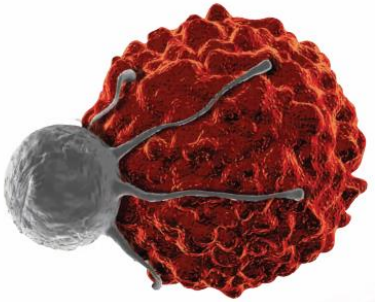
September 4-7 2018, Boston, MA

CAR-TCR Summit



Update of The P-BCMA-101-001 Phase 1 Clinical Trial: A Novel Stem Cell Memory CAR-T for Relapsed/Refractory Multiple Myeloma

Eric Ostertag, MD, PhD

Chief Executive Officer

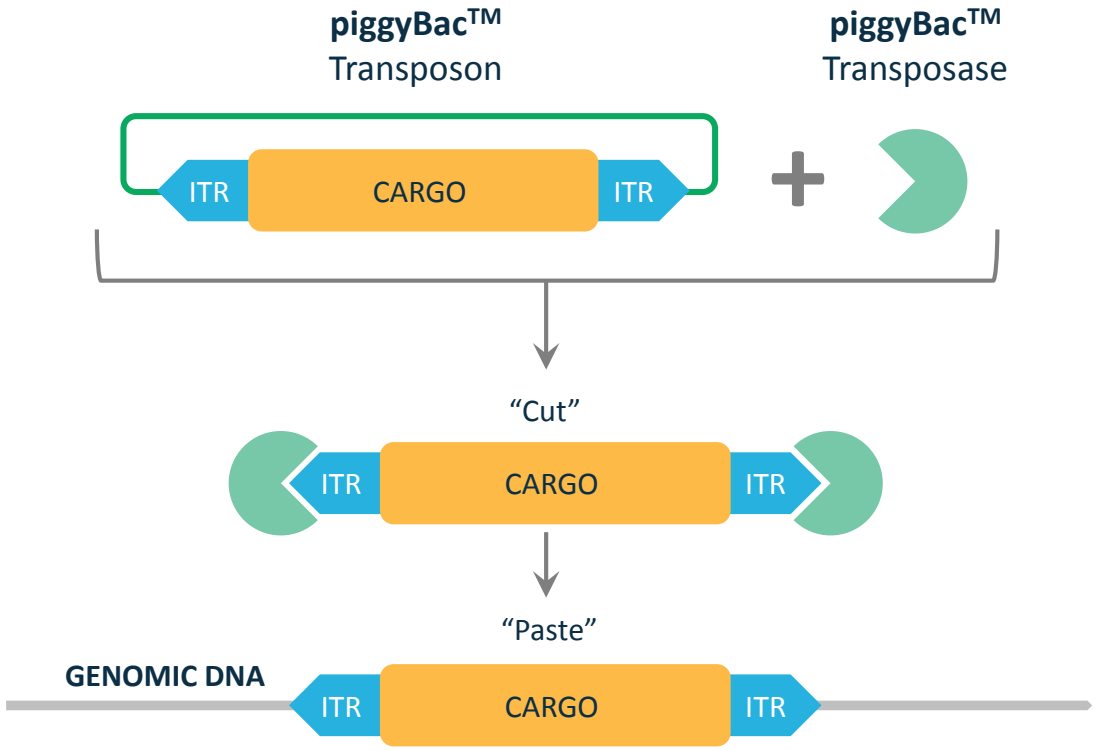
September 5th, 2018

POSEIDA THERAPEUTICS

piggyBac™ Enables Multiple Differentiated CAR-T Product Attributes

piggyBac™ is a superior DNA delivery system for developing CAR-T and other gene therapy products

- **Unprecedented cargo capacity (>30X lentivirus)** – three-in-one transgene and possibility of multiple CAR or TCR molecules
- Creates highly desirable **T Stem Cell Memory (Tscm) Phenotype**
- Non-viral delivery system **– non-oncogenic and non-mutagenic**
- **High insertion efficiency** and **stable transgene expression**
- **Faster** to clinic with **lower cost** than viral methods
- **Substantial IP portfolio** with no dominant or competing IP



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Massive piggyBac™ Cargo Capacity Allows for Delivery of Three-In-One Transgene for P-BCMA-101

1 CAR-T MOLECULE

Superior binding molecule

- Centyrin molecule with **high-specificity binding** to BCMA
- Fully human and **not susceptible to tonic signaling**

2 POSITIVE SELECTION

Drug resistance gene permits positive selection

- **All T-cells** in final product express the CAR molecule
- Predicted to result in **better therapeutic index**

3 SAFETY SWITCH

Incorporates proprietary safety switch

- Rapid, dose-dependent elimination of engineered T-cells if needed
- Management of Cytokine Release Syndrome (CRS) or other AEs

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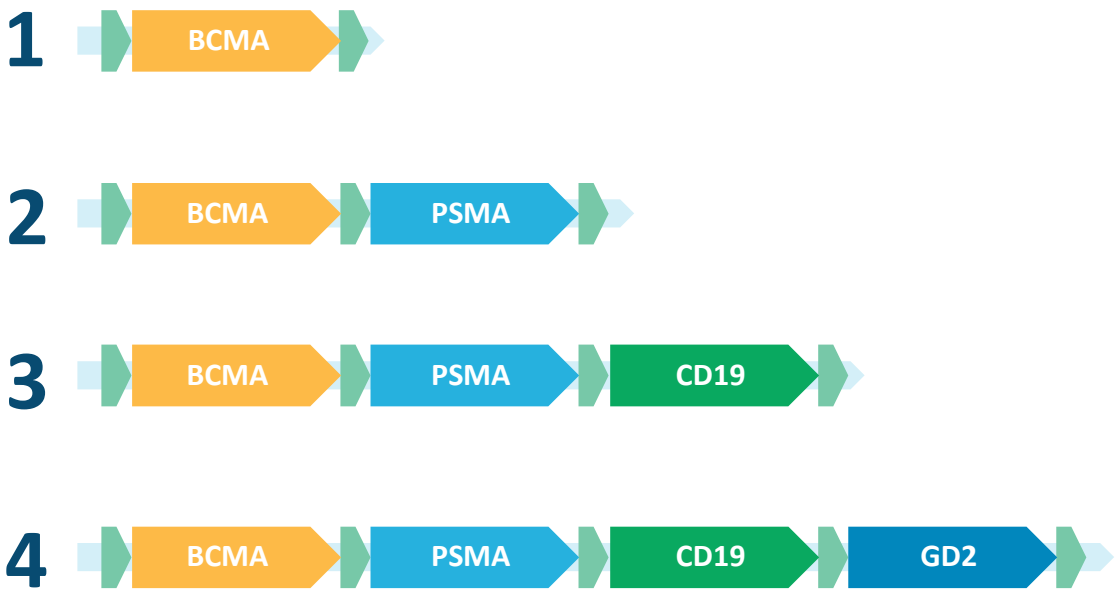
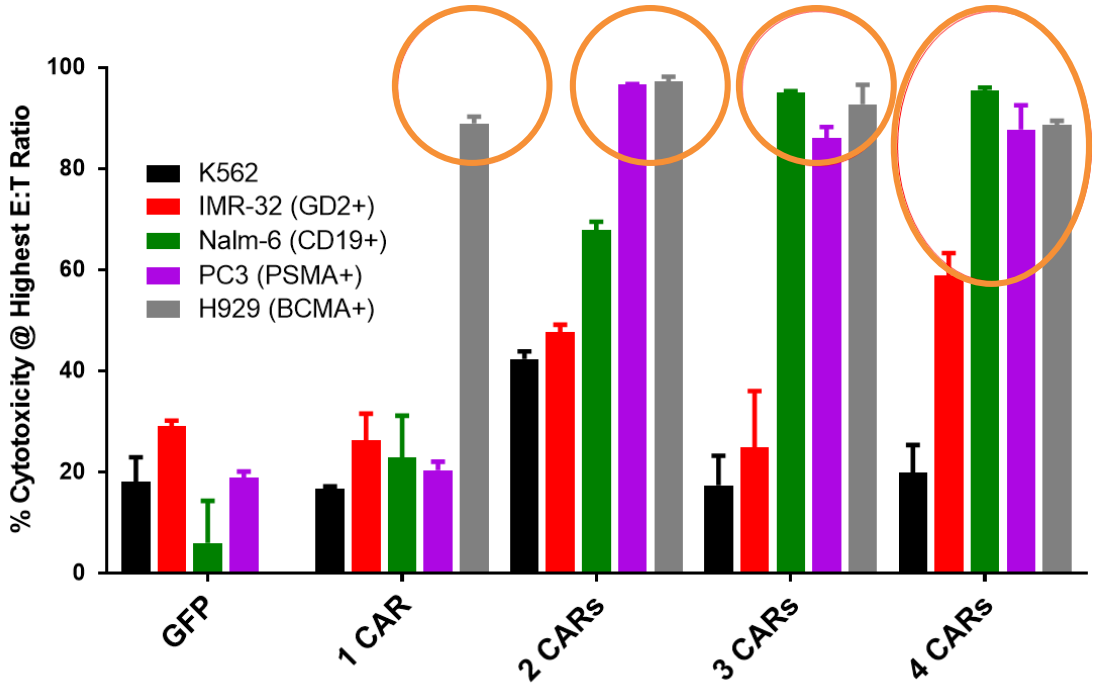
piggyBac™ Unmatched Cargo Capacity Increases Optionality

piggyBac™ effectively delivers multiple full-length CARs in single transposon system

 # Full-length CARs*



Function (Killing)



** Plus selection gene and marker gene*

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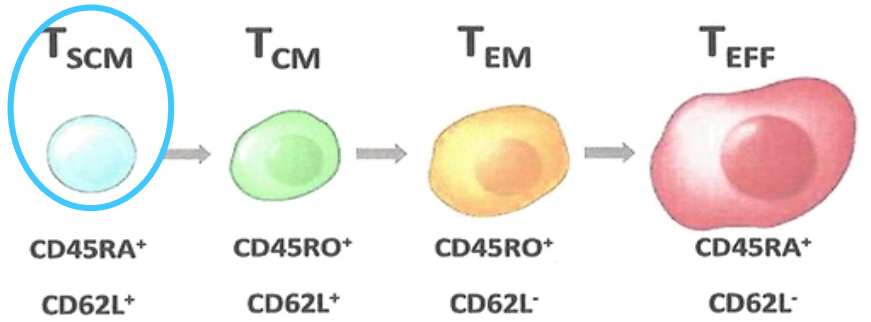
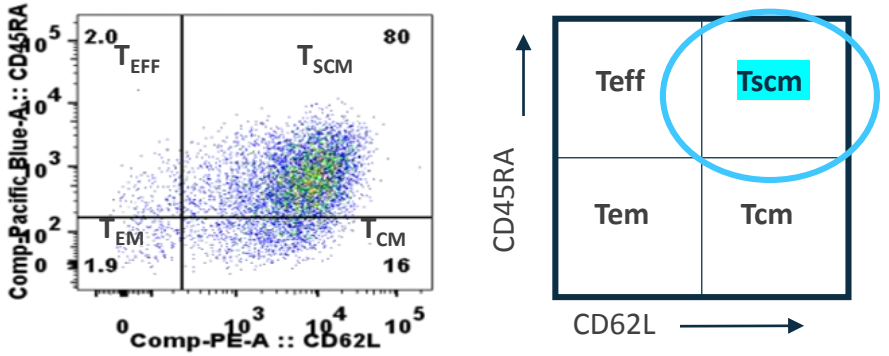
Poseida CAR-T Products Comprised of Highly Favorable Stem Cell Memory T Cells

Tscm phenotype should increase duration of response and allow for relapse control without re-administration

- Ability to develop product with **high percentage of Tscm** cells is a distinct competitive advantage
- **piggyBac™ preferentially transposes in Tscm cells**
- **Tscm cells persist and live longer** than effector cells
- **Tscm cells** can produce potentially unlimited effectors cells
- Tscm-rich product should lead to **better engraftment** and **better duration** of response with the **potential for re-response**

Lentivirus-produced products have not achieved high Tscm
published percentages ranging from less than 1% to ~14%





Gated on CD8+ cells

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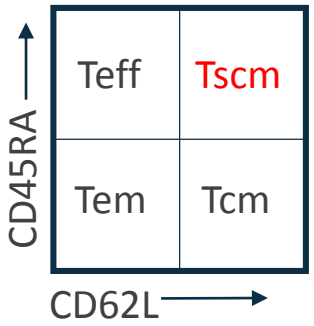
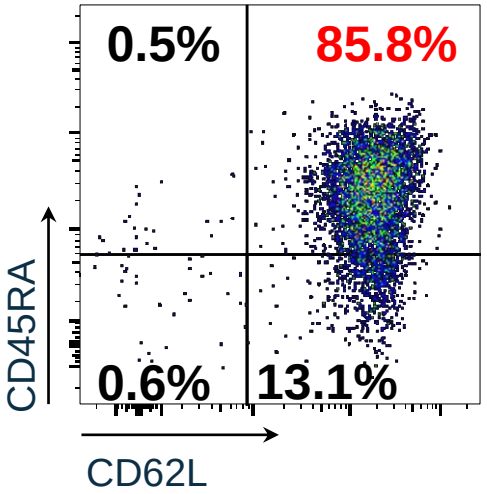
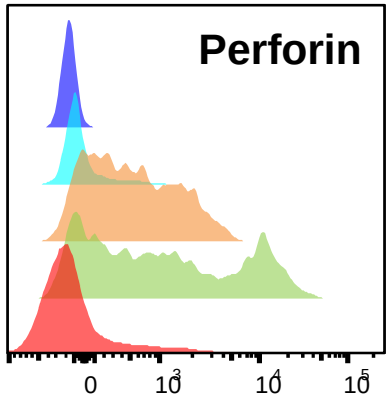
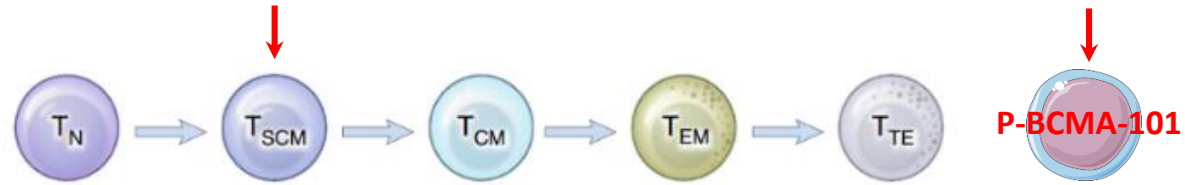
Stem Cell Memory Phenotype



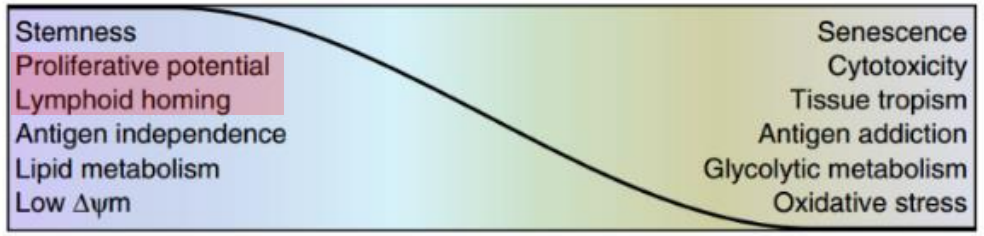


Naïve/Tscm
Tcm
Tem
Teff
P-BCMA-101





	T_N	T_{SCM}	T_{CM}	T_{EM}	T_{TE}	P-BCMA-101
→	CD45RA	+	+	–	–	+
	CD45RO	–	–	+	+	-
	CCR7	+	+	+	–	+
→	CD62L	+	+	+	–	+
	CD28	+	+	+	+/–	+
	CD27	+	+	+	+/–	+
	IL-7Rα	+	+	+	+/–	+
	CXCR3	–	+	+	–	+
	CD95	–	+	+	+	+
	CD11a	–	+	+	+	+
	IL-2Rβ	–	+	+	+	+
	CD58	–	+	+	+	+
	CD57	–	–	–	+/–	+



Adapted from Gattinoni *et al.* (2017) *Nat. Med.*

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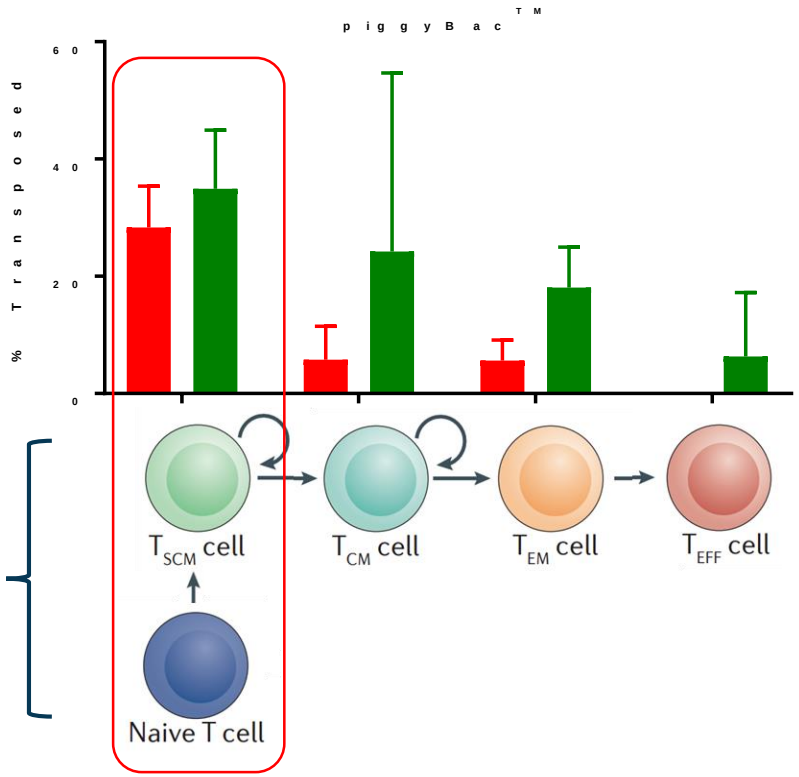
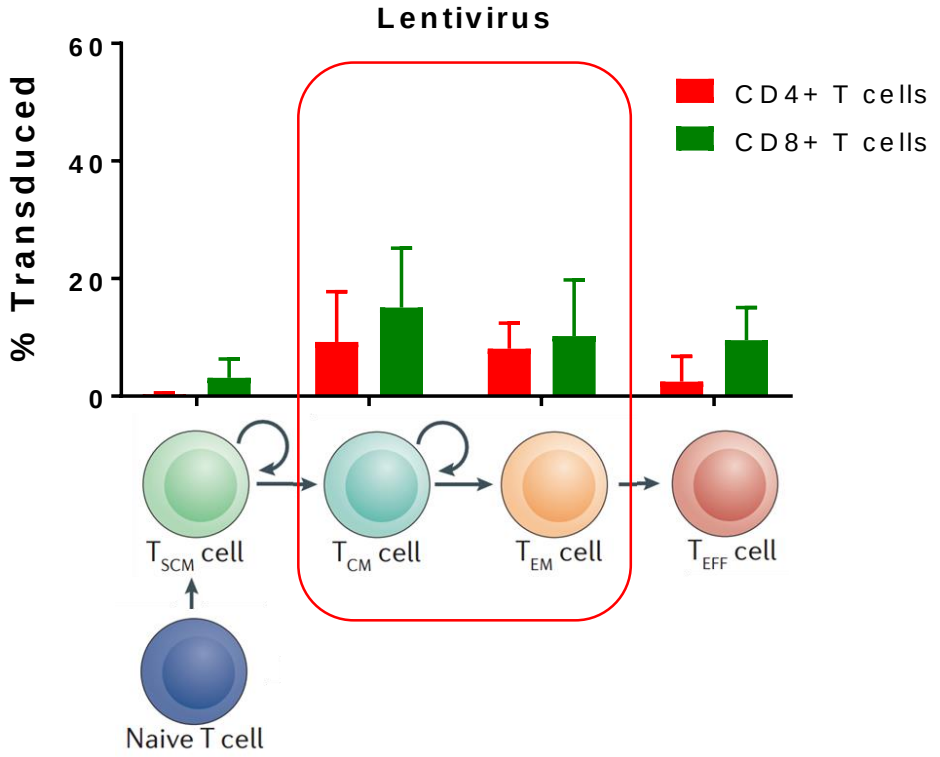
piggyBac™ and Lentivirus Modify Different T Cell Subsets

piggyBac™ preferentially transposes early Tscm cells, while lentivirus prefers differentiated T cells

We purified donor cells to these T-cell subsets and then performed optimized piggyBac™ or optimized lentivirus manufacturing on each subset





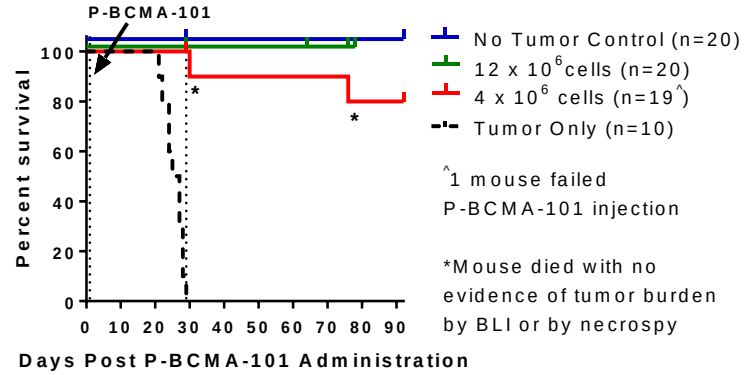
Cell graphics adapted from Henning *et al., Nat. Rev. Immunol.*, 2018

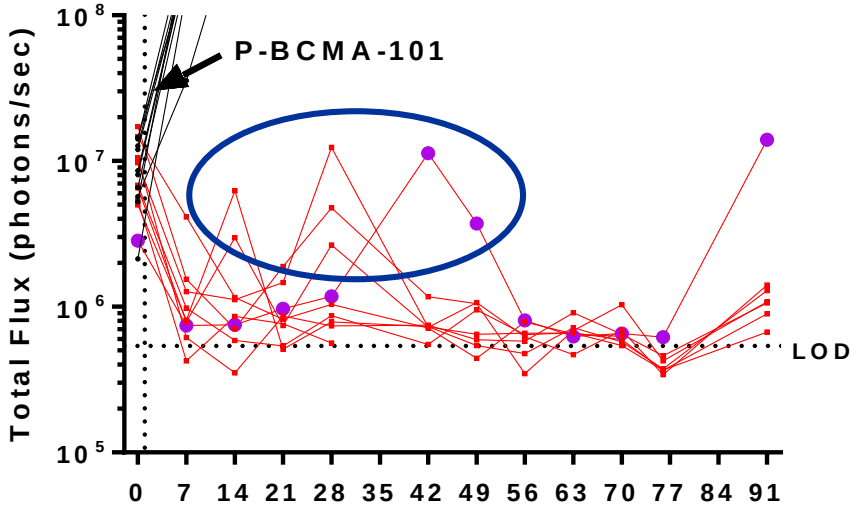
POSEIDA THERAPEUTICS

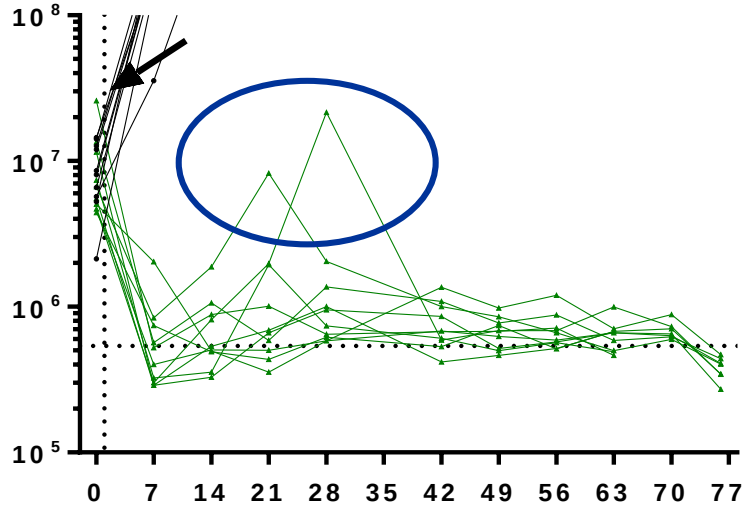
P-BCMA-101 Efficacy & Control of Tumor Recurrences

Unprecedented efficacy in preclinical MM.1S xenograft model

- Some tumor relapse, but subsequent elimination of tumor
  - First observed in MDACC pilot study
  - Many examples of same phenomenon
  - Possibly due to stem-like (T_{SCM}) quality of product







Days Post P-BCMA-101 Administration

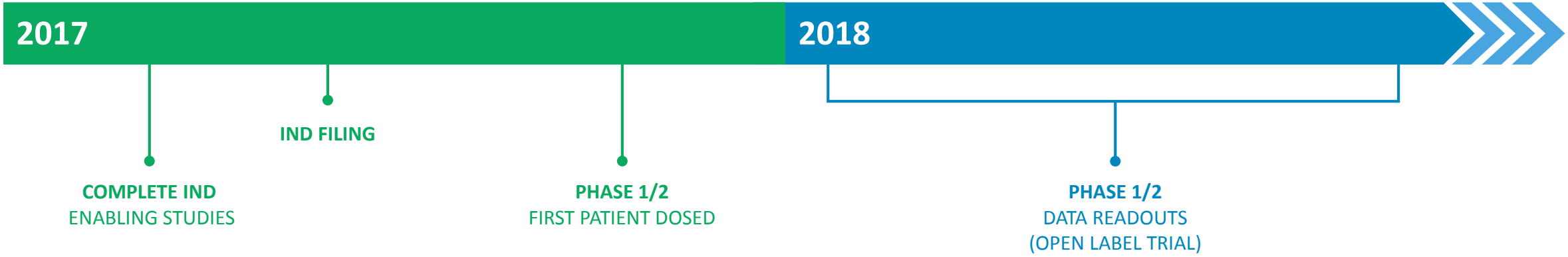
Phase 1 Relapsed/Refractory Multiple Myeloma Clinical Trial

P-BCMA-101-001 Phase 1 Trial Design

- Open Label, 3+3 Design, Single Ascending Dose Study
- Up to 6 dose levels
- 30 mg/m2 fludarabine + 300 mg/m2 cyclophosphamide x 3d lymphodepletion regimen
- P-BCMA-101 administered intravenously as a single dose
- Up to 40 subjects

Clinical Sites / Investigators

- Johns Hopkins – Syed Abbas Ali
- MD Anderson – Krina Patel & Bob Orlowski
- Sarah Cannon (SCRI) – Tara Gregory & Jesus Berdeja
- U. of California at San Diego (UCSD) – Caitlin Costello
- University of Pennsylvania – Adam Cohen



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P-BCMA-101-001 Enrollment

11 patients treated in 3 dose groups

Dose levels assessed	cells/kg
1	0.75×10^6
2	2×10^6
3	6×10^6

Potential additional dose levels	cells/kg
4	10×10^6
5	15×10^6

Total CAR-T cell administered per group (mean)	cells	Patients (#)
	51×10^6	**3**
	152×10^6	**7**
	430×10^6	**1**

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Baseline Demographics and Clinical Characteristics

Parameter	
Median (min, max) age, y	60 (48, 72)
Male, n (%)	7 (64)
Median (min, max) time since diagnosis, y	5 (2, 12)
High-risk, n (%)	73
ECOG PS	
0	7 (64)
1	4 (36)
Median (min, max) prior regimens	6 (3, 9)
proteasome inhibitor, n (%)	11 (100)
bortezomib	11 (100)
carfilzomib	10 (91)
IMiD, n (%)	11 (100)
lenalidomide	11 (100)
pomalidomide	10 (91)
daratumumab, n (%)	11 (100)
Prior autologous SCT	9 (82)

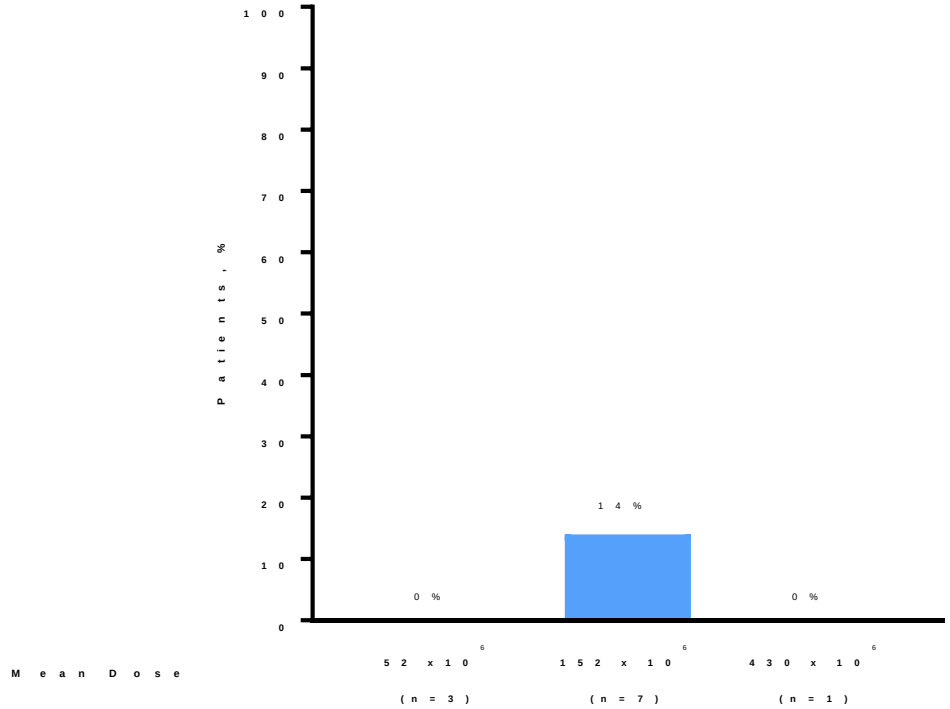
Data cutoff: August 10th, 2018. Evaluable patients: reached first response assessment or PD/death

Adverse Events

Treatment-Emergent Adverse Events (N=11)

TEAE, n (%)	Overall	≥ Grade 3
Dose Limiting Toxicity (DLT)[a]	0	0
Cytokine Release Syndrome[a]	1 (9)	0
Neurotoxicity[a]	0	0
Neutropenia/Neutrophil count decreased[b]	8 (73)	8 (73)
Thrombocytopenia/Platelet count decreased[b]	5 (45)	2 (18)
Anemia	4 (36)	2 (27)
Infection[c]		
Overall	5 (45)	2 (18)
First month	4 (36)	2 (18)

Cytokine Release Syndrome By Dose Level



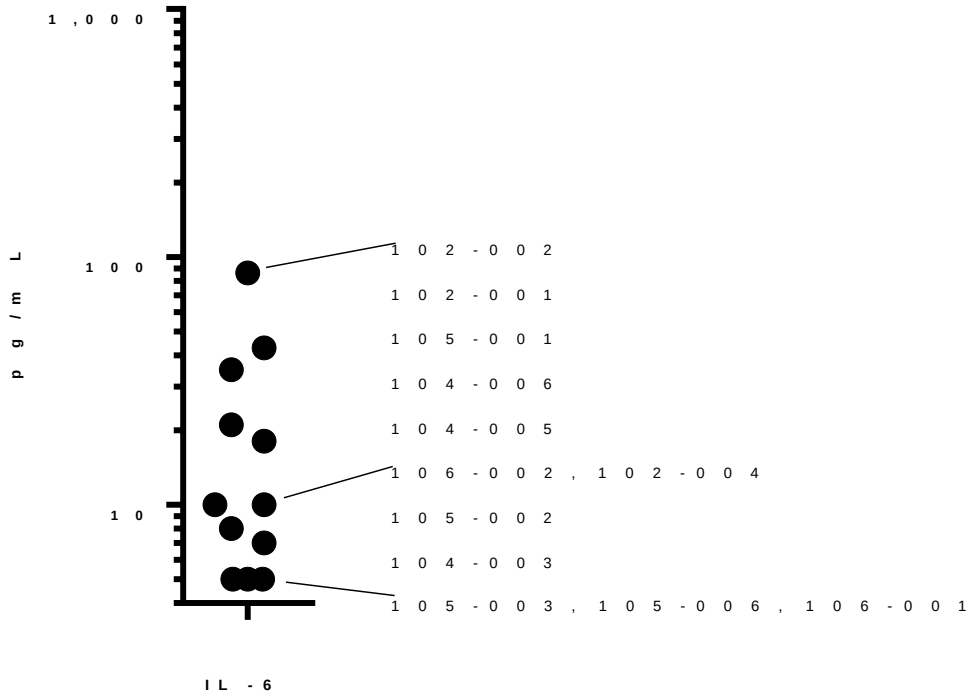
[a]by investigator assessment
[b]subject counted once for either term
[c]includes events in the SOC Infections and Infestations. Subject counted once for any PT within the SOC. Events reported include upper respiratory tract infection (3 subjects), pneumonia, sinusitis, wound infection, candida infection.
Not including orthostatic dizziness or peripheral neuropathy/tremor

Cytokine Release Syndrome: Negligible
No Tocilizumab or Steroid Required, Low IL-6 Peaks

Cytokine Release Syndrome Parameters

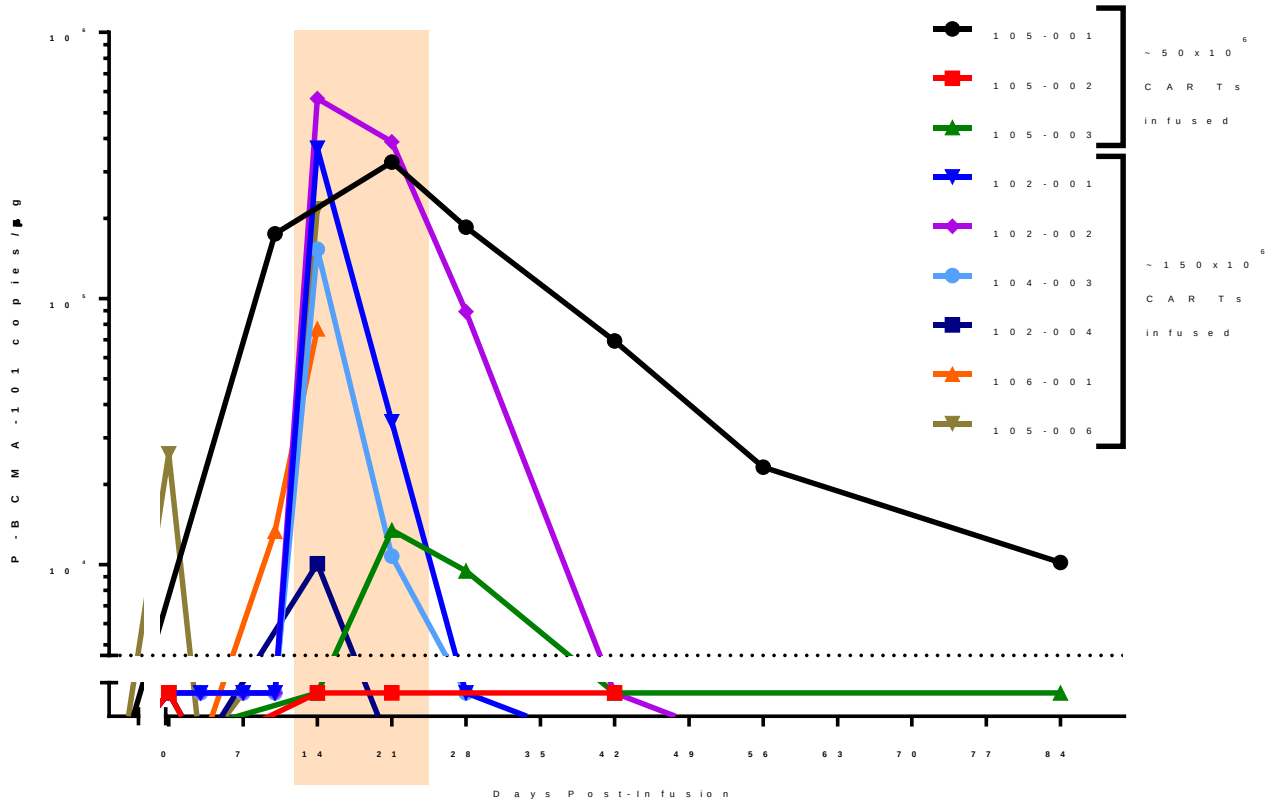
Parameter	Dosed Patients (n=11)
Patients with a CRS event, n	1 (9%)
Maximun CRS grade	
None	10 (91%)
1	0
2	1 (9%)
Median time to onset, d	11
Median duration, d	4
Tocilizumab use, n	0 (0%)
Corticosteroid use, n	0 (0%)

Peak IL-6 Levels After P-BCMA-101



P-BCMA-101 CAR-T Cell Expansion

P-BCMA-101 in Peripheral Blood (PB)



- P-BCMA-101 shows **peak expansion between 14-21 days**
- CAR-T products generally show **peak expansion between 5-14 days**
- **Peak expansion of CAR-Ts often associated with CRS**
- P-BCMA-101 reaches peak expansion gradually **without CRS**

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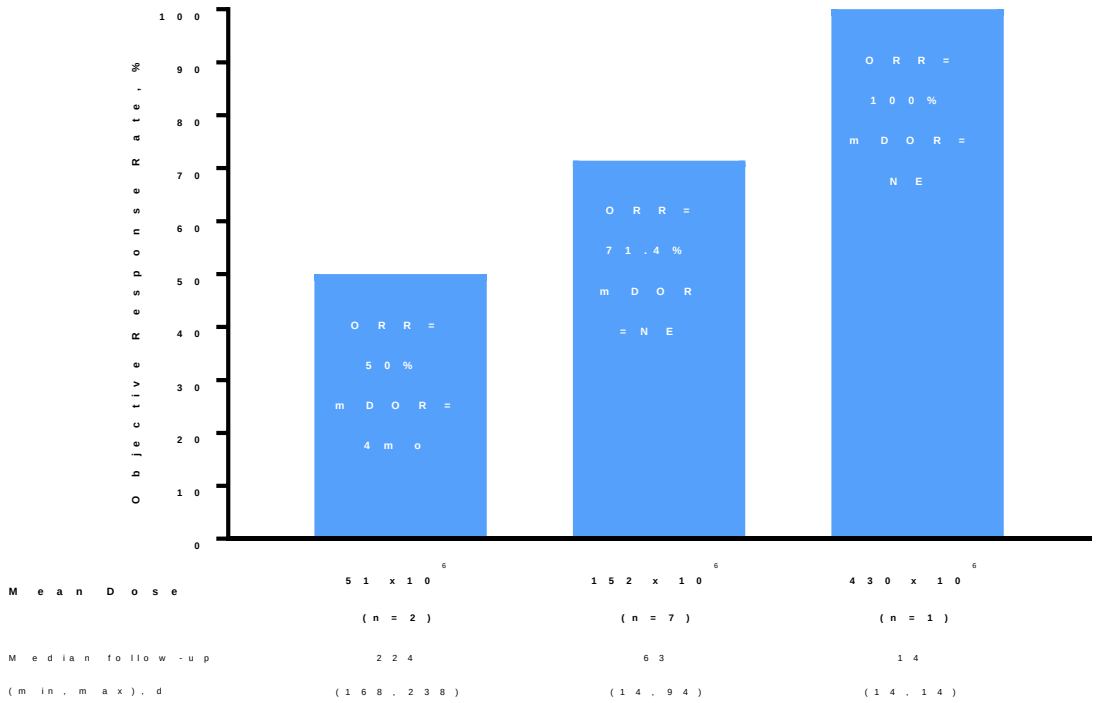
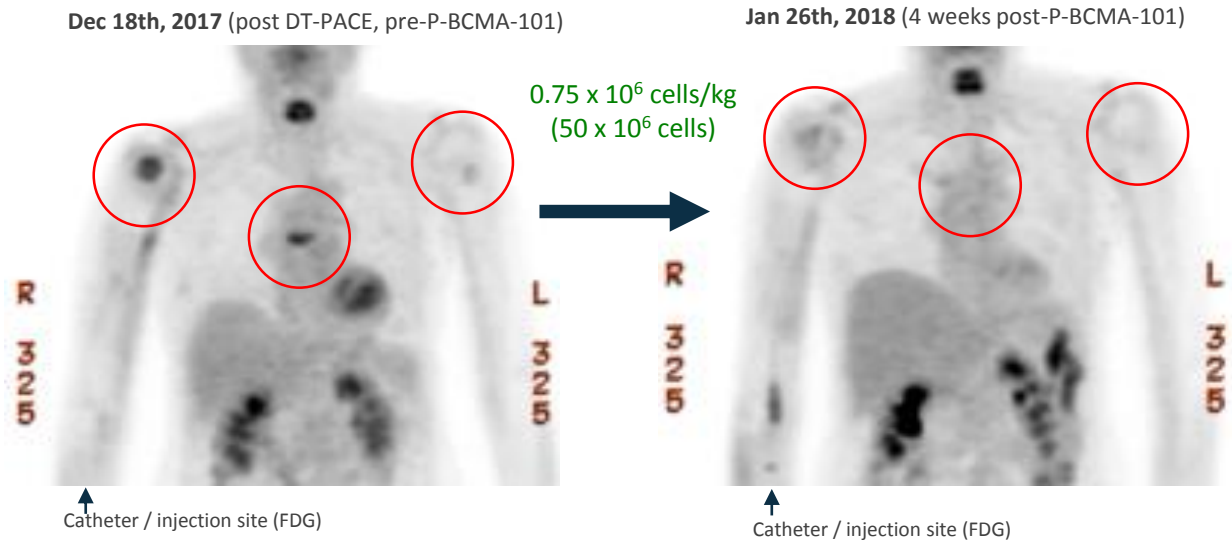
Tumor Response: High From The Lowest Dose Level Up

Tumor Response in Evaluable Patients by Dose



Patient 105-002 PET



Oligosecretory disease, M-protein, SPEP, UPEP, FLC not measurable/within normal limits.

Data cutoff: August 10th, 2018. mDOR, median duration of response; ORR, objective response rate, attaining sCR, CR, VGPR, or PR, including confirmed and unconfirmed responses. Evaluable patients: reached first response assessment by IMWG m-protein criteria or PD/death.

POSEIDA THERAPEUTICS

Acknowledgements

P-BCMA-101 Patients

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P-BCMA-101-001 Investigators

Adam Cohen, M.D.	UP
Abbas Ali, M.D.	JHU
Jesus Berdeja, M.D.	SCRI
Caitlin Costello, M.D.	UCSD
Tara Gregory, M.D.	SCRI/CBCI
Krina Patel, M.D.	MDACC

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Summary

- **P-BCMA-101 at all doses induces deep and durable responses in a heavily pretreated population with R/R MM**

- **To date, the safety profile of P-BCMA-101 has been extremely good**
  - **Only one case of CRS observed**
  - **No tocilizumab or corticosteroid use**
  - **No neurotoxicity**

- **Best-in-class** gene engineering and CAR-T platforms

- **Advantages** in efficacy, safety, speed to clinic and cost
  - Purity may give a **better therapeutic index**
  - Tscm phenotype may give a delayed and **less toxic response**