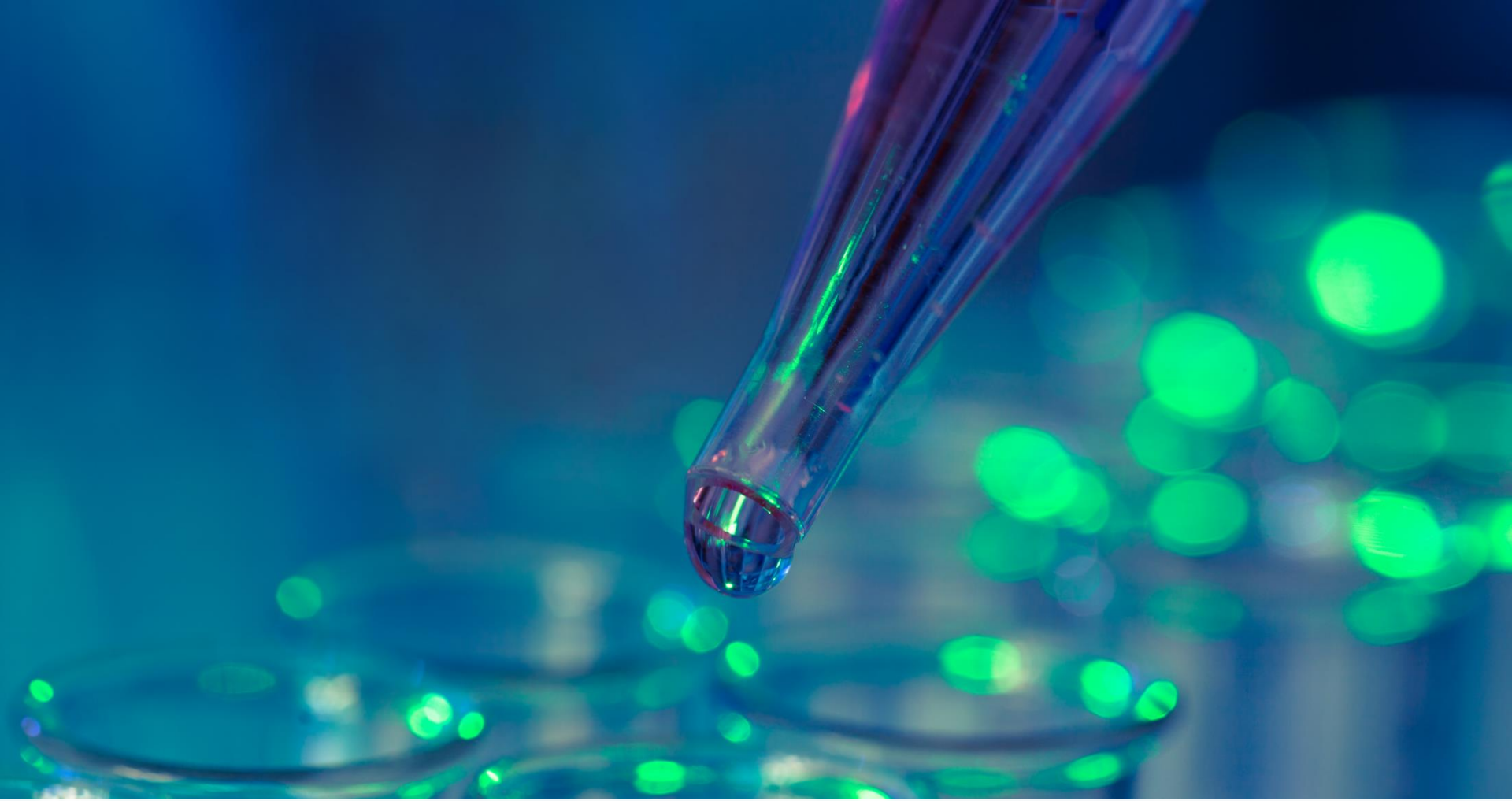


Corporate Presentation

JUNO THERAPEUTICS

Forward-looking Statements, Investigational Status, and Interim Data

This presentation and the accompanying oral commentary contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements involve risks, uncertainties, and assumptions; if the risks or uncertainties ever materialize or the assumptions prove incorrect, our results may differ materially from those expressed or implied by such forward-looking statements. All statements other than statements of historical fact could be deemed forward-looking, including, but not limited to, any statements of the plans, strategies, and objectives of management for future operations, including our clinical development, manufacturing and commercialization plans; any projections of financial information; any statements about historical results that may suggest trends for our business; any statements of expectation or belief regarding future events, potential markets or market size, technology developments, our product pipeline, clinical data or the implications thereof, enforceability of our intellectual property rights, competitive strengths or our position within the industry; any statements regarding the anticipated benefits of our Celgene collaboration or other strategic transactions; and any statements of assumptions underlying any of the items mentioned.

These statements are based on estimates and information available to us at the time of this presentation and are not guarantees of future performance. Actual results could differ materially from our current expectations as a result of many risks and uncertainties, including but not limited to, risks associated with: the success, cost, and timing of our product development activities and clinical trials; our ability to obtain regulatory approval for and to commercialize our product candidates; with respect to the timing of JCAR017 approval, the time it takes to complete enrollment of the pivotal cohort, the timing of Juno's FDA submission, and the duration of FDA review; our ability to establish a commercially-viable manufacturing process and manufacturing infrastructure; regulatory requirements and regulatory developments; the effects of competition and technological advances; our dependence on third-party collaborators and other contractors in our research and development activities, including for the conduct of clinical trials and the manufacture of our product candidates; our ability to attract and retain key scientific, quality control/assurance, manufacturing or management personnel; our dependence on Celgene for the development and commercialization outside of North America and China of our CD19 product candidates and any other product candidates for which Celgene exercises an option; our dependence on JW Therapeutics (Shanghai) Co., Ltd, over which Juno does not exercise complete control, for the development and commercialization of product candidates in China; our ability to obtain, maintain, or protect intellectual property rights related to our product candidates; among others. For a further description of the risks and uncertainties that could cause actual results to differ from those expressed in these forward-looking statements, as well as risks relating to our business in general, see the information we have included in our periodic reports and other documents filed with the Securities and Exchange Commission. Except as required by law, we assume no obligation and do not intend to update these forward-looking statements or to conform these statements to actual results or to changes in our expectations.

All of Juno's product candidates are investigational product candidates and their safety and efficacy have not been established. Juno has not obtained marketing approval for any product, and there is no certainty that any marketing approvals will be obtained or as to the timelines on which they will be obtained.

Any data presented pertaining to Juno product candidates is interim data, and may include investigator-reported interim data for which Juno has not yet independently reviewed the source data. The interim data may not be representative of the final results that may be obtained in the corresponding trial, and results from earlier trials may not be representative of results obtained in later trials or pivotal trials.

JUNO THERAPEUTICS

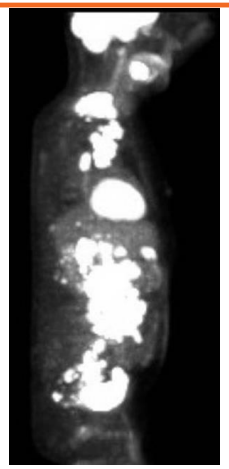
Building to Lead in a New Era of Medicine

- We believe in a future where leveraging cell and gene engineering can transform medicine
- Juno is building the platform and capabilities to bring these innovations to patients
- The first applications are in blood cancers – a large unmet need
- JCAR017 has best-in-class potential targeting CD19
  - A next-generation CD19 CAR T product candidate – manufacturing to control the cell product composition
  - Data suggest potential for differentiated efficacy and tolerability
  - Tolerability profile may allow JCAR017 to grow the overall market – targeting a broader population of patients
  - Pivotal cohort in DLBCL is ongoing with approval in DLBCL as early as 2018 with broad development program targeting multiple cancer types
- Progress in moving beyond CD19
  - Two trials in multiple myeloma underway; trial for Juno-manufactured product candidate expected to start early 2018
  - Solid tumor targets – five in human testing; additional targets in pipeline
- Strong balance sheet with $1.06 billion in cash and equivalents as of September 30, 2017

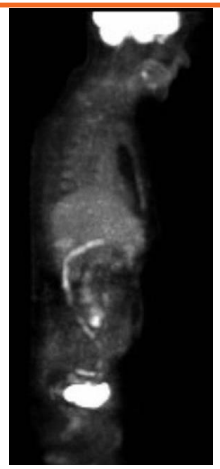
JUNO THERAPEUTICS

Examples of Rapid Tumor Shrinkage in Clinical Trials

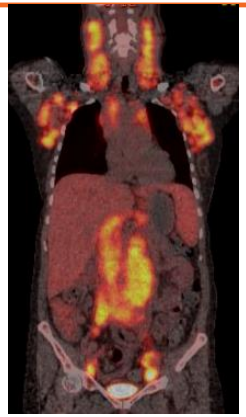
NHL Patient Before CD19 CAR T Cells



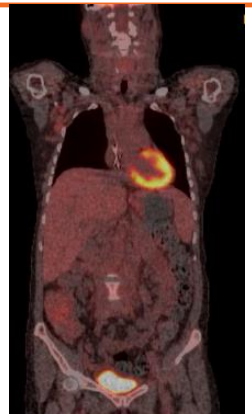
Day 29 After CD19 CAR T Cells



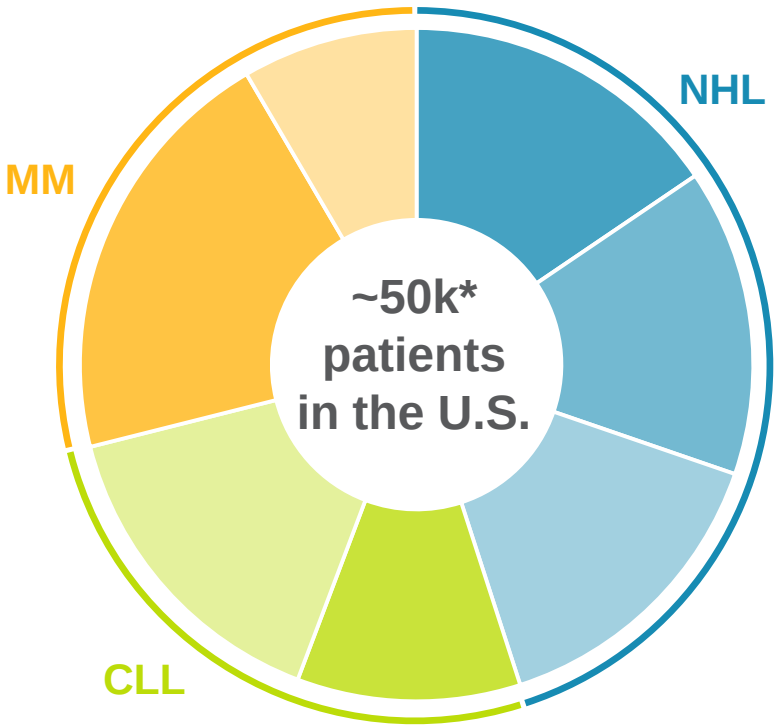
CLL Patient Before CD19 CAR T Cells



Day 33 After CD19 CAR T Cells



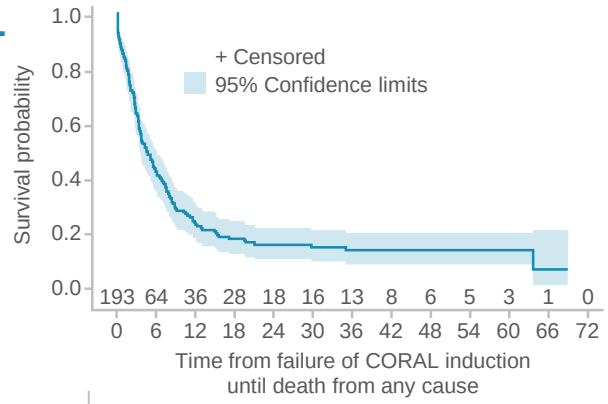
Initial Markets with High Unmet Medical Needs



- 3rd / 4th line NHL
- 2nd line NHL (transplant eligible)
- 2nd line NHL (non-transplant eligible)
- 3rd / 4th line CLL
- 2nd line CLL
- 3rd line MM
- 4th line MM

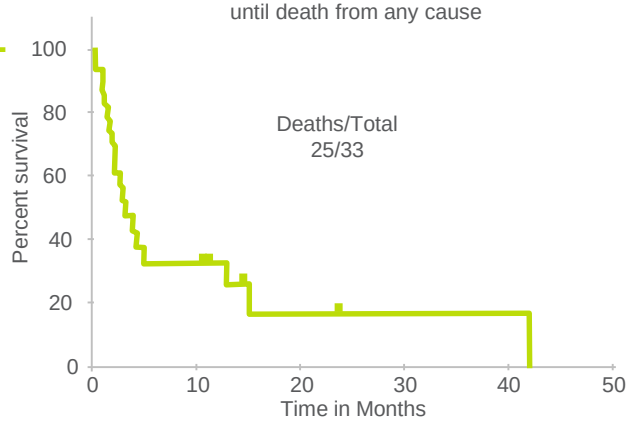
*Approximately doubled when Europe, Japan and ROW are added
Source: Kantar Health patient metrics (December 2016 update) and internal assumptions.

NHL



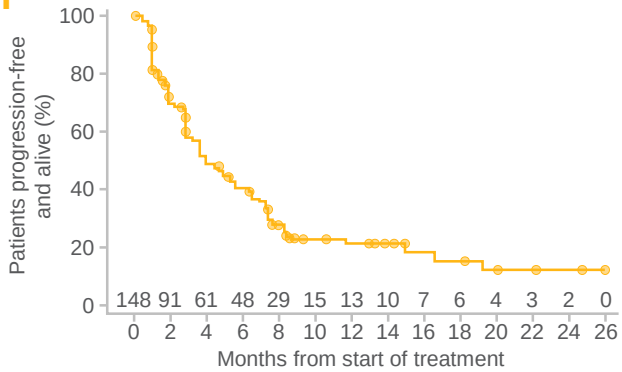
Median OS = 4.4 months

CLL



Median OS = 3.1 months

MM



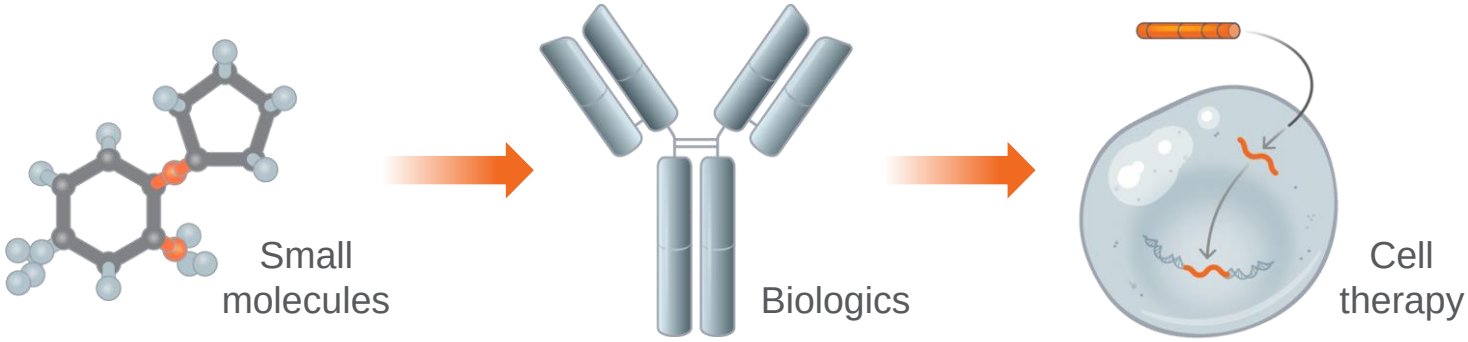
Median PFS = 4.0 months
(95% CI, 2.8-5.6)

Sources: Van Den Neste E, et al. *Bone Marrow Transplant*. 2016;51(1):51-7. Jain P, et al. *Blood*. 2015;125(13):2062-7. Usmani SZ, et al. *Blood*. 2016;128(1):37-44.

JCAR017: A Next-generation CAR T Cell

Incorporating insights to build a better CAR T cell

Evolution of drugs over time:



- The challenge of cell therapy – making a consistent product despite patient-to-patient variability in incoming material
- Juno is a leader in controlling this variability
  - Precise control of dose
  - Precise control of cell ratio
  - Influence toward more naïve and quiescent cells
- Juno's potential differentiation – more control will lead to better patient outcomes

Poor Prognostic Factors in 3rd Line NHL are Well Represented in TRANSCEND Population

Median OS in 3rd Line Therapy Identifies Poor Risk Patients

Poor prognostic factors[1]:	Van Den Neste 2016 Median OS (n=193)
Double/Triple Hit	3.2 mo (BCL-2) 3.5 mo (c-MYC)
Never in CR	4.4 mo
Refractory to ≥2L therapy	3.6 mo
Never undergone ASCT	3.3 mo
Any of above factors	-

Nearly All TRANSCEND Patients have High Risk Demographics

Poor prognostic factors in NHL are well understood[1]:	Percent of TRANSCEND Population (n=55)
Double/Triple Hit	27%
Never in CR	58%
Refractory to ≥2L therapy	49%
Never undergone ASCT	51%
Any of above factors	91%

[1] Van Den Neste E, et al. *Bone Marrow Transplant*. 2016;51(1):51-7.

JCAR017: Potential Best-in-class Profile in NHL

Potential to differentiate on efficacy and tolerability

JCAR017 in DLBCL[1] (NCT02631044)

	CORE All Doses N=40-49	FULL All Doses N=55-69
Best ORR	41/49 (84%)	51/68 (75%)
ORR at 3 months	26/40 (65%)	27/55 (49%)
CR at 3 months	21/40 (53%)	22/55 (40%)
Severe Cytokine Release Syndrome[2]	1/44 (2%)	1/69 (1%)
Severe Neurotoxicity[2]	8/44 (18%)	10/69 (14%)

(1) Investigator-reported data as-of July 7, 2017. Includes fludarabine and cyclophosphamide conditioning regimen. Includes single dose and 2-dose schedules. Other treatment-emergent adverse events, whether or not treatment related, occurring in at least 25% of these patients included neutropenia, fatigue, thrombocytopenia, and anemia. We intend to update data from this trial at the American Society of Hematology meeting in December of 2017.

(2) For CORE analysis group tolerability data, investigator-reported data as-of May 4, 2017. We intend to update data from this trial at the American Society of Hematology meeting in December of 2017.

CR = complete response; PR = partial response; ORR = CR + PR.

Key Attributes

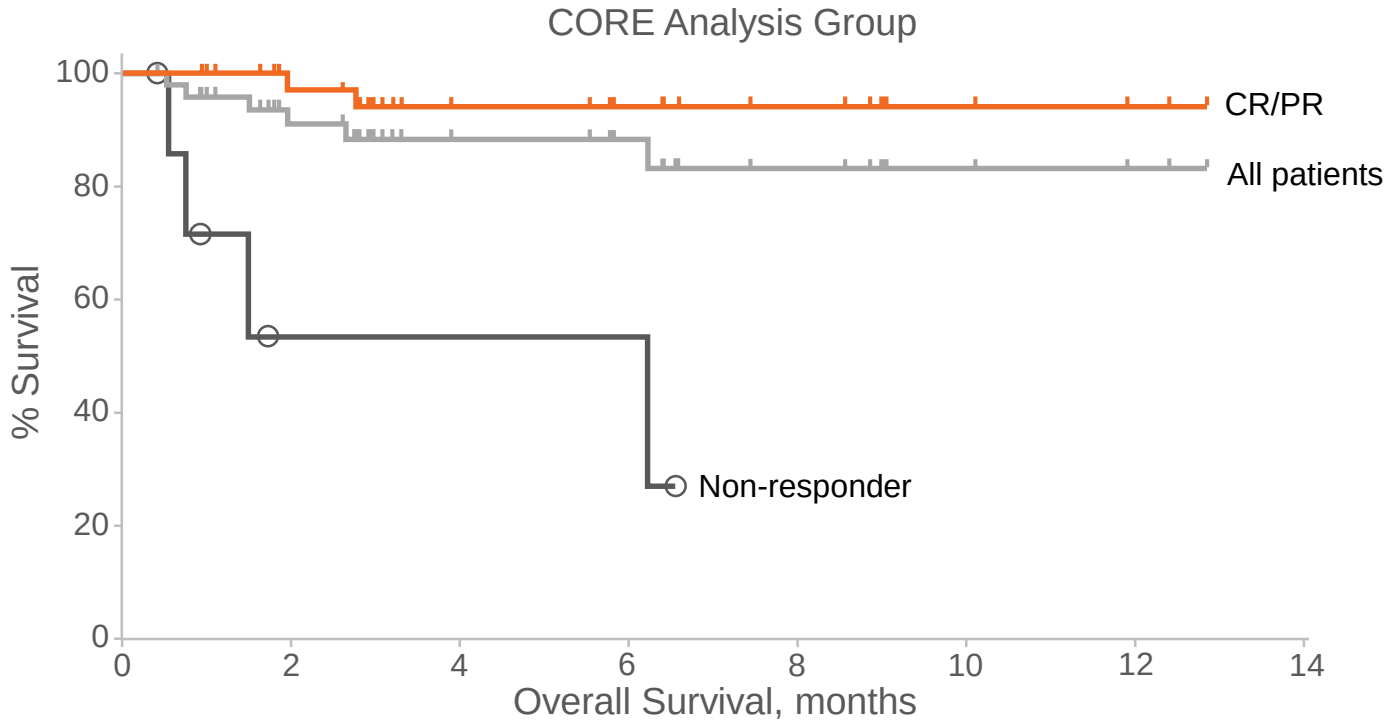
- 64% (44/69) patients did not experience any cytokine release syndrome or any neurotoxicity in the FULL analysis group
- Dose response (CR at 3 months of 33% at Dose Level 1 and 73% at Dose Level 2) observed with similar toxicity profile at each dose in the CORE analysis group
- 80% of patients in CORE analysis group in response at 3 months remain in response at 6 months
- CORE analysis group represents pivotal trial patient population
- Product was available for 98% (86/88) of patients apheresed, as of ASCO 2017

Goal » JCAR017 NHL

Registration trial ongoing with filing expected to be completed 2H18 and approval as early as 2018

JUNO THERAPEUTICS

Survival Among JCAR017 Responders Continues to be Encouraging



- Median OS was 13.7 months in FULL analysis group and has not been reached in CORE analysis group.
- 6-month OS was 75% in FULL and 88% in CORE with median follow up of 5.8 and 5.6 months, respectively.
- Non-responders in the CORE analysis group perform poorly (survival is consistent with outcomes data from the CORAL study).

JCAR017 CLL Phase I/II Trial Begins in 2017

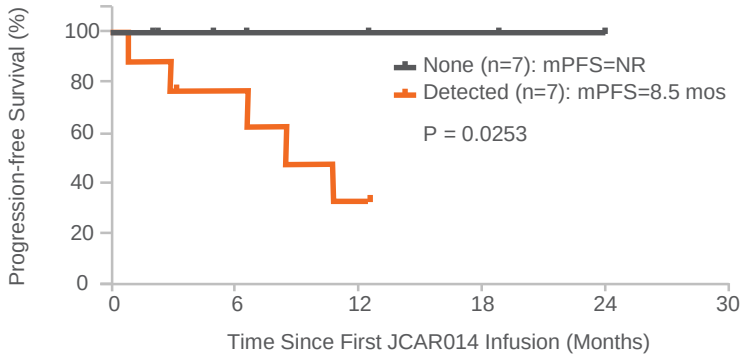
JCAR014 Data Demonstrate Proof of Concept

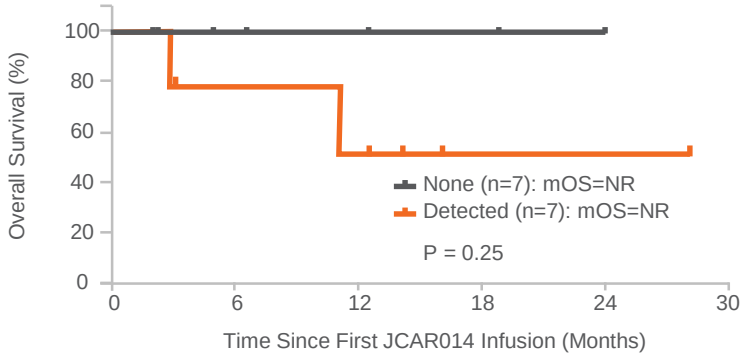
JCAR014 Response Assessment

(NCT01865617)

Lymphodepletion	Flu/Cy lymphodepletion (N=21)[1]
	All patients (N=19 restaged)
Dose Level	DL 1, 2
IWCLL restaging	N=19
ORR (at 4 weeks)	14/19 (74%)
CR (at 4 weeks)	4/19 (21%)
IGH deep sequencing	N=14
CR	7/14 (50%)

Progression-Free Survival & Overall Survival (IGHseq)

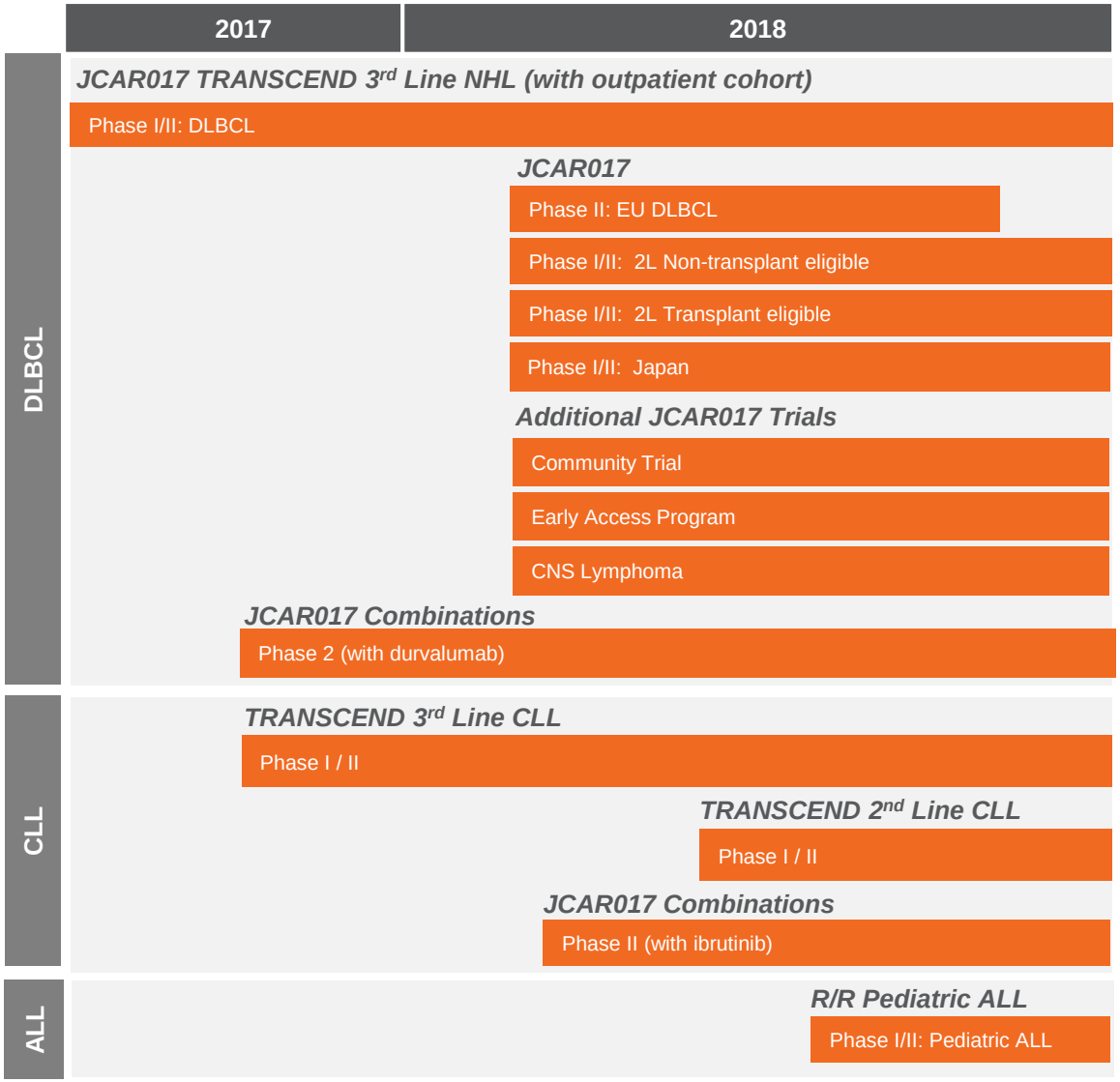




[1]All CLL patients have been previously treated with ibrutinib.
There was 1 treatment-related death in 24 treated CLL patients to-date.
Severe cytokine release syndrome = 8% (2 of 24 patients).
Severe neurotoxicity = 25% (6 of 24 patients).
For JCAR014, investigator-reported data as-of December 4, 2016.
IGH assessment of the bone marrow generally on Day 28.
CR = complete response; PR = partial response; ORR = CR + PR; Flu/cy = fludarabine and cyclophosphamide
IGHseq = Immunoglobulin heavy chain sequencing by advanced PCR technologies; mPFS = median progression free survival, NR = not reached at time of data cut-off; mOS = median overall survival; del (17p) = high risk cytogenetic marker of CLL disease [deletion of the short arm of chromosome 17].

Broad JCAR017 Clinical Development Plan

Moving to address more diseases and earlier lines of therapy



Expanding the Franchise into Multiple Myeloma

Two trials in multiple myeloma underway; JCARH125 trial to begin early 2018

- Late line multiple myeloma market represents over 10,000 patients in the U.S. alone
- Potential to move into early lines of therapy, potentially challenging transplants
- Juno can build on CD19 experience with the aim to develop a competitive therapy

Leveraging CD19 Experience

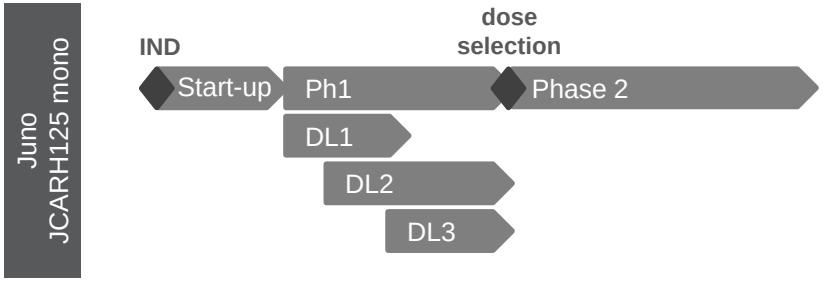
- Fully-human binders
- 4-1BB and next-gen co-stim domains
- Manufacturing technologies
- Build manufacturing at scale

Unique BCMA Features

- Variable BCMA surface expression
- Complex tumor micro-environment

Juno is Well-Positioned in Multiple Myeloma

- The JCARH125 Phase I Trial is expected to begin in early 2018.
  - Seamless Phase I/II design
  - Evaluating the safety and tolerability of JCARH125 at multiple doses to determine the recommended Phase II dose
  - Relapsed or refractory multiple myeloma after ≥ 3 prior treatments, including a proteasome inhibitor and IMiD



We plan to manufacture JCARH125 from our JuMP facility in 2018.

Applying CARs & TCRs to Solid Tumors

Demonstrate that T cells kill cancer – recent checkpoint inhibitor and tumor infiltrating lymphocytes data	✓
Demonstrate that T cells home to the tumor	✓
Understand and overcome how the tumor microenvironment may be limiting the activity of engineered T cells, and understand how to induce epitope spread	
Identify the right targets	

Ongoing Trials

WT-1 (TCR)
NSCLC / Mesothelioma / AML

L1CAM (CAR)
Neuroblastoma

ROR-1 (CAR)
NSCLC / Breast Cancer

MUC-16 / IL-12 "Armored CAR"
Ovarian Cancer

Lewis Y (CAR)
Solid Tumors

Planned for 2018

IL13rα2
GBM

Expect data from one or more trials in 2018

AML = acute myeloid leukemia, NSCLC = non-small cell lung cancer, GBM = glioblastoma

Automation Lowers Cost and Improves Efficiency

Standard Process

- Manual process
- ISO 5
- staff:
- cost: $$$$

Juno Process Today

- Closed and automated process
- Defined cell process
- ISO 7 / 8
- staff:
- cost: $$$

Goal for Juno Process in the Medium-term

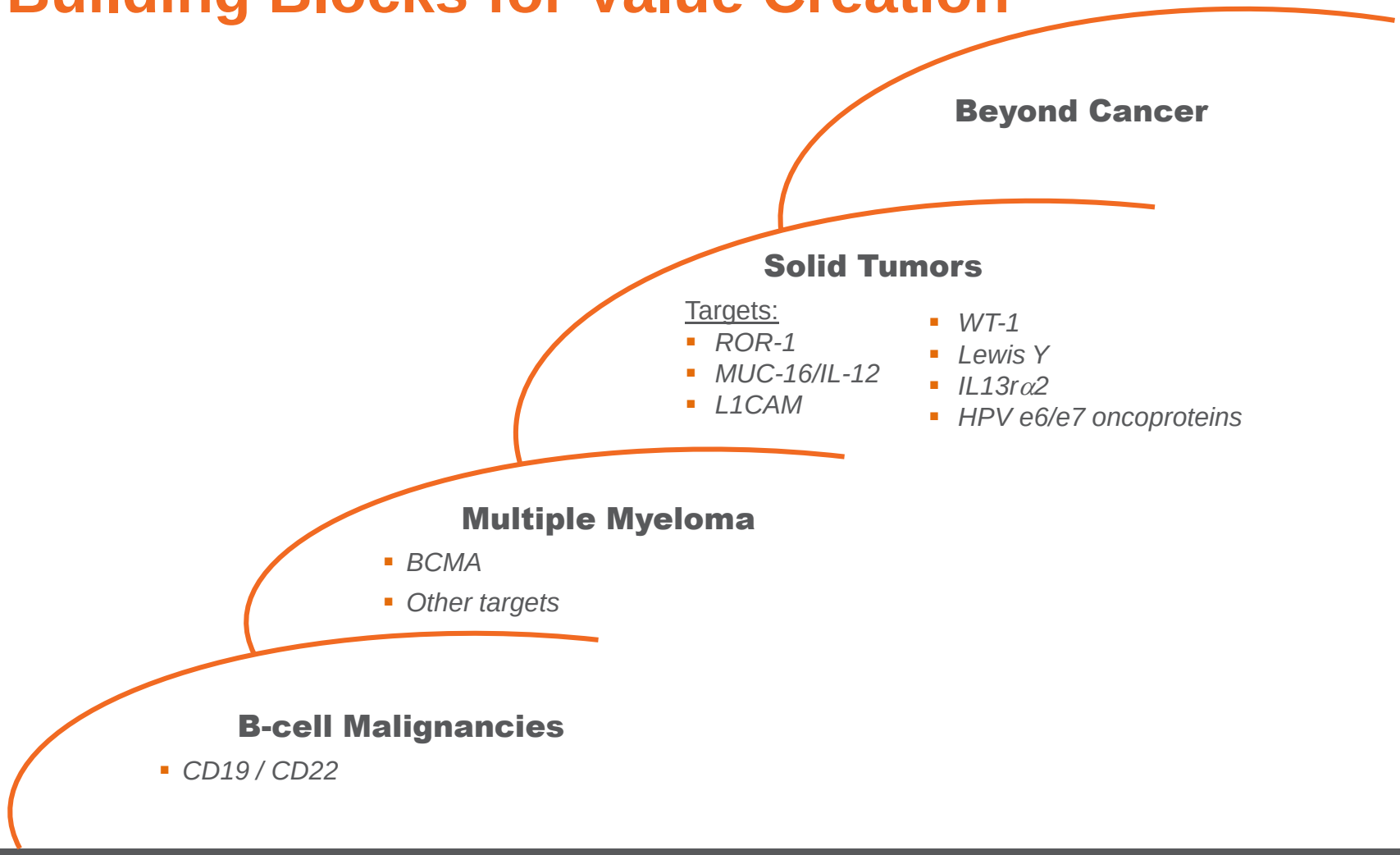
- Closed, automated, and integrated process
- 3-6 day manufacturing time
- staff:
- cost: $$

Investing in Next Generation Manufacturing to Improve Turnaround Time and COGS

Innovation is Critical to Bring Medicines to Patients Around the World

Next Generation	Description	Target Turnaround Time	COGS
Generation 1 (JCAR017)	Closed & Automated	< 21 days	COGS Baseline at JCAR017 Launch
Generation 2 (JCARH125)	*Plus* Single Train & Better Phenotype and Functional Control	14-18 days	~70% of baseline
Generation 3	*Plus* Accelerated Manufacturing Platform and Custom Equipment & Reagents	~8 days	~40% of baseline
Generation 4	*Plus* Accelerated Manufacturing Platform & Next-generation Assays	3-6 days	~30% of baseline

Building Blocks for Value Creation



Investing in products & platform MANUFACTURING • PROCESS DEV • T CELL BIOLOGY • TRANSLATIONAL MED

All of Juno's product candidates are investigational product candidates and their safety and efficacy have not been established. Juno has not obtained marketing approval for any product, and there is no certainty that any marketing approvals will be obtained or as to the timelines on which they will be obtained.

Robust and Diverse CAR & TCR Pipeline

Active Programs	Description
CD19: JCAR017	▪ NHL Phase I ▪ CLL Phase I / II
CD19: JCAR014 Combinations	▪ NHL Phase I (with Durvalumab) ▪ CLL (with Ibrutinib)
CD19: Fully-Human scFv	▪ Adult B Cell Malignancies
CD19: JCAR017 Combinations	▪ NHL (with Durvalumab)
CD19 / 4-1BBL "Armored" CAR	▪ B Cell Malignancies
CD22: JCAR018 Fully-Human scFv	▪ Pediatric ALL / NHL Phase I
BCMA: MCARH171 & FCARH143	▪ Multiple Myeloma Phase I
WT-1: JTCR016	▪ AML Phase I / II ▪ NSCLC / Mesothelioma Phase I / II
L1CAM: JCAR023	▪ Pediatric Neuroblastoma Phase I
MUC16 & IL-12: JCAR020 "Armored" CAR	▪ Ovarian Phase I
ROR-1: JCAR024	▪ NSCLC / Breast Phase I
Lewis Y	▪ Solid Tumor Phase I

Planned Programs	Description
CD19: JCAR017 or Similar Product Candidate	▪ ALL
BCMA: JCARH125	▪ Multiple Myeloma Phase I
IL13rα2	▪ Glioblastoma
A2aR Antagonist	▪ B Cell Malignancies and Solid Tumors
HPV e6/e7 Oncoproteins	▪ HPV-Associated Cancers

JUNO THERAPEUTICS