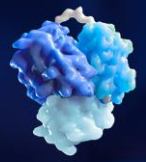
HARPOON Therapeutics

Spearheading Immunotherapies

SVB SECURITIES GLOBAL BIOPHARMA CONFERENCE
FEBRUARY 14, 2023

Nasdaq: HARP

Forward-looking Statements



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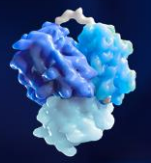
Clinical-Stage Immuno-Oncology Company
Directing T Cells to Kill Tumors



Advancing a Portfolio of Novel T Cell Engagers (TCEs)

Clinical Pipeline

Addressing broad patient populations

- **Clinical-stage T cell engagers across multiple indications**
- **Clinical benefit seen in hematological and solid tumor settings:**
  - **Confirmed responses, tumor lesion reductions deepening over time in our ongoing Phase 1 clinical studies**
- **Emerging clinical data validate TriTAC platform designed to maximize the therapeutic window**

Novel TCE Platforms

Solid and hematological tumors

- **Platform technologies allowing for "off-the-shelf" T cell therapies**
- **Treating broad patient populations with unmet needs**
- **Addressing solid and hematologic malignancies**
- **Each platform designed to maximize the therapeutic window**

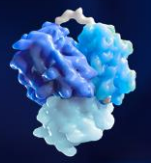
Strong Capabilities

Industry veterans developing novel TCEs

- **Deep expertise in oncology, T cell engagement, and protein engineering**
- **Cash runway expected to fund operations through end of 2023**
  - ***$66.1M in cash, cash equivalents & short-term marketable securities****
- **Strong patent protection across platforms and programs**

*As of September 30, 2022

Broad Pipeline of Immuno-Oncology Programs
Clinical-Stage TriTAC® Programs, Novel TCE Platforms



Program	Indication(s)	Stage of Development	Partner
		Preclinical / Phase 1 / Phase 2 / Phase 3	
HPN217[1] (BCMA)	Multiple Myeloma	Phase 1	abbvie[1]
HPN328[2] (DLL3)	Small Cell Lung Cancer / Other Solid Tumors	Phase 1	Roche atezolizumab Supply Agreement
HPN601 (EpCAM)	Multiple Solid Tumors	Phase 1	
Preclinical Candidates			
TriTAC/ProTriTAC	Oncology	Preclinical	abbvie[3]
TriTAC-XR	Oncology / Non-Oncology	Preclinical	

TriTAC | ProTriTAC | TriTAC-XR

(1) AbbVie retains an option to worldwide exclusive rights (HPN217)
(2) Roche supply agreement established for the use of atezolizumab in combination with HPN328
(3) AbbVie entered in a discovery platform collaboration to select a fixed number of targets from these platforms

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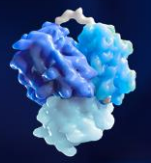
TriTAC®

HPN217

Targeting BCMA

Interim Data Presented at ASH 2022

Multiple Myeloma: High Unmet Need Remains
Multiple Development Opportunities in a Rapidly Evolving Landscape



- 58% overall 5-year survival rate in U.S. increasing over time[1], creating **need for multiple lines of therapy**
- BCMA agents beginning to redefine RRMM treatment, with **opportunities to improve upon tolerability, efficacy, and accessibility**
- BCMA agents with improved tolerability have future potential to be **developed in the early line setting**

Newly Diagnosed Multiple Myeloma

(34k patients in the U.S. in 2022)

50 – 60% → SCT Ineligible (elderly / frail): Doublets/Triplets

40 – 50% → SCT Eligible (young / fit): ASCT + Triplets

Multiple Combinations of PIs, IMIDs, CD38s

Relapsed Refractory MM

New MOAs
BCMA Agents: T cell engagers; Cellular Therapies, ADCs
NEI, HDAC Inhibitors, Novel Agents

Lines of Therapy: 1L → 2L-3L → 4L+

[1] Over time period 2012 and 2018 Cancer stats Facts: Myeloma https://seer.cancer.gov/statfacts/html/mulmy.html

BCMA means B-cell Maturation Antigen; RRMM means Relapsed/Refractory Multiple Myeloma, SCT means Stem Cell Transplant

(Accessed Oct 2022); Global Data, 2019; Strassel L; Schreder, M, 2021; KOL Interviews

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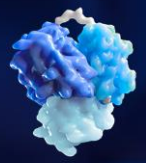
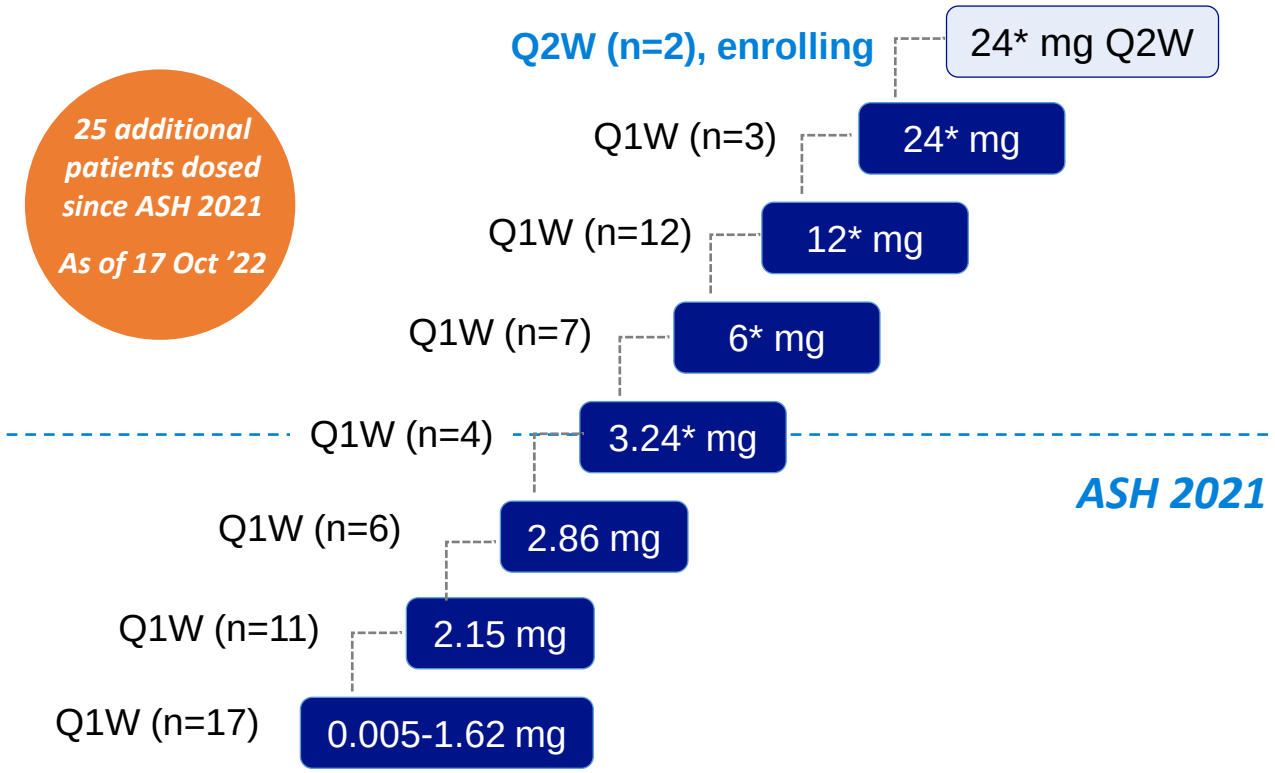
HPN217-3001 Phase 1/2 Trial Design
Relapsed/Refractory Multiple Myeloma



Dose Escalation 3+3 Design



Fixed- and Step-Dose Escalation Cohorts: 3-6 patients per dose level; Backfilling permitted; * Step-Dose Regimen

Key Eligibility Criteria

- Relapsed/refractory multiple myeloma
- ≥3 prior therapies, including PI, IMID, and anti-CD38
- Prior BCMA-targeted therapies allowed

Trial Design

- Primary Objectives: Safety, PK, Establish MTD or RP2D
- Secondary Objectives: Clinical Activity per IMWG Criteria

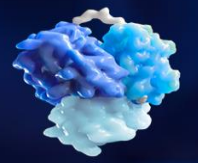
Dosing & Administration

- HPN217 administered by 1-hour IV infusion as flat dose
- Premedication for Cytokine Release Syndrome (CRS) prophylaxis

Next Steps

- Currently enrolling initial bi-weekly dosing cohort
- Dose optimization and backfill ongoing, with final cohort plans to be based upon emerging data

HPN217: Study Patient Population Represents Real-World, Late-Line Population with High-Risk Features



Baseline Characteristics and Demographics

Baseline Characteristics	Total N = 62
Age (yr), Median (range)	70 (38 – 83)
Age ≥ 75 years, n (%)	12 (19%)
Time Since Initial MM Diagnosis (yr), Median (range)	8 (1 – 20)
Baseline sBCMA (ng/mL), Median (range)	240 (27– 2444)
ECOG, n (%)	
0	14 (23%)
1	46 (74%)
Missing	1 (2%)
Revised ISS Stage at Study Entry, n (%)	
I	16 (26%)
II	17 (27%)
III	26 (42%)
Missing	3 (5%)

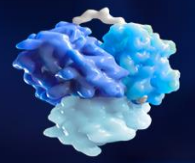
Prior Systemic Therapies

Prior Cancer Therapy	Total N = 62
Prior Systemic Therapies, Median (range)	6 (2-19)
Prior Transplantation, n (%)	46 (74%)
Exposure Status, n (%)	
Triple-class[a] exposed	58 (94%)
Penta-drug[b] exposed	41 (66%)
BCMA exposed	13 (21%)
Relapsed/Refractory Status, n (%)	
Triple-class[a] refractory[c]	47 (76%)
Penta-class[b] refractory[c]	26 (42%)
BCMA refractory[c]	11 (18%)

[a]IMiD, PI, and anti-CD38; [b]At least 2 Pis, at least 2 IMiDs, and at least 1 anti-CD38 antibody; [c] No response to regimen or discontinued regimen due to progression, adapted from Rajkumar et al (Blood 2011)

Note: Unaudited patient data are based on entries provided in open clinical database as of 10/17/2022

HPN217: Safety Summary



Common Treatment-Emergent Adverse Events (Regardless of Relationship), ≥15%

AE Preferred Term	All Grades (N=62)[a]	≥ Grade 3 (N=62)[a]
Anemia	27 (44%)	21 (34%)
Fatigue	20 (32%)	2 (3%)
Cytokine release syndrome[b]	17 (27%)	0 (0%)
Headache	15 (24%)	0 (0%)
Hypokalemia	13 (21%)	2 (3%)
Nausea	13 (21%)	0 (0%)
Back Pain	11 (18%)	1 (2%)
Diarrhea	11 (18%)	1 (2%)
Hypophosphatemia	11 (18%)	4 (7%)
AST increased	11 (18%)	5 (8%)
Cough	11 (18%)	0 (%)
Arthralgia	10 (16%)	1 (2%)
Neutrophil count decreased	10 (16%)	8 (13%)
Dyspnea	10 (16%)	2 (3%)
ALT increased	9 (15%)	4 (7%)
Constipation	9 (15%)	0 (%)
Hypercalcemia	9 (15%)	1 (2%)

- **Dose Limiting Toxicity**
  - Fixed Dose: 2 patients at 2.86 mg/week, reversible transaminitis (Gr 3, n=1; Gr 4, n=1), no clinical sequelae
  - Step Dose: No DLTs; MTD not reached
- **Neurologic/Psych Events[c]**
  - **Treatment related** events reported in 10 patients
    - All events Grade 1 - 2
    - Most common: Headache (n=6) and Confusion (n=2)
- **Infections[d]**
  - Reported in 28 (45%) patients (Gr 3/4, 16%)
  - Most common: Pneumonia (n=6), upper respiratory tract infection (n=5) and urinary tract infection (n=5)

[a] Grading per CTCAE v5.0; [b] Grading per ASTCT 2019 Criteria; [c] SOC nervous system disorders and psychiatric disorders; [d] SOC infections and infestations

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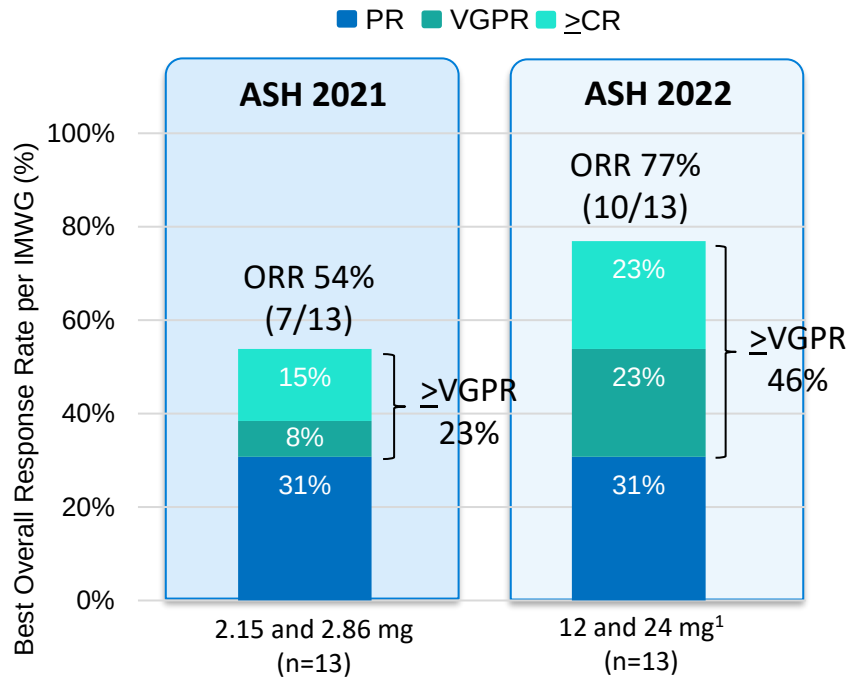
Note: Unaudited patient data are based on entries provided in open clinical database as of 10/17/2022

HPN217: ORR and CRS Rates Suggest Potentially Differentiated Profile with Widened Therapeutic Index

ORR

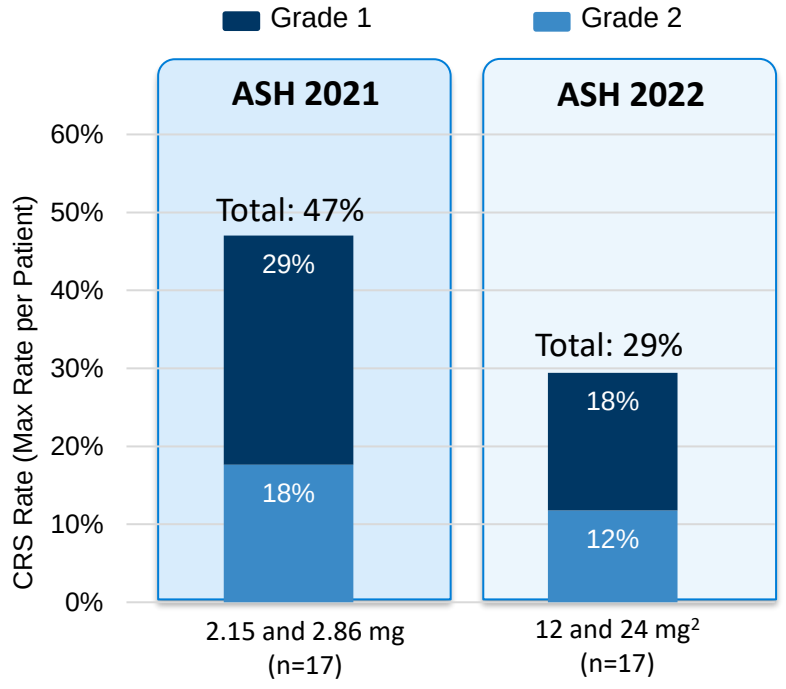
Overall Response Rate
ASH 2021 Compared to ASH 2022*
Highest 2 Target Dose Levels at Each Timepoint



Confirmed and Unconfirmed Responses per Investigator Assessment
Disease-evaluable patients shown with at least 1 post-baseline assessment

CRS

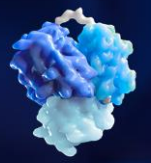
Maximum CRS Grade by Dose Group
ASH 2021 Compared to ASH 2022*
Highest 2 Target Dose Levels at Each Timepoint



Grading per ASTCT 2019 Criteria
All patients shown who received ≥1 dose HPN217

*Note: Unaudited patient data based on entries provided in open clinical database as of 10/17/2022. Responses per Investigator Assessment (subject to change)
[1]Highest 2 dose levels with disease-evaluable patients at each timepoint Q1W; [2]Highest 2 dose levels with patients who received ≥1 dose Q1W or Q2W

HPN217: Time on Treatment at Target Doses ≥ 2.15mg
Deep Early Responses Observed at Highest Exposures



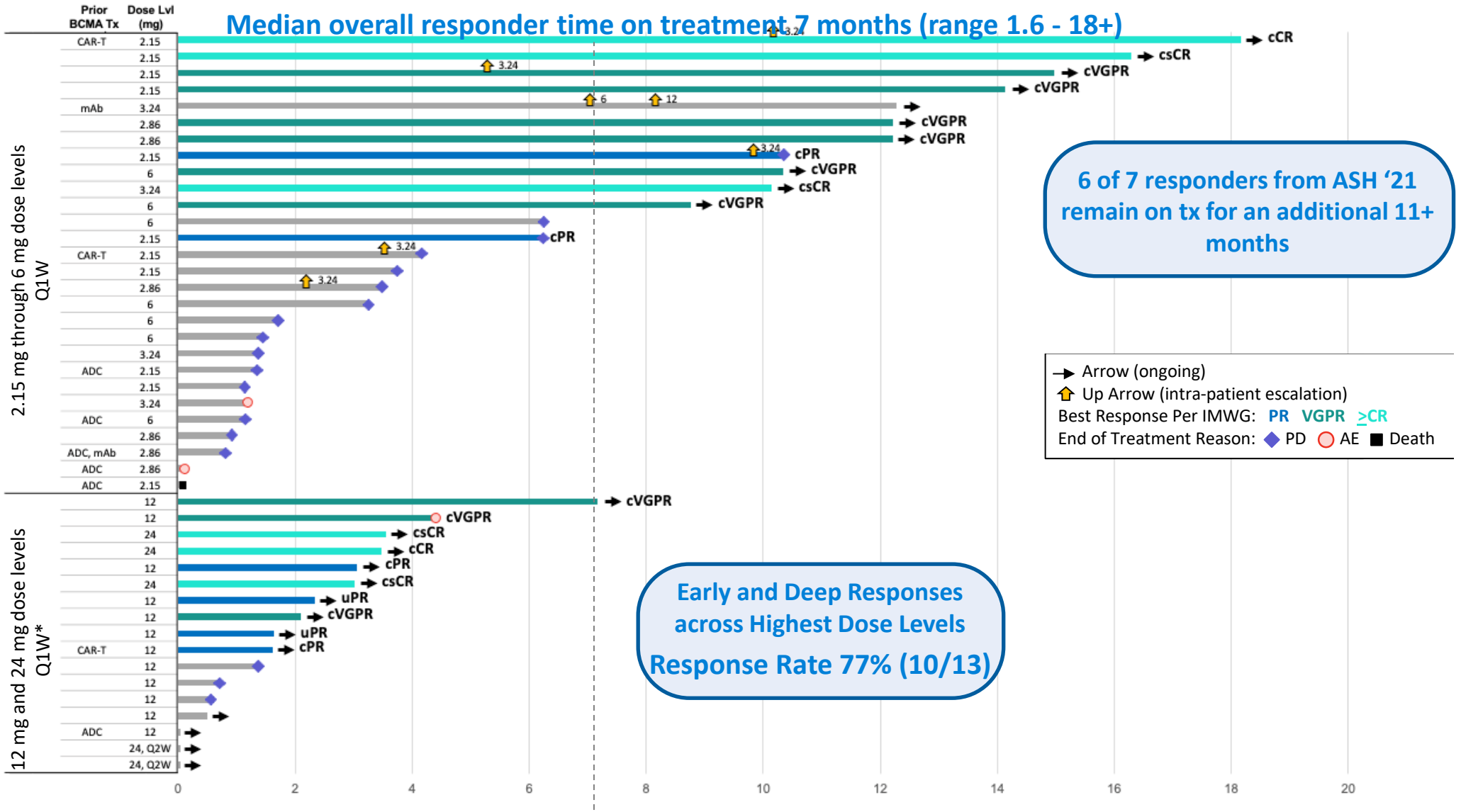
For 2.15 - 6mg Cohorts:

All Patients with at least 9 Months of Follow up

Median Responder Time on Tx: 12 months (6 - 18+)

For 12 & 24 mg Step Cohorts Enrollment Ongoing

Median Responder Time on Tx: 3 months (1.6 - 7+)



6 of 7 responders from ASH '21 remain on tx for an additional 11+ months

Arrow (ongoing)
Up Arrow (intra-patient escalation)
Best Response Per IMWG: PR VGPR ≥CR
End of Treatment Reason: ◆ PD ○ AE ■ Death

Early and Deep Responses across Highest Dose Levels

Response Rate 77% (10/13)

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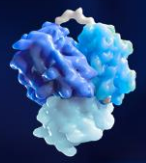
* All patients Q1W schedule with exception of patients denoted

Note: Based on available data in unaudited patient database as of 10/17/2022; confirmed and unconfirmed responses per Investigator Assessment (subject to change)

HPN217: Summary



Profile Emerging with Opportunity to be Best-in-Class T Cell Engager Targeting BCMA

Active Agent[1]

- **77% (10/13) ORR** observed across highest step-dose levels (12 and 24 mg)
- **Responses occurred early and were durable**; for patients with at least 9 months follow up, the median responder time on treatment is 12 months
- 18 of 21 responders remain on study treatment with sustained response, **with many responses deepening over time**

Well Tolerated Safety Profile Emerging

- Transient CRS in 29% of patients across highest step-dose levels (12 and 24mg)
- Post ASH, 1 patient experienced Gr3 CRS and Gr1 ICANS at 24 mg target dose followed by post-traumatic Grade 5 subdural hematoma
- **Overall, low incidence of CRS across the patient population studied to date**

Anticipated Near-Term Milestones

- **Dose expansion and backfill cohorts continue to enroll at target dose of 12mg and 24mg**
- **Study enrollment anticipated to complete** in 1H 2023, with up to potentially 94 patients, based on data from dose escalation cohorts

[1] Relative to other BCMA-targeted TCEs in heavily pretreated patients across the highest step-dose cohorts
[2] ICANS means Immune effector cell-associated neurotoxicity syndrome

Note: Unaudited patient data based on entries provided in open clinical database as of 10/17/2022 (subject to change)

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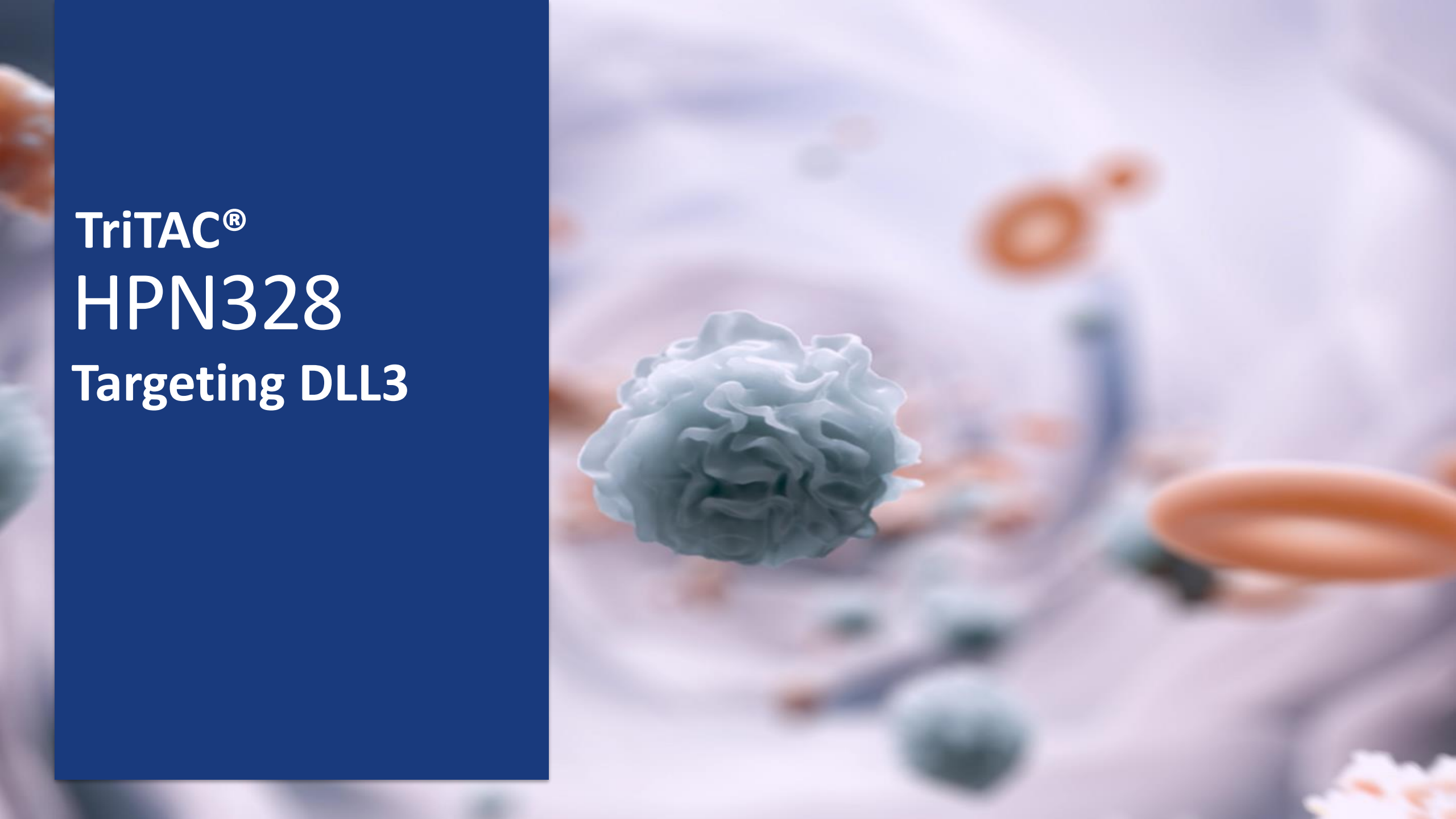
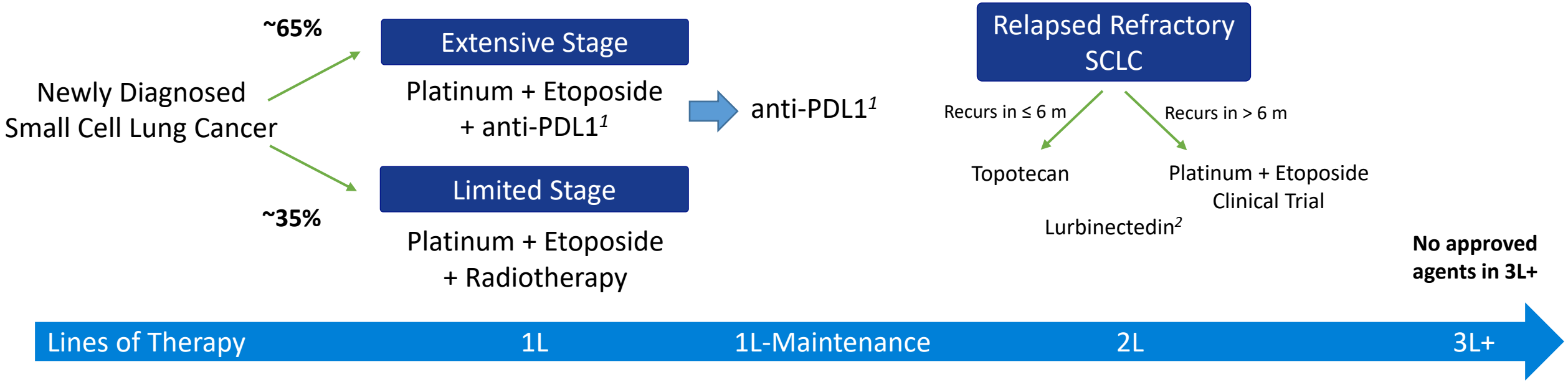
TriTAC®

HPN328

Targeting DLL3



Small Cell Lung Cancer Standard of Care
Limited effective options available in the relapsed/refractory setting



[1] Atezolizumab and Durvalumab approved for 1L ES-SCLC in combination with platinum-doublet chemo and continued in maintenance for patients with ≥SD;
[2] Lurbinectedin has accelerated approval in the U.S. only.
Source: NCCN Guidance; Physician Interviews 2021

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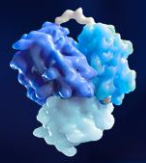
HPN328: Trial Design and Demographics

A Phase 1/2 Open-Label, Multi-Center, Dose Escalation / Expansion, Safety & PK Study



- **Target population**
  - SCLC relapsed after platinum chemotherapy
  - Other high-grade neuroendocrine cancers R/R to standard of care (SOC) or no SOC available
- **Trial objectives**
  - Assess safety and tolerability at increasing dose levels
  - Characterize PK and PD
  - Evaluate preliminary anti-tumor activity
- **Dosing and administration**
  - Weekly IV infusion
- **Status**
  - 29 patients enrolled at the end of 2022
  - Currently enrolling backfill patients in 1mg – 6mg cohort; enrollment continuing in dose escalation 1mg – 12 mg cohort

Baseline Characteristics	Total N = 22
Age (yr), Median (range)	61 (43 – 73)
ECOG performance status 0-1, n (%)	22 (100)
Brain / Liver metastases, n (%)	8 (36) / 11 (50)
Disease	n (%)
Small Cell Lung Cancer	15 (68)
Neuroendocrine Prostate Cancer	2 (9)
Other Neuroendocrine Neoplasm	5 (23)
Prior Lines of Therapy	n (%)
1	5 (23)
2	5 (23)
≥3	12 (54)
Median (range)	3 (1-6)
Prior immune checkpoint inhibitor (αPD-1/αCTLA4, αPD-L1)	18 (82)

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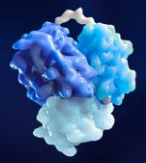
Unaudited patient data based on entries provided in open clinical database as of 10/10/2022 (subject to change)

HPN328: Safety Summary

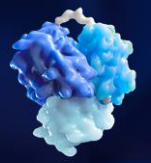


- **Recent priming dose DLTs inform optimization of priming dose to support further escalation of target dose**[1]
- **TriTAC platform designed to minimize CRS risk and allow for greater escalation of target dose, and re-escalation of target dose is underway**
- **No** DLTs at target dose
- Target dose MTD **not yet reached**

[1] as reported in Harpoon press release dated November 14, 2022

Unaudited patient data based on entries provided in open clinical database as of 10/10/2022 (subject to change)

HPN328: Clinical Summary
Anti-tumor Activity Seen in Small Cell Lung Cancer at Higher Doses



- HPN328 was observed to be active [1]
  - 71% (5/7) of SCLC patients at doses ≥1.215mg had target lesion shrinkage
  - 25% (3/12) of SCLC patients across all doses with >30% Target Lesion Shrinkage
  - 1 Confirmed Partial Response, durable beyond 6 Months
- Treatment duration ≥ 5 months was observed in 7 of 20 (35%) patients
- Median half-life of 71 hours, with linear pharmacokinetics
- **Update as of January 2023**: 1 additional Confirmed Partial Response was observed in a SCLC patient in the 2-12mg QW cohort who remains on treatment

[1] Unaudited patient data based on entries provided in open clinical database as of 10/10/2022 (subject to change)

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HPN328 Patient Case 1: Relapsed ES-SCLC

53% Reduction in Sum of Target Lesion Diameters at Week 10: Confirmed PR

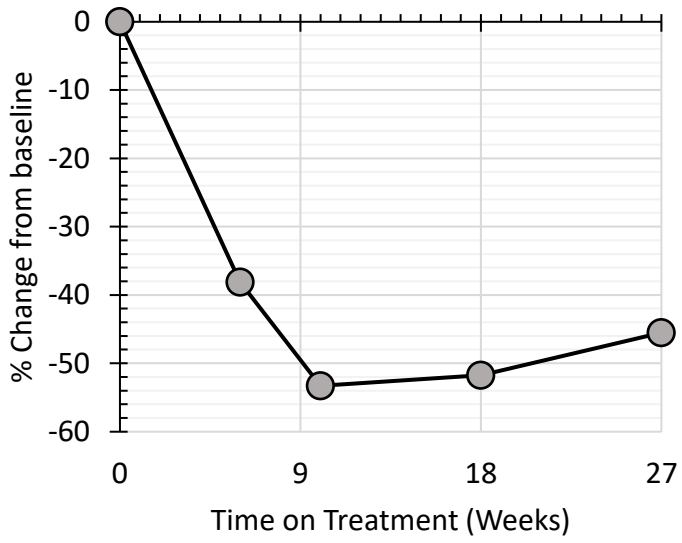
Data as of October 10, 2022

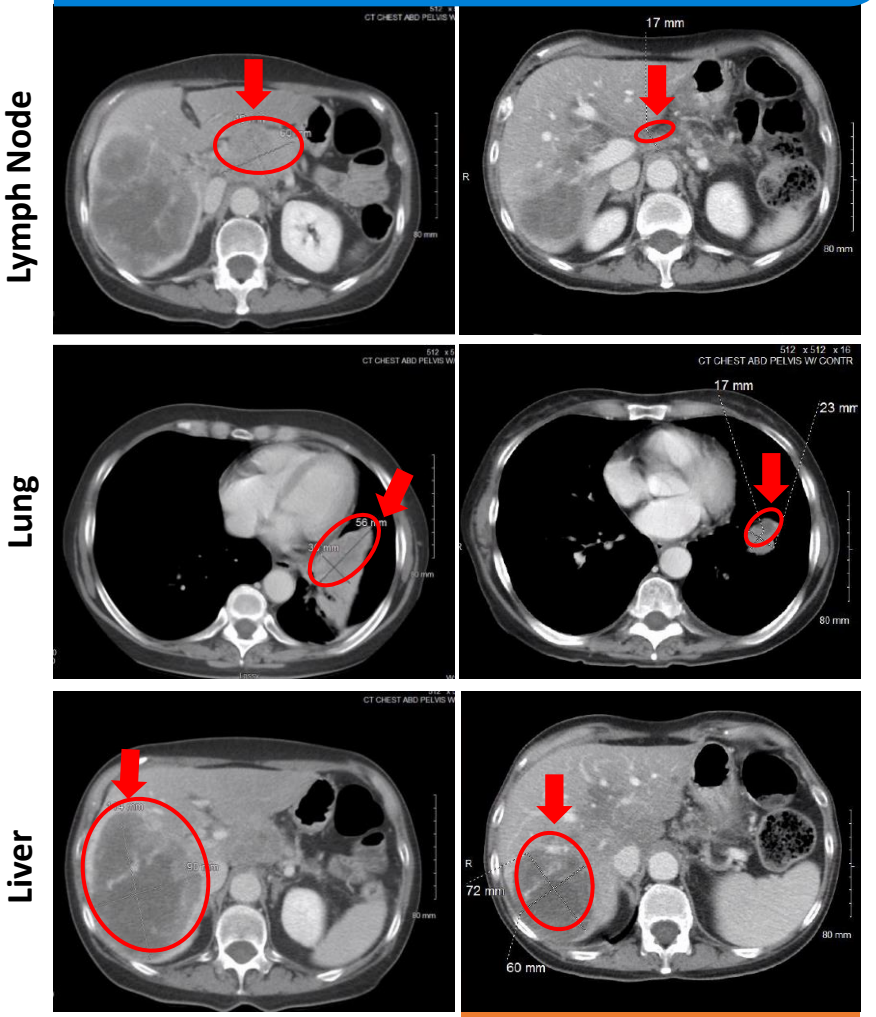
Patient History

- 61-year-old female
- Diagnosed Jan 2021 with extensive-stage SCLC
- Location of metastases:
  - TLs: lung, liver x2, lymph nodes x2
  - Non-TLs: lung x2, liver
- Prior systemic treatment:
  - carboplatin + etoposide + atezolizumab
- Time on most recent prior systemic treatment: 20.1 weeks
- Upon study entry, **stable disease as best response** to most recent prior systemic treatment

Results

- **Initiated HPN328 at 1.215mg/week, later dose escalated**
- **Confirmed PR at week 10**
- **Continued treatment with HPN328 for 33 weeks**





53% reduction at wk 10

Unaudited patient data based on entries provided in open clinical database as of 10/10/2022 (subject to change)

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HPN328 Patient Case 2: Relapsed ES-SCLC

72% Reduction in Sum of Target Lesion Diameters

Deepening of response over time continuing beyond ASCO 2022 data

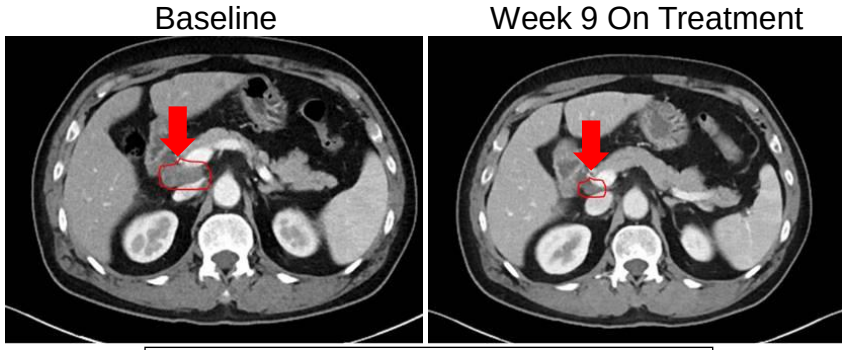
Data as of October 10, 2022

Patient History

- 67-year-old male
- Diagnosed in April 2020 with extensive-stage SCLC
- Location of metastases
  - TLs: liver x2, lymph nodes x2
  - Non-TLs: liver, lymph nodes x2, spleen, bone, brain
- Prior systemic treatment
  - Carboplatin + Etoposide + Toripalimab
  - Cisplatin + Etoposide
  - Lurbinectedin
- Time on most recent prior systemic treatment
  - 10.9 weeks
- Upon study entry, partial response as best response to most recent prior systemic treatment but unable to tolerate further treatment

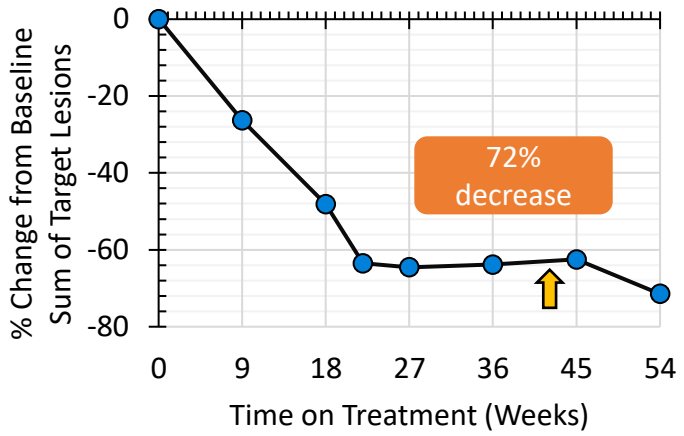
Results

- **HPN328 3.6 → 7.2 mg/week (increased to 12 mg/week)**
  - Well tolerated
- **72% reduction in sum of target lesion diameters**
  - Asymptomatic brain metastasis identified at week 2
  - Systemic disease responding to HPN328
  - RECIST v1.1: Target Lesions: PR; Overall: PD
  - 60% cells positive for DLL3
- **Deepening of radiographic target lesion response over time**
- **Remains on HPN328 treatment beyond 54 weeks**
  - At ASCO 2022 (April 21, 2022 data) was at 27 weeks
  - Current data: **ongoing clinical benefit observed beyond 1 year**

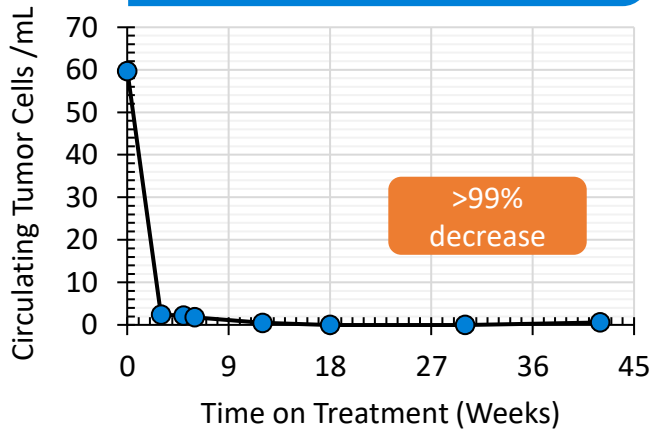


Response in peri-portal lymph node

Deep, durable target lesion shrinkage



Durable >99% decrease in CTCs



⇧ = Dose Increase

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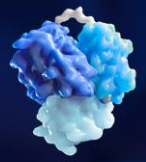
HPN328: Anticipated Next Steps



- Continue enrollment in the Phase 1 dose exploration study
  - Monotherapy cohorts:
    - 1 mg – 6 mg step dose cohort enrolled and cleared for escalation
    - 1mg – 12mg step dose cohort enrolling
    - 29 patients were enrolled at year end 2022
    - Enrollment started in Q2W dosing cohorts for HPN328 monotherapy planned in 1H 2023
  - Combination cohorts:
    - Begin enrollment of additional cohorts in the Phase 1 dose escalation study evaluating HPN328 in combination with atezolizumab in SCLC
- Provide Phase 1 interim data in mid-2023 for the highest target doses studied
  - Plan for enrollment up to potentially 70 patients with ≥1 on-treatment scan by end of Q2 ’23*
- Plan for enrollment of up to 100 patients in monotherapy and combination therapy dose cohorts (including backfill) by mid-2023*
- Complete Phase 1 enrollment of potentially up to 130 patients in monotherapy and combination cohorts in 2H 2023 *

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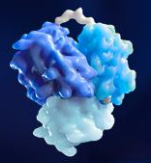
* Enrollment projections dependent on data from ongoing dose escalation cohorts

Summary and Anticipated Milestones



- Advancing pipeline of next-generation T cell engagers address broad patient populations with high unmet needs
- Strategic prioritization to focus resources on ongoing clinical programs in or nearing the clinic
- Clinically meaningful activity in hematology and solid tumor Phase 1 studies
- Current cash and equivalents of $66.1 million* expected to fund operations to the end of 2023

1H 2023

HPN217 (BCMA):
- Ongoing patient enrollment in the Phase 1 trial;
- Complete enrollment in 1H-2023

HPN328 (DLL3):
- Begin enrolling additional cohorts in the Phase 1 dose escalation study evaluating HPN328 in combination with atezolizumab in SCLC in 1H-2023

HPN601 (EpCAM):
- Harpoon expects to be ready to file an IND in 1H-2023 to enable a Phase 1 dose exploration study, pending available resources

2H 2023

HPN217 (BCMA):
- Patient follow up and completion of final data package to deliver to AbbVie by YE
- Prepare for EOP1 and Phase 2 planning meeting with FDA

HPN328 (DLL3):
- Complete enrollment in monotherapy and combination arms
- Provide interim data for the highest target doses studied in mid-2023
- Identify RP2D; prepare for EOP1 and Phase 2 planning meeting with FDA

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*Cash, cash equivalents and short-term marketable securities as of September 30, 2022

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Thank You!

Nasdaq: HARP