Bellicum PHARMACEUTICALS

Corporate Presentation

December, 2018

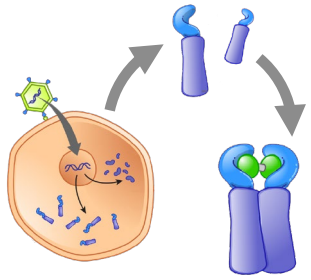
Forward Looking Statement

This presentation contains estimates, projections and other forward-looking statements, concerning, among other things: our research and development activities relating to our CaspaCIDe® ("iC9"), GoCAR-T® (incorporating "iMC") and related technologies; our product candidates including rivo-cel™ (previously BPX-501), BPX-601, BPX-602, BPX-603, BPX-701, and rimiducid; the effectiveness of our CaspaCIDe and GoCAR-T programs and their possible range of application and potential curative effects and safety in the treatment of diseases, including as compared to other treatment options and competitive therapies; the success of our collaborations with academic and commercial partners; the timing, progress of enrollment and success of our clinical trials; and the timing of potential European marketing authorization applications for rivo-cel and rimiducid. Our estimates, projections and other forward-looking statements are based on our management's current assumptions and expectations of future events and trends, which affect or may affect our business, strategy, operations or financial performance. Although we believe that these estimates, projections and other forward-looking statements are based upon reasonable assumptions, they are subject to numerous known and unknown risks and uncertainties and are made in light of information currently available to us. Many important factors, in addition to the factors described in this presentation, may adversely and materially affect our results as indicated in forward-looking statements. All statements other than statements of historical fact are forward-looking statements.

Estimates, projections and other forward-looking statements speak only as of the date they were made, and, except to the extent required by law, we undertake no obligation to update any forward-looking statement. These statements are also subject to a number of material risks and uncertainties that are described more fully in Bellicum's filings with the Securities and Exchange Commission, including without limitation our annual report on Form 10-K for the year ended December 31, 2017 and our quarterly report on Form 10-Q for the period ended September 30, 2018.

Our Platform

Enhancing T-cell function via controllable molecular switches



Our Clinical Programs

Rivo-cel* (BPX-501)	BPX-601	BPX-701
Hematologic Malignancies & Inherited Blood Disorders	Pancreatic, Gastric, & Prostate Cancers	AML / MDS Uveal Melanoma

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Striving to deliver cures through controllable cell therapy

Our People

~150 Bellicians

Our Capabilities

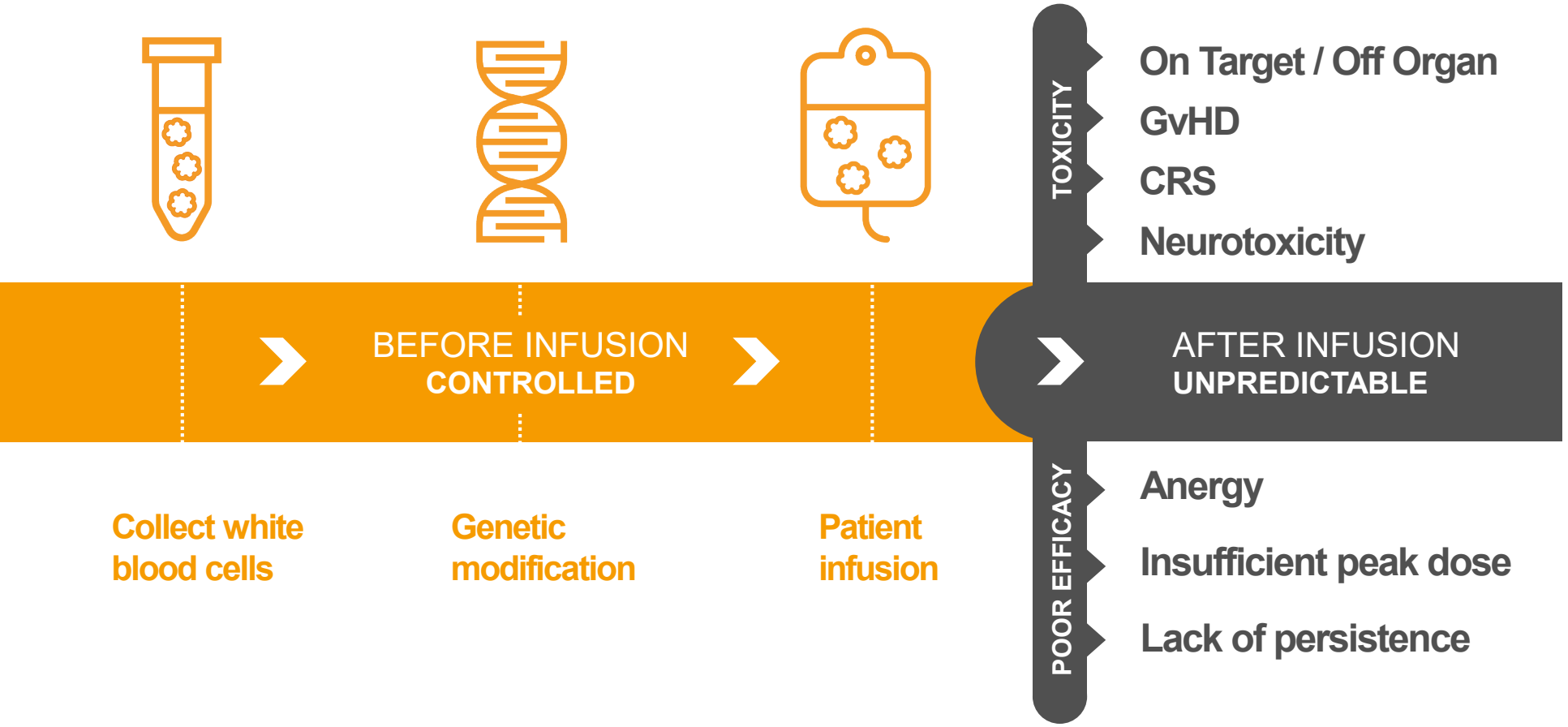
Over 250 patients treated in clinical studies to date

- Translational Research & Clinical Development
- GMP Viral Vector & Cell Manufacturing
- Allogeneic & Autologous Cell Therapy Supply Chain

*Rivo-cel™ (rivogenlecleucel, formerly BPX-501)

Current Limitations of Cell Therapy

Most cell therapies can only be controlled **before** infusion



Our Approach to Enhance Cell Therapy

Bellicum's molecular switches allow control **after** infusion

BEFORE INFUSION
CONTROLLED

AFTER INFUSION
CONTROLLED

Collect white blood cells

Genetic modification

Patient infusion

iMC ACTIVATION switch
to activate immune cells and modulate the tumor micro-environment

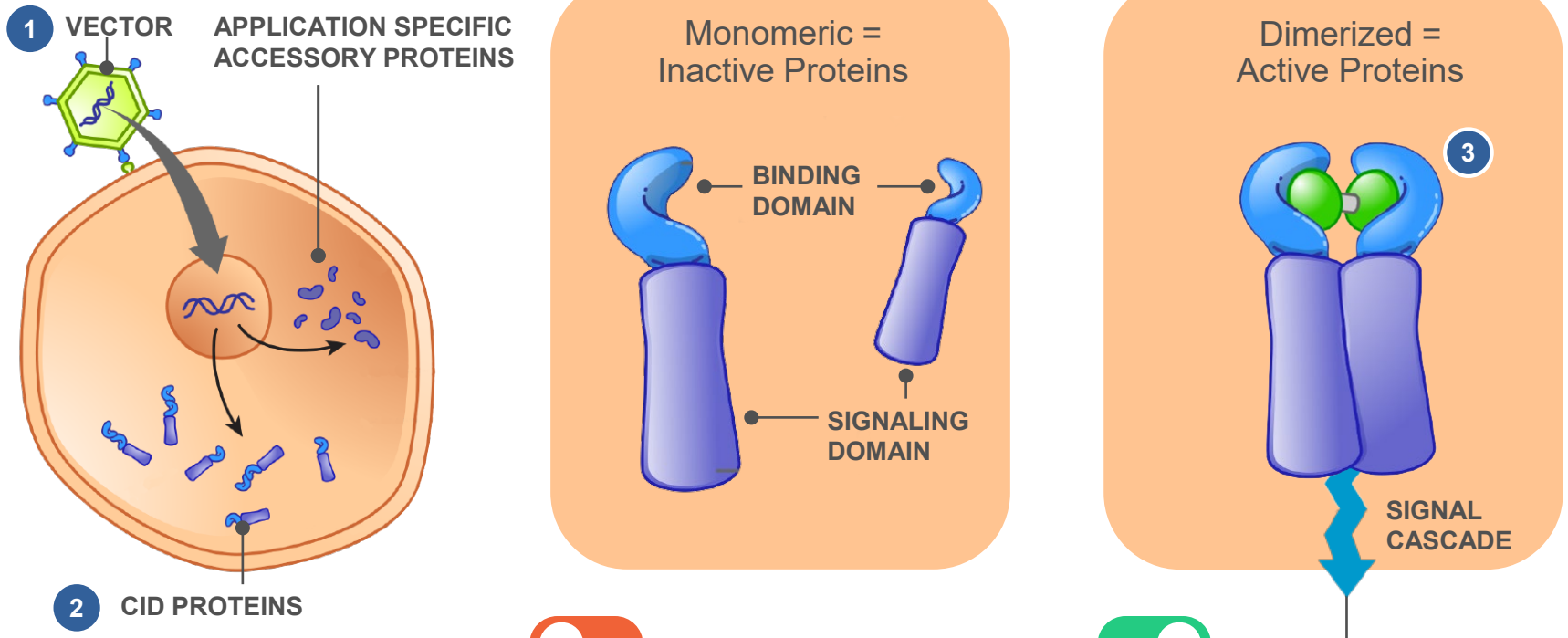
CaspaCIDe SAFETY switch
to eliminate toxic cells

Potential for Improved Benefit / Risk

Chemical Induction of Dimerization ("CID") Molecular Switch Platform

Rimiducid infusion activates signaling pathways to control T-cell function

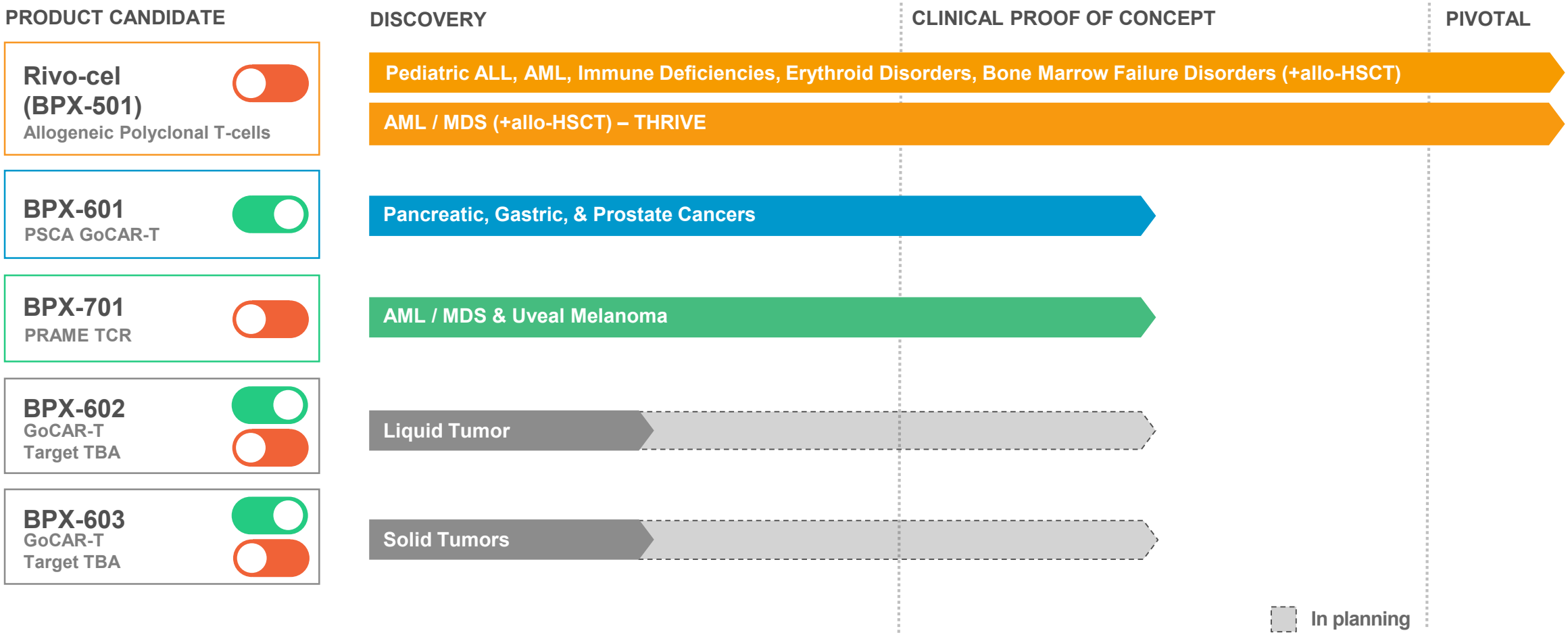
1. Viral transduction transfers the DNA from a **vector** into the target cell nucleus.
2. Vector-derived DNA directs expression of **CID** and **accessory proteins.**
3. **Rimiducid** dimerizes the CID proteins, thus turning on the signal cascade.



Signal	Caspase-9 ("iC9")	MyD88 and CD40 ("iMC")
Result	Apoptosis (cell death)	T-cell activation, proliferation & survival

Highly Differentiated Portfolio

Control switch selected to address most critical situation-specific challenge



Rivo-cel (rivogenlecleucel) Product Overview

Allogeneic polyclonal T-cells incorporating the CaspaCIDe safety switch (formerly BPX-501)

Unmet Need in Leukemias, Lymphomas, and Inherited Blood Disorders

- Potentially cured by allogeneic hematopoietic stem cell transplantation (allo-HSCT)
- Allo-HSCT patients without HLA-matched related donor are at higher risk of morbidity & mortality. Leading causes:
  - Malignant relapse
  - Viral infection
  - Graft Versus Host Disease (GvHD)
- ~70% of allo-HSCT patients lack a HLA-matched related donor
  - Europe – 11,700 patients / year
  - US – 6,300 patients / year
- ~26,000 additional eligible patients forgo allo-HSCT annually in Europe & US in part due to risks

Anticipated Rivo-cel Benefits

- Graft versus leukemia (GvL) to prevent malignant relapse and extend survival
- Reduce transplant-related mortality (TRM) due to infection
- Ability to treat GvHD via CaspaCIDe

Program Update

- Enrollment complete in Phase 1/2 BP-004 pediatric basket trial – **EMA filing planned for 2019**
- Randomized global Phase 2/3 **THRIVE AML / MDS trial in patients 12+ to initiate by year-end 2018**

BP-004 Study: Schema and Enrolled Populations

Phase 1/2 study of rivo-cel gene modified donor T cells following TCR αβ depleted allo-HSCT

High risk malignancies and non-malignant disorders → αβ T-cell and B-cell depleted haplo-HSCT without GvHD Prophylaxis → **Rivo-cel** → Rimiducid for patients who develop visceral GvHD or are refractory to SOC treatment

Enrolled Populations

N = 249	
Malignant (N = 117)	**Non-Malignant (N = 132)**
Diagnosis	**Diagnosis**
Acute lymphocytic leukemia (ALL)	Primary Immune Deficiencies
Acute myeloid leukemia (AML)	β Thalassemia Major
Other	Other Erythroid Disorders
	Bone Marrow Failure Disorders

Outcomes

Rivo-cel:

- Event-free survival at 180 days (regulatory endpoint)
  - TRM/NRM, severe GvHD, life-threatening infections
- Progression-free survival
- Disease status

Rimiducid:

- GvHD response

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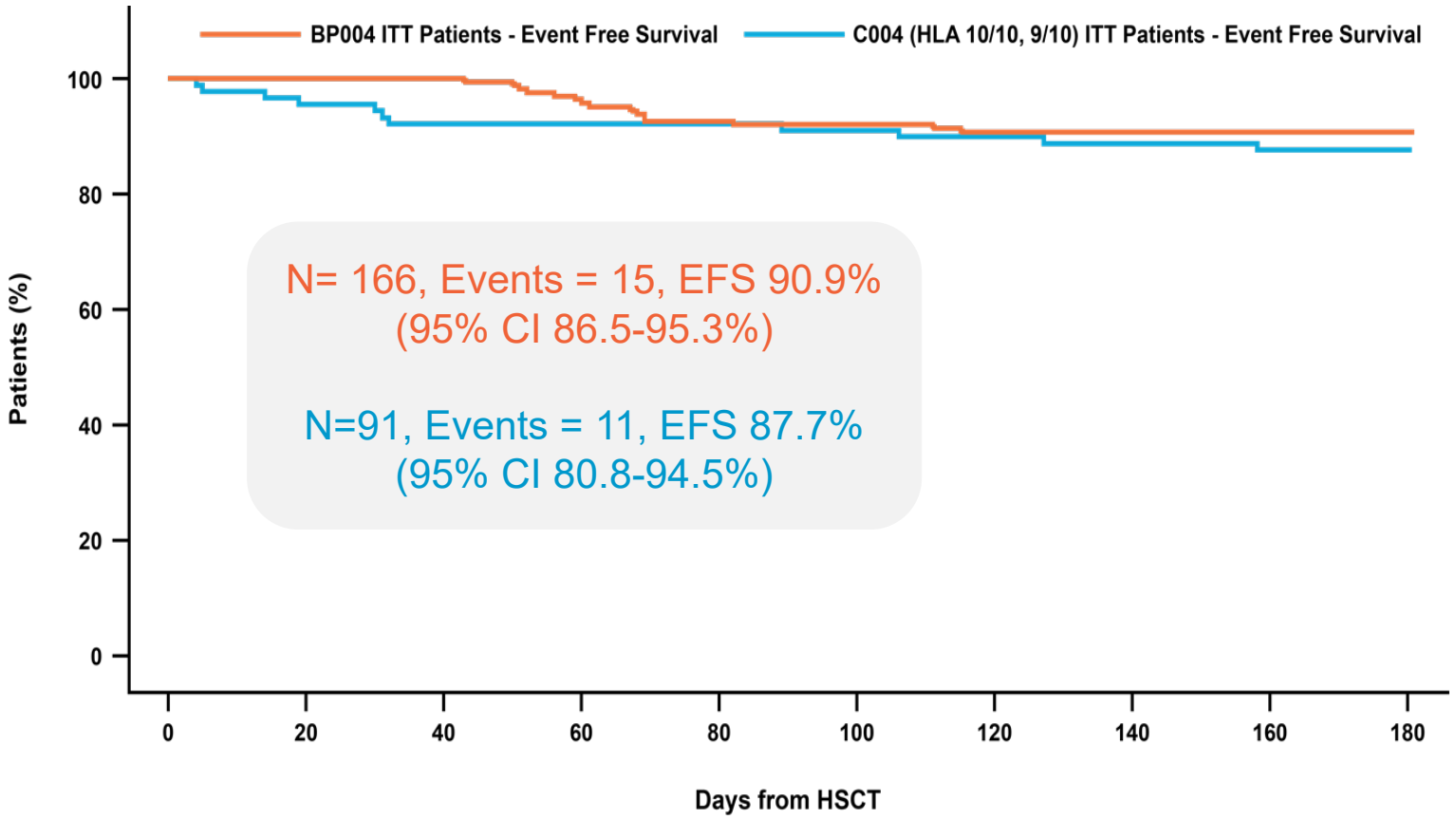
TRM, transplant-related mortality; NRM, non-relapse mortality; GvHD, graft versus host disease; SOC, standard of care; HSCT, hematopoietic stem cell transplantation. ClinicalTrials.gov Identifiers: NCT01744223, NCT02065869.

Interim Six-Month Event-Free Survival Results

Rivo-cel interim event-free survival comparable to MUD HSCT

- C-004 is an observational trial of pediatric patients with malignant (67%) or non-malignant (33%) disease who underwent a MUD HSCT
- Non-inferiority of rivo-cel EFS at 180 days to MUD HSCT is required for EMA approval
- Full analysis with statistical comparisons of patients who received rivo-cel or a MUD HSCT planned for 2019

Event Free Survival at 180 days



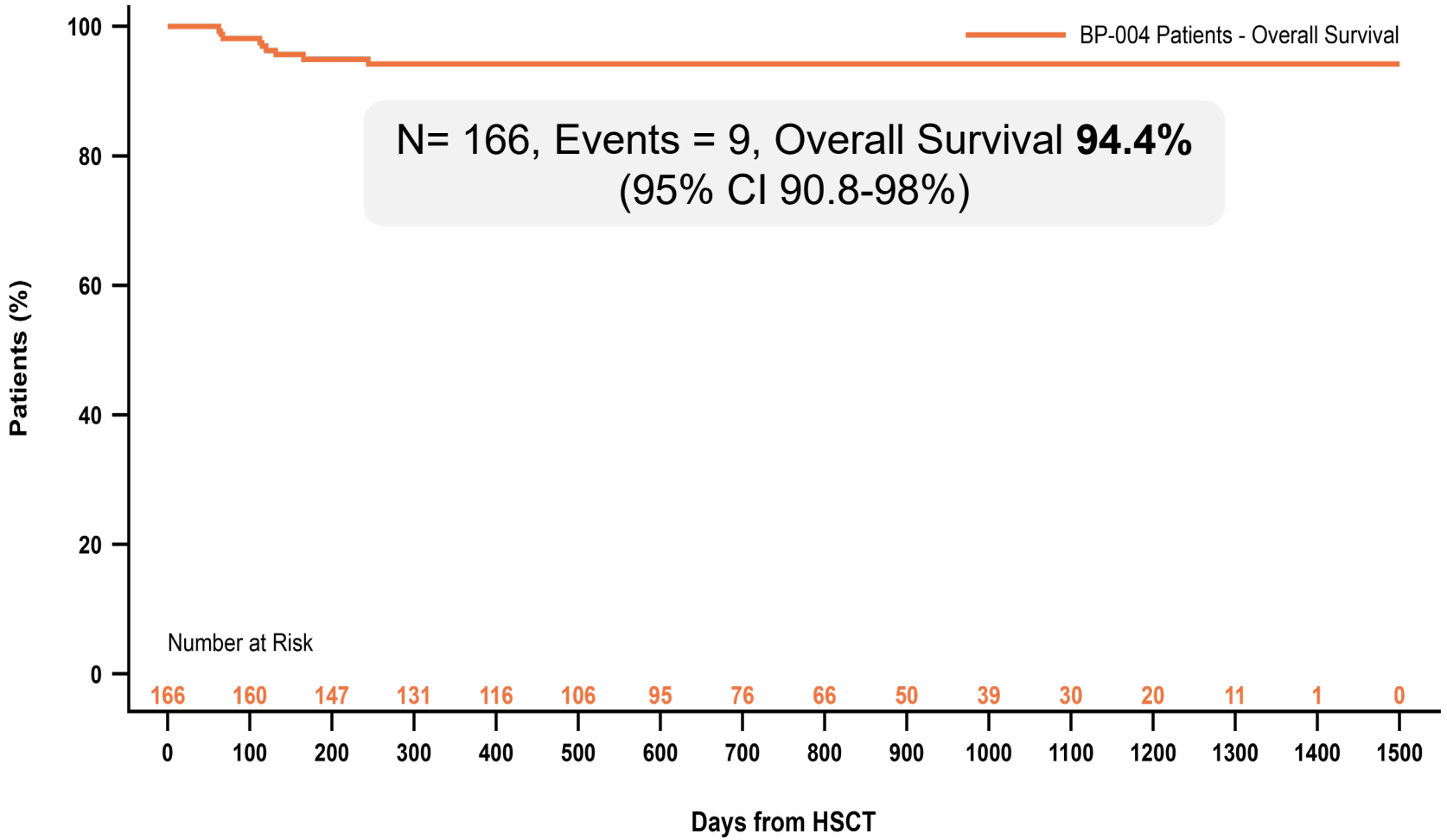
EFS, event free survival; MUD, matched unrelated donor; HSCT, Hematopoietic Stem Cell Transplantation

Interim Survival Results

High rates of disease-free and overall survival in rivo-cel treated patients

With median 20.3 months (0.5 – 47.4 months):

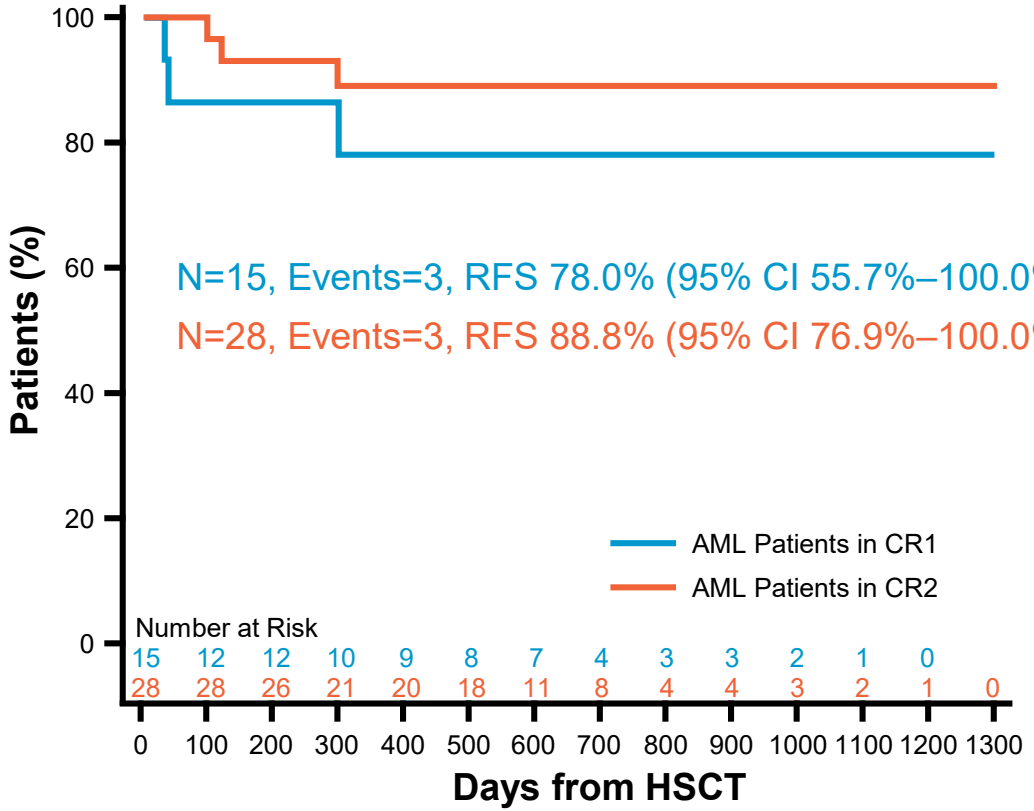
- Relapse-free survival **82.9%** in malignant patients
- Disease-free survival **95.2%** in non-malignant patients



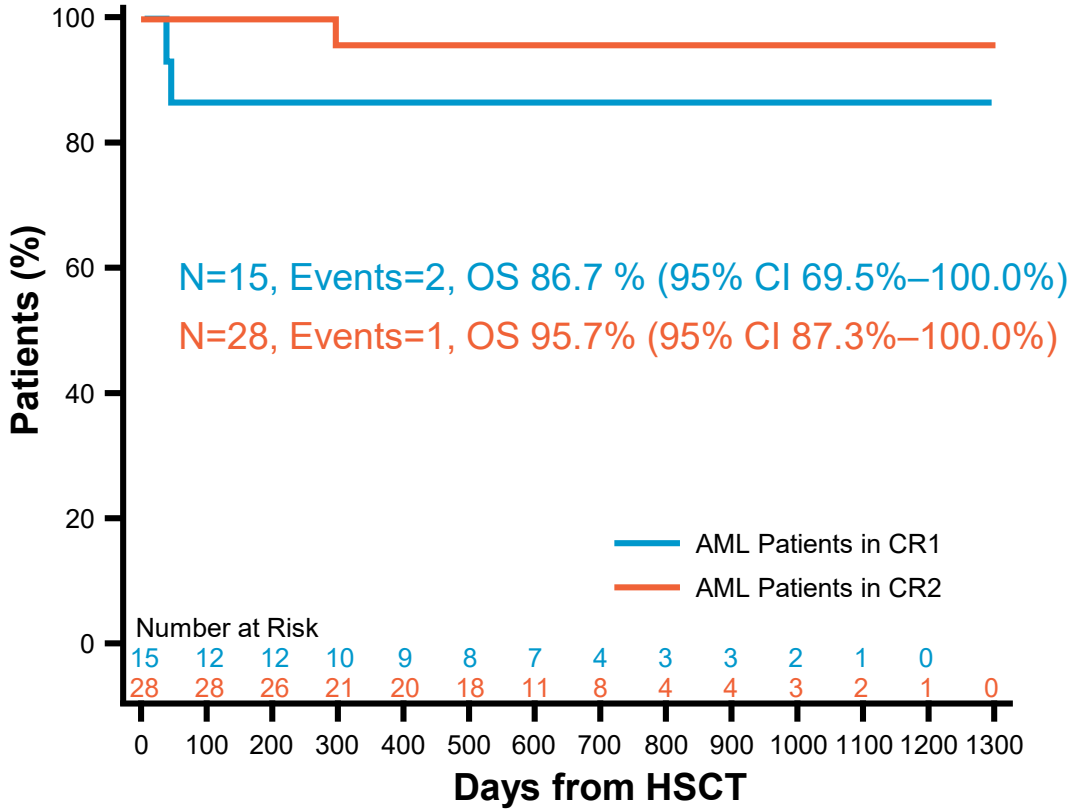
Interim AML Efficacy Outcomes*

High rates of RFS and OS in patients in first or second complete remission

Relapse-Free Survival by CR Status



Overall Survival by CR Status



RFS, Relapse-free survival; OS, Overall survival; CR, Complete Remission
*Efficacy evaluable population
Data cutoff date: September 17, 2018

Interim GvHD Response to Rimiducid

High rates of response in patients refractory to standard of care treatment

Methods & Evaluable Population

Patients who developed visceral GvHD or were refractory to SOC treatment were eligible to receive ≥1 dose (up to 3 at 48 hour intervals) of rimiducid (0.4 mg/kg)

Of 238 GvHD-evaluable patients:

- 35.7% (85/238) experienced any grade acute or chronic GvHD
- 28.2% (24/85) of patients with GvHD received rimiducid

Efficacy Results

Best overall response of 70%
7 days post-rimiducid

- 9 CR and 7 PR
- Median time to response of 1 day (1 - 4 days)

Four patients in PR or not evaluable at day 7 achieved CR within 30 days post-rimiducid

Translational Results

Reduction in rivo-cel serum levels observed in all patients receiving rimiducid[1]

Rimiducid eliminates the most highly activated rivo-cel T cells which express the highest level of iC9[2], leaving remaining cells to re-expand

- 79% (11/14) malignant patients receiving rimiducid remain relapse free

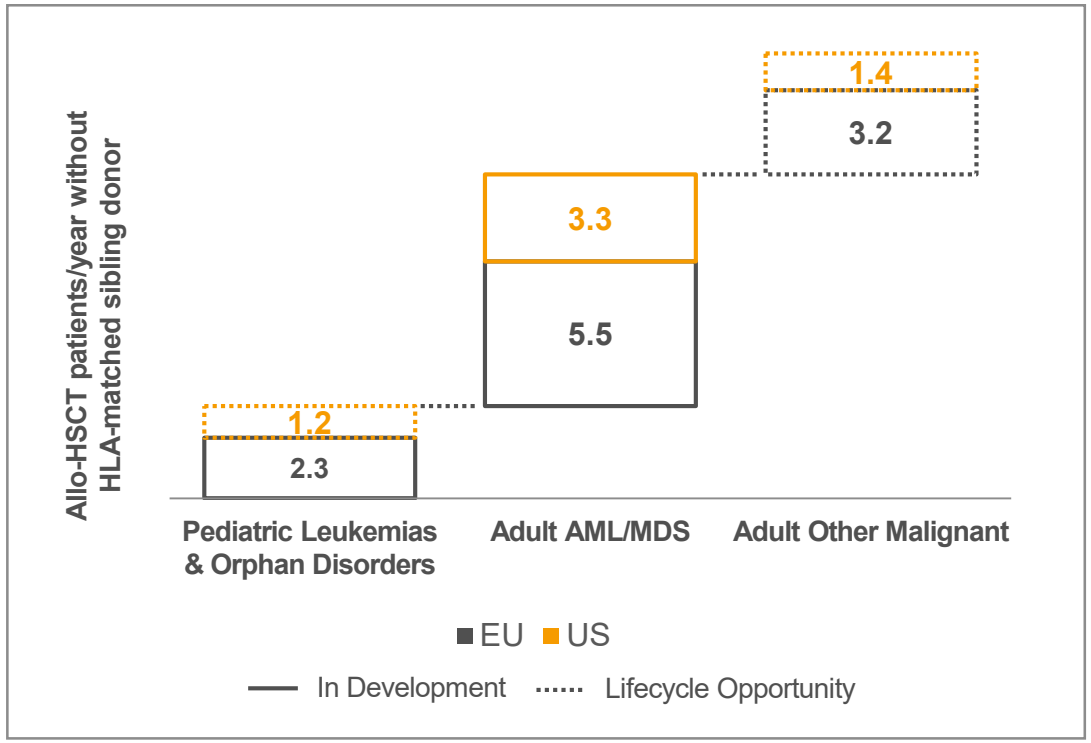
GvHD: acute graft versus host disease; SOC, Standard of Care; PR, Partial Response; CR, Complete Response

1. N = 10 with translational data at time of interim.

2. Zhou et al. ASH 2018, a3496

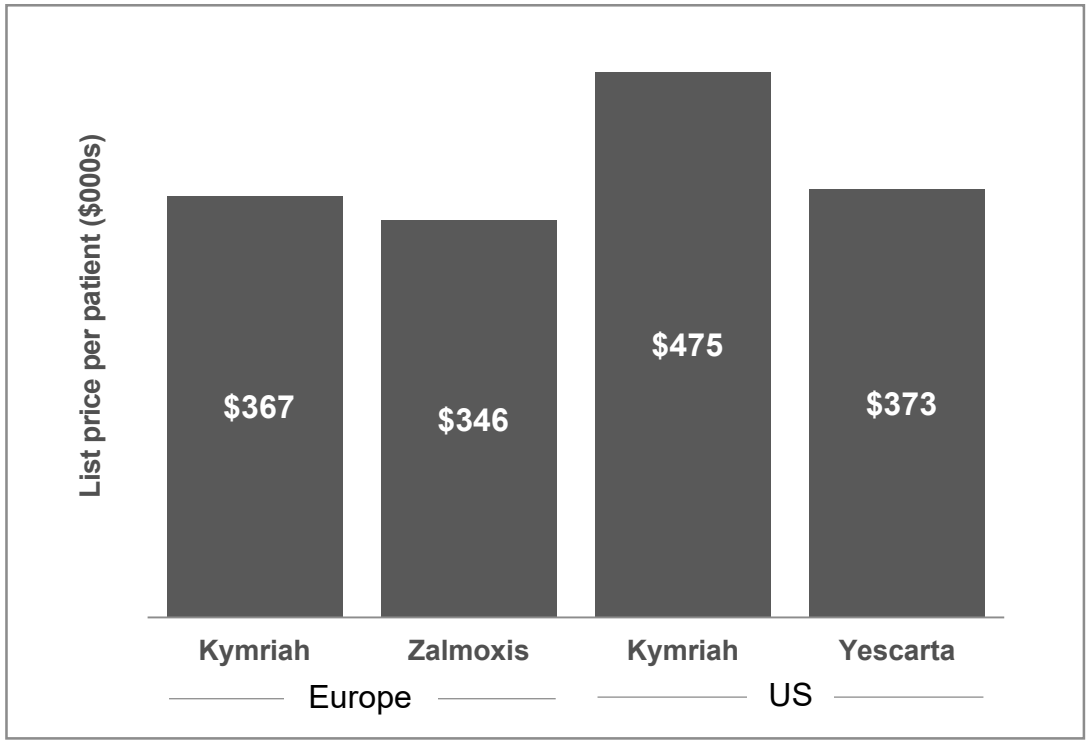
Rivo-cel: Compelling Commercial Opportunity

Large addressable patient population (000's)



Additional ~26k eligible patients per year without HLA-matched donor who forgo transplant represent market growth opportunity

Pricing reflects value in cell therapy



Sources: EBMT Transplant Activity Survey 2016; CIBMTR Current Uses & Outcomes of HCT; internal company analysis

Zalmoxis price assumes 2 infusions per patient, the average observed in clinical trials. Approved range of infusions per patient is 1-4.

Rivo-cel: Compelling Value Proposition

Potential Rivo-cel Benefits

Potential to address the leading causes of morbidity & mortality in curative allo-HSCT

- Malignant relapse
- Viral infection
- GvHD

May reduce healthcare costs for the most complex allo-HSCTs: those without HLA-matched sibling

- May shorten hospital length-of-stay and lower readmission
- May reduce infectious and GvHD complications during and post-discharge
- Eliminates MUD graft procurement costs

Potential to reduce disease burden and associated costs

- May reduce rate of malignant relapse
- Potential to enable curative allo-HSCT in patients without HLA-matched donor

BPX-601 Product Overview

GoCAR-T targeting Prostate Stem Cell Antigen (PSCA)

Unmet Need

High unmet need in solid tumors expressing PSCA

	Incidence (US)	Annual Deaths (US)	% Expressing PSCA
Pancreatic	55k	44k	~60%
Prostate	165k	29k	75-90%
Gastric	26k	11k	76-89%

Strategic Rationale

Attractive first-in-class solid tumor CAR-T opportunity

- Clinically validates the GoCAR-T platform, designed to:
  - Drive T-cell activation, proliferation, and persistence
  - Modulate the tumor micro-environment to enhance immune activity

Program Update

Phase 1 trial enrollment ongoing

- Trial amended Q3 2018
  - Standardized Cy/Flu conditioning
  - Added gastric & prostate cancers
- Initial data presentation planned for December, 2018

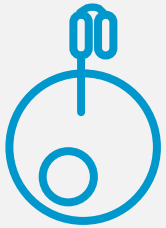
Incidence and annual deaths: Noone AM, Howlader N, Krapcho M, Miller D, Brest A, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2015, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2015/, based on November 2017 SEER data submission, posted to the SEER web site, April 2018.
PSCA expression: Argani et al, Cancer Res 2001; Reiter et al., PNAS 1998; Abate-Daga et al, HGT 2014; Data on file

GoCAR-T: Designed to Enhance Efficacy

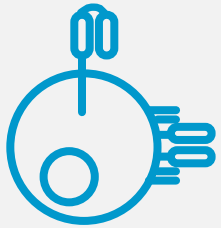
Broad immunological effects of inducible MyD88/CD40 (iMC) activation switch

GoCAR-T

CAR Targeting



TCR Targeting

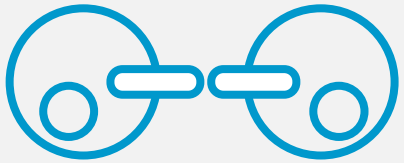


Proliferation/ Self-renewal

Resistance to Inhibitory Factors

HOST IMMUNITY

Costimulation



Antigen Presentation

Tumor Visibility

Immune Cell Recruitment

BPX-601 Phase 1 Trial Dose Escalation

BP-012 trial in relapsed/refractory pancreatic, gastric, and prostate cancers

	Cohort 0 (Lead-in)	Cohort 3	Cohort 4	Cohort 5a	Cohort 5b
Patient Population	3L+ Pancreatic			2L Pancreatic 2L Gastric HR-Refractory Prostate	
BPX-601 Dose *x10^6 cells/kg @ Day 0*	1.25	1.25	2.5	5.0	
Rimiducid Dose *mg/kg @ Day 7*	None	0.4	0.4	0.4	
Conditioning	Cytoxan 1g/m^2 @ Day -3			Cytoxan 1g/m^2 @ Day -3	Cytoxan 0.5g/m^2 Fludarabine 30mg/m^2 @ Days -5, -4, -3
Status	Enrolled			Active	

Trial Highlights and Updates

- Standard 3+3 dose escalation / de-escalation design to establish MTD or RP2D
- Q3 amendment updated conditioning regimen and adds gastric and prostate cancer patients
- Schedule for repeat dosing of rimiducid to be evaluated after cohort 5
- Abstract accepted for oral presentation at ESMO Immuno-Oncology meeting in December

ClinicalTrials.gov Identifier: NCT02744287

BPX-701 Product Overview

TCR targeting Preferentially Expressed Antigen in Melanoma (PRAME) incorporating CaspaCIDe

Unmet Need

Several hematologic and solid tumors express PRAME

- Predominantly expressed in AML, uveal melanoma, sarcomas and neuroblastomas

Strategic Rationale

Attractive first-in-class opportunity targeting a cancer/testis antigen

- Supports further proof-of-concept of CaspaCIDe in T-cell therapy

Program Update

Phase 1 trial enrollment ongoing

- Adding sites beginning Q4 2018 to accelerate enrollment
- Initial data presentation planned for 2019

*License/collaboration with Leiden University Medical Center

Anticipated Program Milestones

	2018	2019
Rivo-cel	Initiation of randomized Phase 2/3 study in AML / MDS (patients 12+)	Final analyses of BP-004 and C-004 trials MAA submissions for rivo-cel and rimiducid for pediatric patients
BPX-601	Abstract accepted for oral presentation of initial Phase 1 results at ESMO Immuno-Oncology Congress	Presentation of updated Phase 1 results, including pancreatic, gastric & prostate cancers
BPX-701		Presentation of initial Phase 1 results
PIPELINE		IND submissions for two new dual-switch GoCAR-T programs

Financial Highlights

Cash and Investments

$118.4 million of cash, restricted cash and investments as of **September 30, 2018**

Cash Guidance

Expect that current cash resources will be sufficient to meet operating requirements through 2019

Shares Outstanding

43.4 million shares of common stock at **September 30, 2018**

Bellicum

Striving to deliver cures for cancer and rare diseases through controllable cell therapy

Industry-leading CID switch platform for controlling cell therapy

- iMC activation switch to enhance efficacy, particularly in solid tumors
- CaspaCIDe safety switch to manage toxicity

Growing portfolio of differentiated oncology & hematology programs

- Rivo-cel – Best-in-class allogeneic T-cell product in hematologic malignancies and inherited blood disorders
- BPX-601/701 – First-in-class GoCAR-T and TCR products
- BPX-602/603 – First controllable "dual-switch" GoCAR-Ts to enter clinic in 2019

Fully integrated cell therapy capabilities support future growth

- Robust R&D, clinical, and manufacturing capabilities
- Ongoing collaborations with other leaders in the field

Bellicum Leadership Team

Rick Fair
President & CEO
Rick has a 20-year track record as a strategist and commercial leader in the biopharmaceutical industry. Rick joined Bellicum in 2017 from Genentech/Roche.

David Spencer
Chief Technology Officer
Dave is the inventor of CID technology, and co-developed the first clinical applications of the technology, DeCIDe® and CaspaCIDe®.

Thierry Darcis
General Manager, Europe
Thierry has over 20 years of experience in European and global marketing, product development, and operations. He joined Bellicum in 2018.

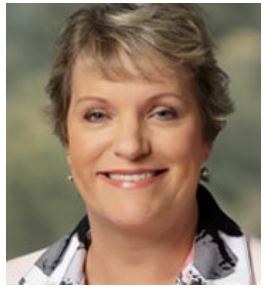
William Grossman
Chief Medical Officer
Bill has an extensive background in the development of cancer immunotherapies and joined Bellicum in 2018 from Genentech/Roche.

Aaron Foster
Vice President Translational Research & New Product Development
Aaron leads the CAR and TCR gene-modified T-cell programs that are developing systems for controlling T-cell behavior *in vivo* using molecular switch technology.

Shane Ward
General Counsel & Corporate Secretary
Shane is a seasoned public company executive with over 20 years of biotechnology and pharmaceutical industry experience. Shane joined Bellicum in 2018.

Gregory Naeve
Chief Business Officer
Greg joined in 2017 from Pfizer, where he was ImmunoOncology & Cell Therapy Lead in their External Research and Development Unit. He was previously a Principal at The Column Group.

Alan Smith
Exec. Vice President Tech Operations
Alan has over 30 years of experience in R&D, Manufacturing and Quality roles in cellular therapeutics.

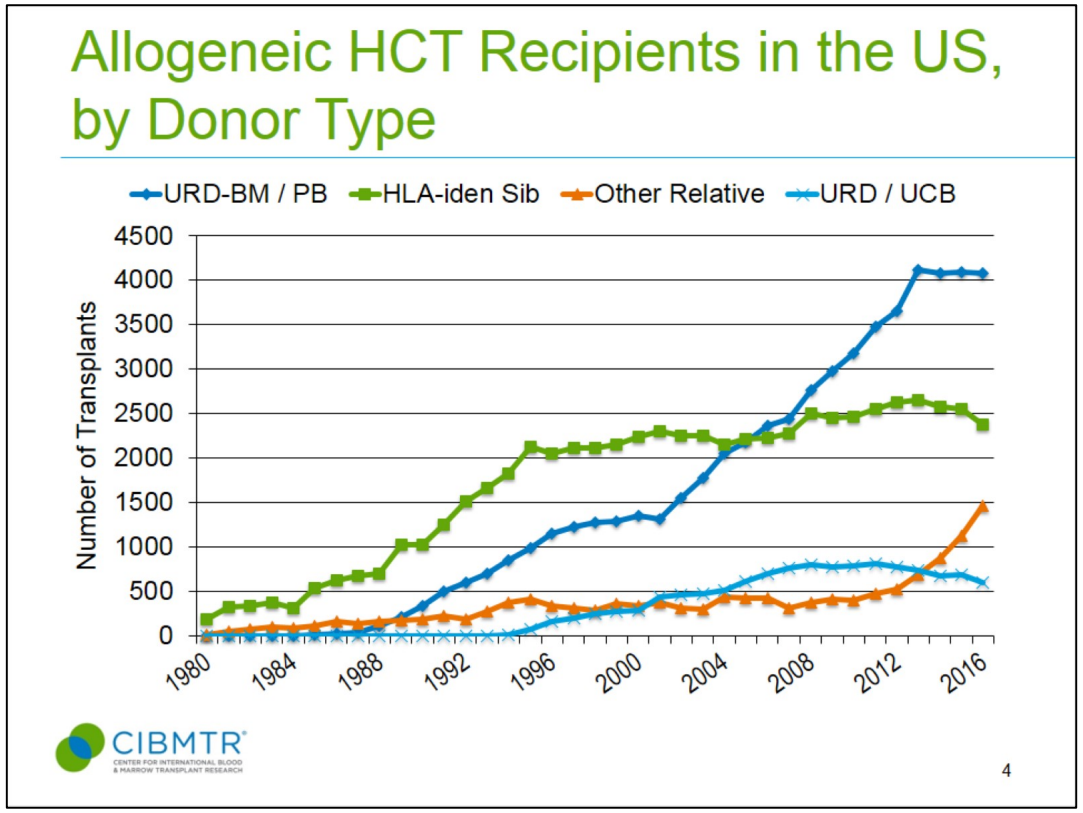


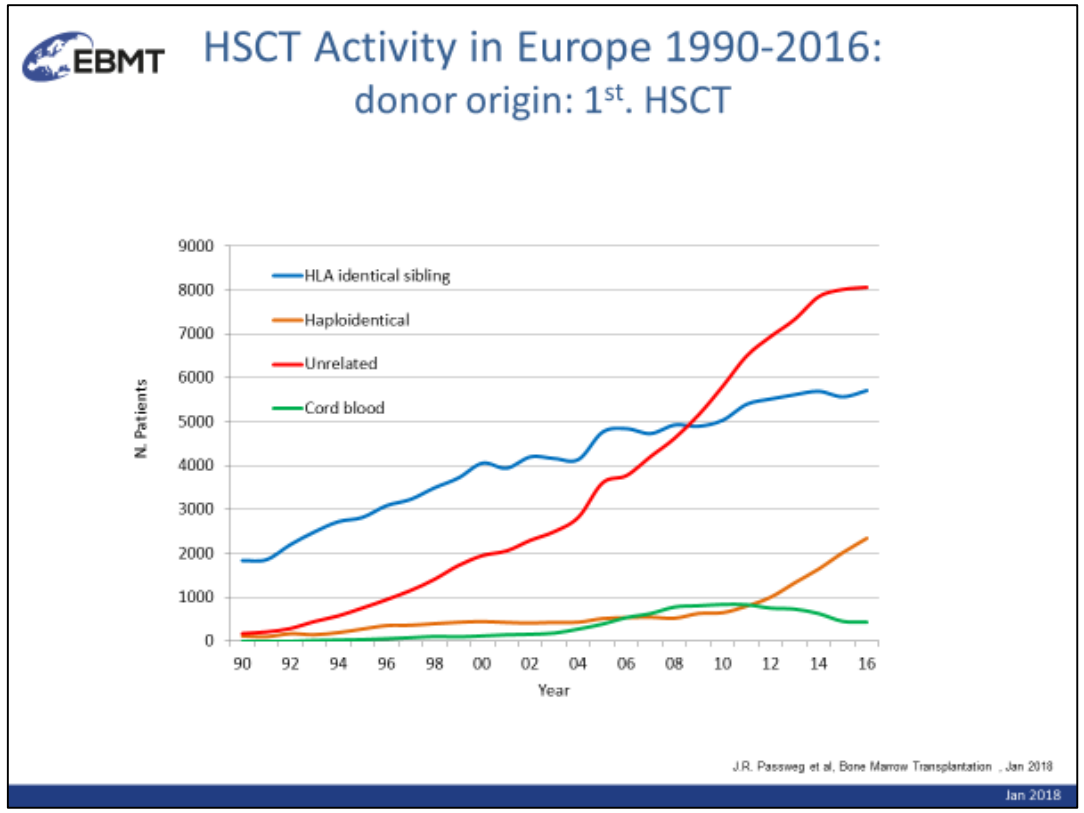
Rosie Williams
Vice President Finance & Controller
Rosie is a CPA and has over 30 years of experience in finance and accounting at Arthur Andersen and in a variety of companies and industries. She joined Bellicum in 2014.

Genentech — A Member of the Roche Group
Baylor College of Medicine
Janssen
MERCK
Baxter
abbvie
BIOTHERA pharmaceuticals
Pfizer
INSTITUTE OF REGENERATIVE MEDICINE
Stanford University
VERSARTIS
DYNAVAX — INNOVATING IMMUNOLOGY
Abbott
ZogenIX
ViroPharma
NPS Pharma
gsk GlaxoSmithKline
NOVARTIS
ARTHUR ANDERSEN

APPENDIX

Uptake of Haplo HSCT has accelerated in the last decade





Sources: CIBMTR Current Uses and Outcomes of HCT 2017; EBMT Activity Survey 2016