 2017
- FDA approval of axicabtagene ciloleucel on October 18, 2017, in R/R DLBCL, TFL and PMBCL
- EMA approval of axicabtagene ciloleucel on August 23, 2018, in R/R DLBCL, PMBCL after 2 lines

# History, a journey of almost 30 yearsFDA Approval for axi-ce

## Discovery and Translational = 25 years



ORIGINAL ARTICLE

## Axicabtagene Ciloleucel CAR T-Cell Therapy in Refractory Large B-Cell Lymphoma

S.S. Neelapu, F.L. Locke, N.L. Bartlett, L.J. Lekakis, D.B. Miklos, C.A. Jacobson, I. Braunschweig, O.O. Oluwole, T. Siddiqi, Y. Lin, J.M. Timmerman, P.J. Stiff, J.W. Friedberg, I.W. Flinn, A. Goy, B.T. Hill, M.R. Smith, A. Deol, U. Farooq, J. McSweeney, J. Munoz, I. Avivi, J.E. Castro, J.R. Westin, J.C. Chavez, A. Ghobadi, K.V. Komanduri, R. Levy, E.D. Jacobsen, T.E. Witzig, P. Reagan, A. Bot, J. Rossi, L. Navale, Y. Jiang, J. Aycock, M. Elias, D. Chang, J. Wieszorek, and W.Y. Go

# EU joins the US in the pace of cell therapy innovation



EUROPEAN MEDICINES AGENCY  
SCIENCE MEDICINES HEALTH

29 June 2018  
EMA/431116/2018  
Media and Public Relations

## **Press release**

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First two CAR-T cell medicines recommended for approval in European Union

- They belong to a **new generation of personalised cancer immunotherapies** that are based on collecting and modifying patients' own immune cells to treat their cancer

One is pending of Price and Reimbursement in Spain

[http://www.ema.europa.eu/ema/index.jsp?curl=pages/news\\_and\\_events/news/2018/06/news\\_detail\\_002983.jsp&mid=WC0b01ac058004d5c1](http://www.ema.europa.eu/ema/index.jsp?curl=pages/news_and_events/news/2018/06/news_detail_002983.jsp&mid=WC0b01ac058004d5c1)





# ASH Annual Meeting



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## 2967 2-Year Follow-up and High-Risk Subset Analysis of Zuma-1, the Pivotal Study of Axicabtagene Ciloleucel (Axi-Cel) in Patients with Refractory Large B Cell Lymphoma

Program: Oral and Poster Abstracts

Session: 626. Aggressive Lymphoma (Diffuse Large B-Cell and Other Aggressive B-Cell Non-Hodgkin Lymphomas)

—Results from Prospective Clinical Trials: Poster II

Hematology Disease Topics & Pathways:

Diseases, Biological, Lymphoma (any), Therapies, CAR-Ts, Non-Hodgkin Lymphoma, B-Cell Lymphoma, immunotherapy, Lymphoid Malignancies

## Long-term safety and activity of axicabtagene ciloleucel in refractory large B-cell lymphoma (ZUMA-1): a single-arm, multicentre, phase 1-2 trial



Frederick L. Locke\*, Armin Ghotbedi, Caron A. Jacobson, David B. Millon, Larawan J. Lohakiti, Chalmers O. Okunle, Yi Lin, Ira Braunschweig, Brian T. Hill, John M. Timmerman, Abhinav Desai, Patrick M. Reagan, Patrick Stoff, Ian W. Flinn, Umar Farooq, Andre Goy, Peter A. M. Sweeney, Javier Munoz, Tonya Siddiqui, Julie C. Chavez, Alice F. Fleming, Nancy L. Bartlett, Jeffrey S. Wisnawski, Lynn Navroli, Allen Xue, Yizhou Jiang, Adrian Bot, John M. Rossi, Jenny J. Kim, William Y. Ge, Sottiva S. Nallapuri\*

www.thelancet.com/oncology Published online December 2, 2018 [http://dx.doi.org/10.1016/S1470-2045\(18\)30864-7](http://dx.doi.org/10.1016/S1470-2045(18)30864-7)



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📌 denotes an abstract that is clinically relevant.

📌 denotes that this is a recommended PHD Trainee Session.

🎫 denotes that this is a ticketed session.

## 91 Axicabtagene Ciloleucel (Axi-cel) CD19 Chimeric Antigen Receptor (CAR) T-Cell Therapy for Relapsed/Refractory Large B-Cell Lymphoma: Real World Experience📌

Program: Oral and Poster Abstracts

Type: Oral

Session: 627. Aggressive Lymphoma (Diffuse Large B-Cell and Other Aggressive B-Cell Non-Hodgkin Lymphomas)  
—Results from Retrospective/Observational Studies: Outcomes With CD19 CAR T Therapy and Checkpoint Blockade in the Real World Setting

Hematology Disease Topics & Pathways:

Biological, Therapies, CAR-Ts

Saturday, December 1, 2018: 9:30 AM

Pacific Ballroom 20 (Marriott Marquis San Diego Marina)

**Loretta J. Nastoupil, MD<sup>1</sup>**, Michael D. Jain, MD, PhD<sup>2</sup>, Jay Y. Spiegel, MD, FRCPC<sup>3</sup>, Armin Ghobadi, MD<sup>4\*</sup>, Yi Lin, MD, PhD<sup>5</sup>, Saurabh Dahiya, MD<sup>6</sup>, Matthew A. Lunning, DO<sup>7</sup>, Lazaros J. Lekakis, MD<sup>8\*</sup>, Patrick M. Reagan, MD<sup>9</sup>, Olalekan O. Oluwole, MBBS, MPH<sup>10</sup>, Joseph P. McGuirk, DO<sup>11</sup>, Abhinav Deol, MD<sup>12</sup>, Alison R. Sehgal, MD<sup>13</sup>, Andre Goy, MD<sup>14</sup>, Brian T. Hill, MD, PhD<sup>15,16</sup>, Charalambos Andreadis, MD<sup>17,18</sup>, Javier Munoz, MD<sup>19</sup>, Jason R. Westin, MD<sup>20</sup>, Julio C. Chavez, MD<sup>21</sup>, Amanda F Cashen, MD<sup>22</sup>, Nora N Bennani, MD<sup>5</sup>, Aaron P. Rapoport, MD<sup>23</sup>, Julie M. Vose, MD, MBA<sup>7</sup>, David B. Miklos, MD, PhD<sup>24</sup>, Sattva S. Neelapu, MD<sup>25</sup> and Frederick L. Locke, MD<sup>26</sup>

# Acquisitions and mergers with objectives around cell therapy



New Cooperative Research and Development Agreement (CRADA) to targeting patient-specific tumor neoantigens



To use Zinc finger nucleases to edit genes for next generation cell therapies



Technology Gamma Delta Receptor T cells for solid tumors



To investigate the combination of CAR-T plus an antibody agonist of 4-1BB



To investigate the combination of CAR-T plus anti-PDL1



New technology platforms to modulate cellular therapy using small molecules

# Pipeline Overview

Draft

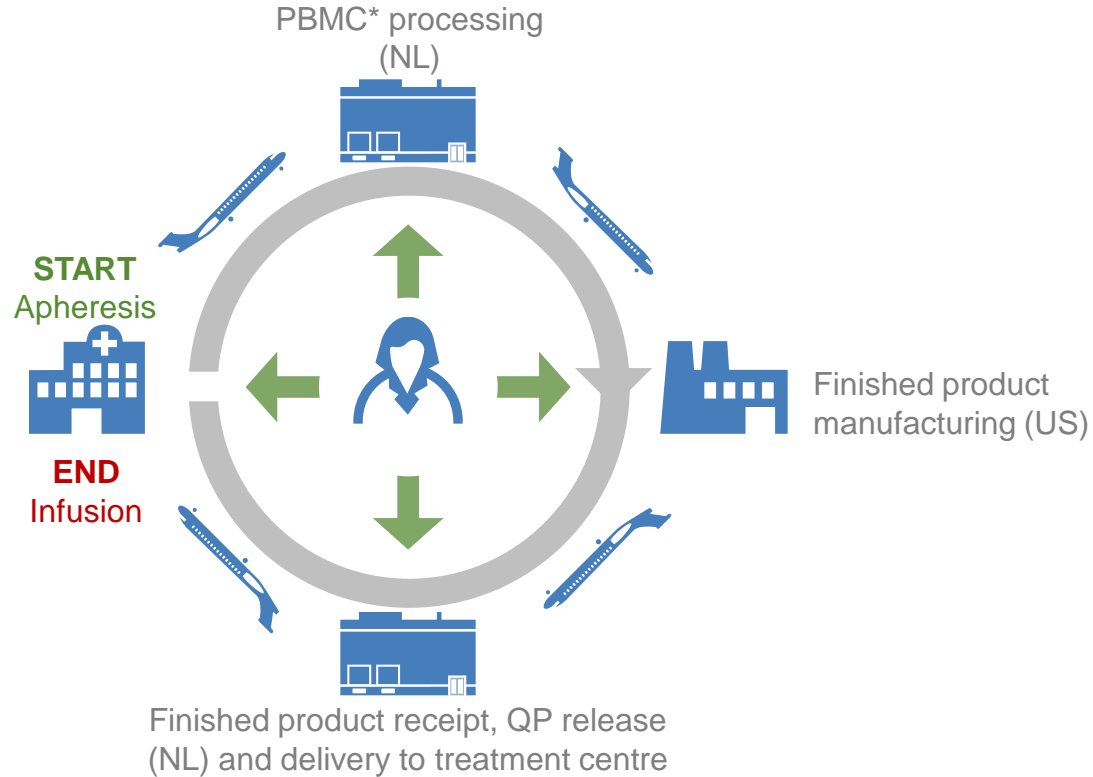
Disease	Clinical trial title	Pre-Phase 1 <sup>a</sup>	Phase 1	Phase 2	Phase 3
Aggressive Non- Hodgkin Lymphoma (NHL)	A Phase 1-2 Multi-Center Study Evaluating Axicabtagene Ciloleucel in Subjects With Refractory Aggressive Non-Hodgkin Lymphoma (ZUMA-1)*				
Indolent Non-Hodgkin Lymphoma (iNHL)	A Phase 2 Multicenter Study of Axicabtagene Ciloleucel in Subjects With Relapsed/Refractory Indolent Non-Hodgkin Lymphoma (ZUMA-5)				
Diffuse Large B-Cell Lymphoma (DLBCL)	A Study Evaluating KTE-C19 in Combination With Atezolizumab in Subjects With Refractory Diffuse Large B-Cell Lymphoma (DLBCL) (ZUMA-6)				
Diffuse Large B-Cell Lymphoma (DLBCL)	A Study Evaluating the Efficacy of Axicabtagene Ciloleucel Compared to Standard of Care Therapy in Subjects With Relapsed/Refractory Diffuse Large B Cell Lymphoma (ZUMA-7)				
Mantle Cell Lymphoma (MCL)	A Phase 2 Multicenter Study Evaluating Subjects With Relapsed/Refractory Mantle Cell Lymphoma (ZUMA-2)				
Acute Lymphoblastic Leukemia (ALL) - Adults	A Study Evaluating KTE-C19 in Adult Subjects With Relapsed/Refractory B-precursor Acute Lymphoblastic Leukemia (r/r ALL) (ZUMA-3)				
Acute Lymphoblastic Leukemia (ALL) - Paediatric	A Multi-Center Study Evaluating KTE-C19 in Pediatric and Adolescent Subjects With Relapsed/Refractory B-precursor Acute Lymphoblastic Leukemia (ZUMA-4)				
Multiple Myeloma	A Study Evaluating the Safety and Efficacy of KITE-585 in Subjects With Relapsed/Refractory Multiple Myeloma				
Solid tumour	A Study Evaluating the Safety and Efficacy of MAGE-A3/A6 T Cell Receptor Engineered T Cells (KITE-718) in HLA-DPB1*04:01 Positive Subjects With Advanced Cancers				
HPV-Associated Cancers	T Cell Receptor Immunotherapy Targeting HPV-16 E6 for HPV-Associated Cancers				

<sup>a</sup>Regulatory approval

The safety and efficacy of these investigational agents and/or uses have not been established. There is no guarantee that they will become commercially available.



# Logistic process



Note: \* Peripheral blood mononuclear cell.

## And now the challenge of implementing across EU countries

- Selection and training of the sites
- Setting up multidisciplinary teams in sites
- Referral networks
- Ensuring equity in patient's access to this technology
- Selection of the right patients
- Boost collaboration between Gilead, hospitals and health authorities

Thanks for your attention

