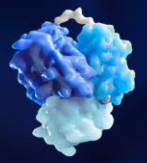
HARPOON
Therapeutics

Spearheading Immunotherapies

INVESTOR PRESENTATION
OCTOBER 2021

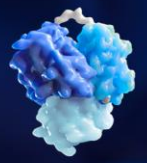
Forward-looking Statements



This presentation contains forward-looking statements about Harpoon Therapeutics, Inc.. All statements other than statements of historical facts contained in this presentation are forward-looking statements, including statements about our financial position, strategy, expectations regarding the timing and achievement of our product candidate development activities, research and development activities and ongoing and planned preclinical studies and clinical trials, and plans and expectations for future operations. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including, but not limited to: our limited operating history; net losses; our expectation that we will incur net losses for the foreseeable future, and that we may never be profitable; our need for additional funding and related risks for our business, product development programs and future commercialization activities; the timing and success of preclinical and clinical trials we conduct; the ability to obtain and maintain regulatory approval of our product candidates; the ability to commercialize our product candidates; our ability to compete in the marketplace; risks regarding our license agreements; our ability to obtain and maintain intellectual property protection for our product candidates; and our ability to manage our growth. We operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this presentation may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. For a discussion of many of these and other risks and uncertainties, see our filings with the Securities and Exchange Commission, including the “Risk Factors” section in our Annual Report on Form 10-K and subsequent Quarterly Reports on Form 10-Q, which are available on the SEC’s website at www.sec.gov. Except as required by law, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this presentation to conform these statements to actual results or to changes in our expectations.

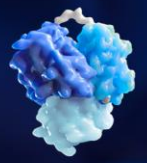
Certain information contained in this presentation and statements made orally during this presentation relate to or are based on studies, publications, surveys and other data obtained from third-party sources and our own internal estimates and research. While we believe these third-party studies, publications, surveys and other data to be reliable as of the date of this presentation, we have not independently verified, and make no representations as to the adequacy, fairness, accuracy or completeness of, any information obtained from third-party sources. In addition, no independent source has evaluated the reasonableness or accuracy of our internal estimates or research and no reliance should be made on any information or statements made in this presentation relating to or based on such internal estimates and research.

Harpoon Therapeutics – Investment Overview



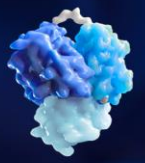
Therapeutic Focus	Clinical-stage immunotherapy company
Platform Technologies	T cell engager technology, “off-the-shelf” therapies for solid tumors -TriTAC®: Tri-specific T cell Activating Construct platform -ProTriTAC®: Pro-drug form of TriTAC for tumor-specific activation
Multiple Product Candidates	HPN424 (PSMA TriTAC) Phase 1/2a in prostate cancer HPN536 (mesothelin TriTAC) Phase 1/2a in ovarian cancer and other solid tumors HPN217 (BCMA TriTAC) in Phase 1/2 in multiple myeloma HPN328 (DLL3 TriTAC) in Phase 1/2 in small cell lung cancer and other neuroendocrine tumors
Multiple Anticipated Clinical Catalysts in 2H 2021	HPN424 – Trial update, initiation of expansion cohort HPN536 – Trial update, initiation of expansion cohort HPN217 – Trial update, initiation of expansion cohort HPN328 – Trial update
Strong Financial Position	Cash balance of $175.2 million expected to fund operations into 1H 2023

Broad Pipeline of Immuno-Oncology Programs



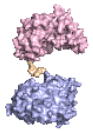
	Product Candidate	Target / Indication	Stage of Development	Anticipated 2H 2021 Milestones
TriTAC	HPN424	PSMA / Prostate cancer	Phase 1	Initiate expansion cohort YE 2021
	HPN536	MSLN / Ovarian, pancreatic and other solid tumors	Phase 1	Trial update by YE Initiate expansion cohort
	HPN217	BCMA / Multiple myeloma	Phase 1 → abbvie	Data presentation at a medical conference by YE Initiate expansion cohort
	HPN328	DLL3 / Small cell lung cancer and other tumors	Phase 1	Trial update by YE
	ABBV-189	Survivin / Multiple tumors	Phase 1 → abbvie	
	Discovery	Various	Preclinical	Lead optimization
Pro	HPN601	EpCAM/GI cancers	Preclinical	IND-enabling studies
	Discovery	Various	Preclinical	Lead optimization

TriTAC: Small Size and Flexibility, Albumin Domain Confers Extended Half Life

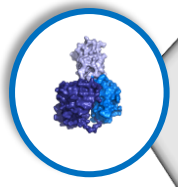


Molecular Weight | **Molecular Structure**

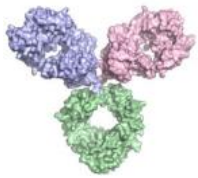
Bispecific ~50kD

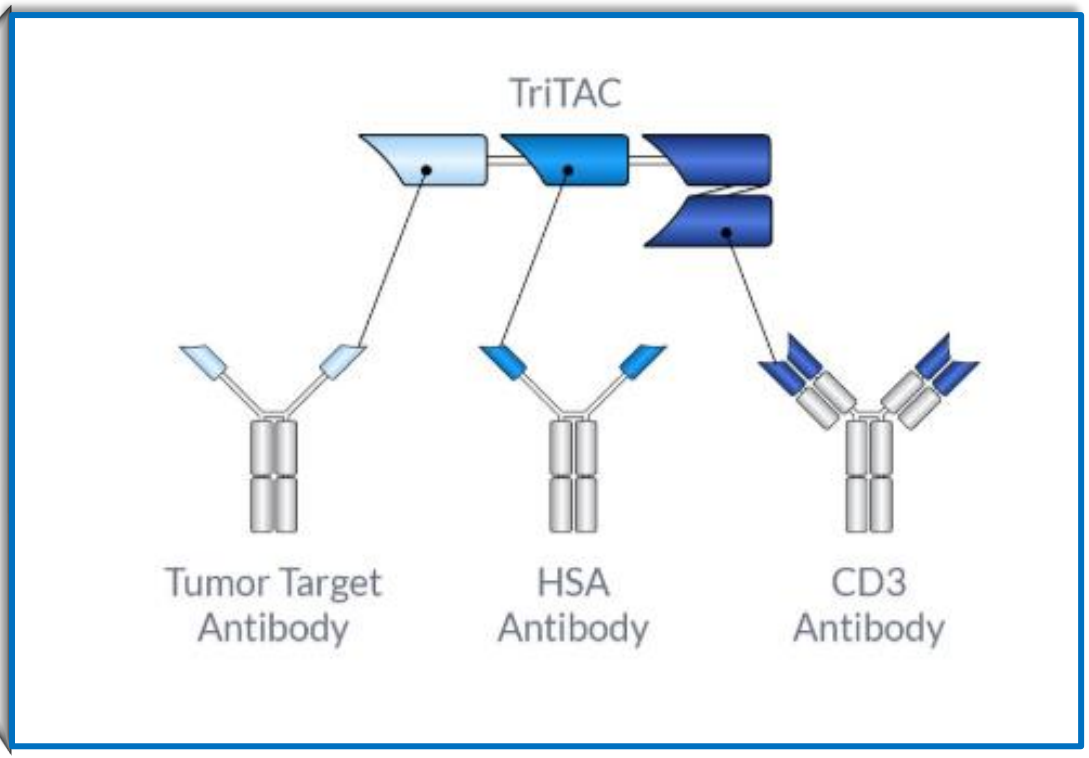


TriTAC ~50kD



Bispecific Antibody ~150kD



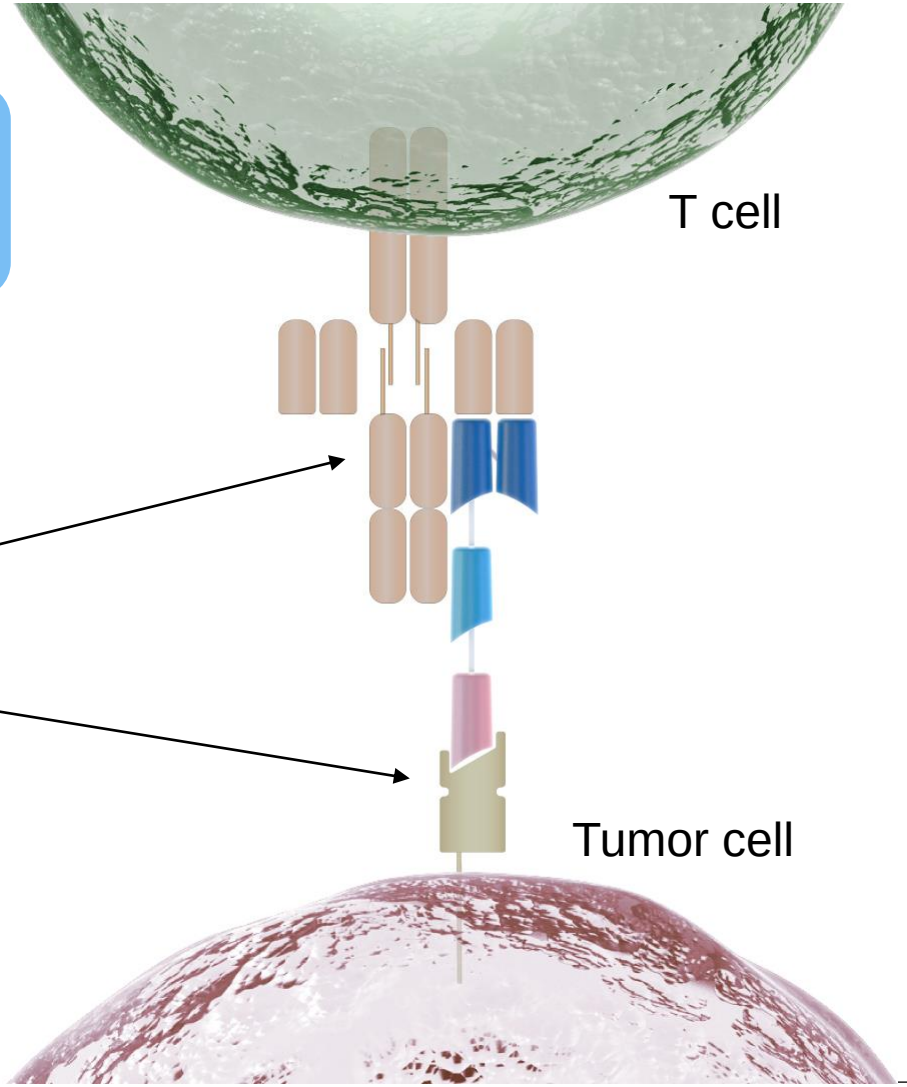


HSA – human serum albumin

TriTACs Can Overcome Immune Escape Mechanisms and Induce Killing Independent of MHC Expression

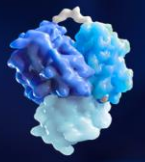
MHC downregulation and mutations are a major tumor evasion mechanism

- Does not require a T cell clone with specific T cell receptor
- Any T cell can recognize a surface antigen
- Does not require MHC expression for recognition by T cell



MHC – major histocompatibility complex

TriTACs - the Next Generation of T Cell Engagers



Extended Half-Life and Stability	• Stable in bloodstream and long-serum half-life allow for treatment without continuous IV administration • Once-weekly dosing
Active at Low Antigen Level	• Active at low levels of antigen expression where other treatment modalities lose efficacy • Does not require high levels of target antigen expression to engage T cells to kill disease cells (based on preclinical studies)
MHC Independence	• Direct T cells to kill target cells independent of MHC expression • Expected to be able to generate greater and more durable therapeutic responses than MHC dependent approaches
Small Size and Tissue Penetration	• Small size expected to allow for faster diffusion into human tumor tissue • Designed for greater potential in solid tumors
Modularity	• Structure is modular and antigen binding domain designed to be easily switched out • Allows for potential rapid discovery and development of new product candidates
Safety Design Elements	• No potential for Fc receptor binding • Single-armed CD3 binding reduces likelihood of non-specific T cell activation
Conventional Manufacturing	• Less complex manufacturing than personalized or cell-based therapies • Off-the-shelf therapies

PIPELINE REVIEW

Metastatic Prostate Cancer: >$5B Global Market Opportunity*

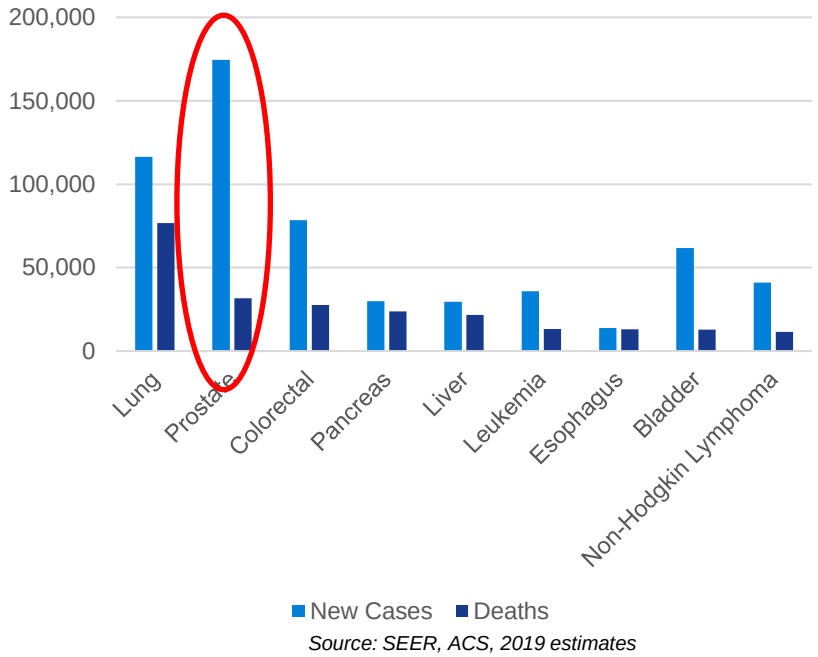
~ 174K new cases of prostate cancer annually in the U.S.

- >31K U.S. deaths per year (2nd leading cause of cancer death in men)
- Mean survival time for mCRPC = 13 months
- 5-year survival rate is ~30% in more aggressive forms
- ~ 23% initially diagnosed with advanced disease

Significant unmet need for patients with incurable mCRPC

- Continued high mortality rates of advanced disease
- Potential "fast to market" strategy for high-risk patient subgroups

U.S. Incidence and Mortality of Cancer in Men



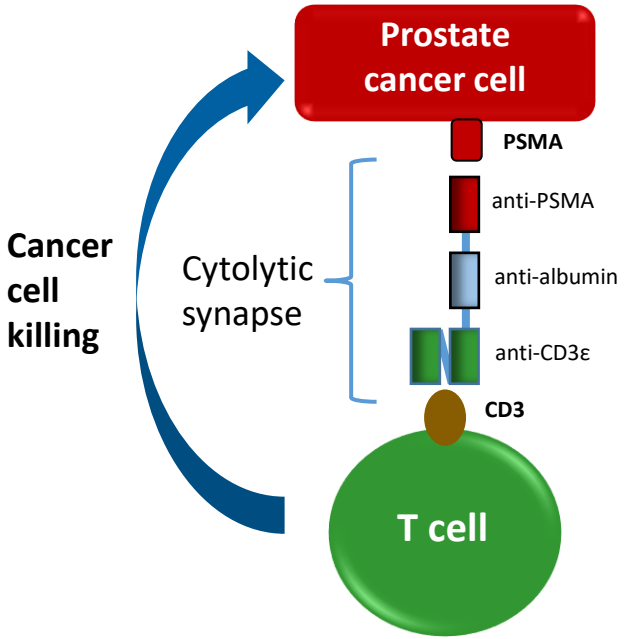
Source: SEER, ACS, 2019 estimates

* Based on combined sales in 2017 of later-generation anti-androgen drugs such as Zytiga and Xtandi.

mCRPC – metastatic castration resistant prostate cancer

HPN424 Targets PSMA - A Highly Expressed and Validated Target for Prostate Cancer

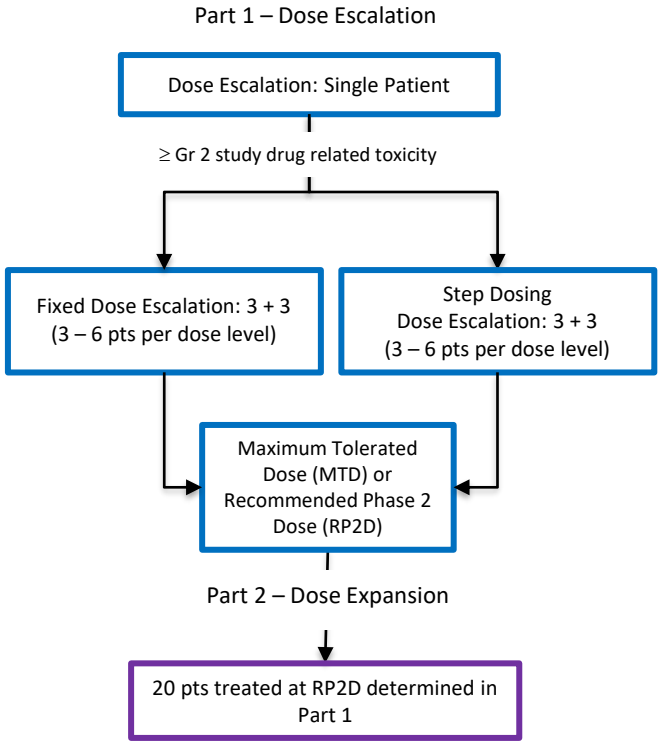
- Designed to bind to human PSMA, CD3, and albumin
- Redirects T cells to kill PSMA-expressing target cells
- Target overexpressed in malignant cells, with limited expression in normal tissue
- Phase 1 trial initiated in patients with mCRPC cancer in August 2018
  - Updates presented at ASCO 2020, company update in December 2020 and ASCO presentation 2021



HPN424 is a tri-specific single chain molecule of ~50 kDa

HPN424 Trial Design and Status

Figure 2. HPN424 Phase I / IIa Trial Schema



- **Target Population**
  - Disease progression on the prior systemic regimen
  - At least two prior systemic therapies approved for mCRPC
  - Prior chemotherapy allowed, but not required

- **Trial Design**
  - Objectives include characterization of safety, PK, pharmacodynamics and identification of expansion dose
  - Tumor assessments performed q9w and include conventional CT and bone scans and PSA

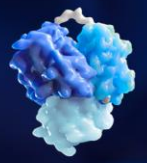
- **Dosing, Administration & Exposure**
  - HPN424 administered qw, 1 hour IV infusion (one cycle = 3 weeks)
  - Starting dose of 1.3ng/kg established by minimally anticipated biological effect level

- **As of April 23, 2021 89 patients were treated in the dose escalation phase**

- **Escalation is ongoing to identify RP2D**
  - As of August 5, patient has been successfully treated at 450 ng/kg

Baseline Demographics

Heterogeneous patient population, heavily pre-treated



Data from clinical database as of April 23, 2021

Table 2. Baseline Characteristics and Demographics

Age (Years)	
Median	70
Range	43 - 91
Race	
White	69 (78%)
Black	8 (9%)
Asian	2 (2%)
Other / Not reported	10 (11%)
ECOG Performance Status	
0	39 (44%)
1	50 (56%)
PSA (ng/mL)	
Mean	464
Median	129
Range	0.1 – 5000

Time Since Diagnosis (Years)	
Mean	8.5
Median	6.9
Range	0.9 – 27.1
Stage at Diagnosis (n=75)[a]	
M0	37 (49%)
M1	38 (51%)
Location of Metastases	
Bone	78 (88%)
Lymph Node	43 (48%)
Lung	12 (14%)
Liver	10 (11%)
Other Visceral	10 (11%)
Other Non-visceral	4 (5%)

Prior Therapies	n (%)	Median (Range)
All Prior Therapy	89 (100%)	5 (1 – 12)
Novel Hormonal Therapy	87 (98%)	2 (0 – 4)
Chemotherapy (mCRPC)	65 (73%)	1 (0 - 3)
Immunotherapy	30 (33%)	0 (0 – 3)

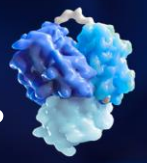
Reason for Entering Study (n=64)[a]	
PSA Progression	27 (42%)
PSA & Clinical Progression	3 (5%)
PSA & Radiographic Progression	10 (16%)
Radiographic Progression	24 (38%)

[a] Actual n is indicated where full dataset not available

- Median of 5 prior systemic therapies, median of 2 prior novel hormonal therapies
- 73% of patients had prior chemotherapy in metastatic castration-resistant setting

Common Treatment-Emergent Adverse Events by Grade

All Grade 3 CRS events occurred with administration of 1st target dose



Data from clinical database as of April 23, 2021

Table 3. Common Treatment Emergent Adverse Events (TEAEs) by Grade per CTCAE, V5.0

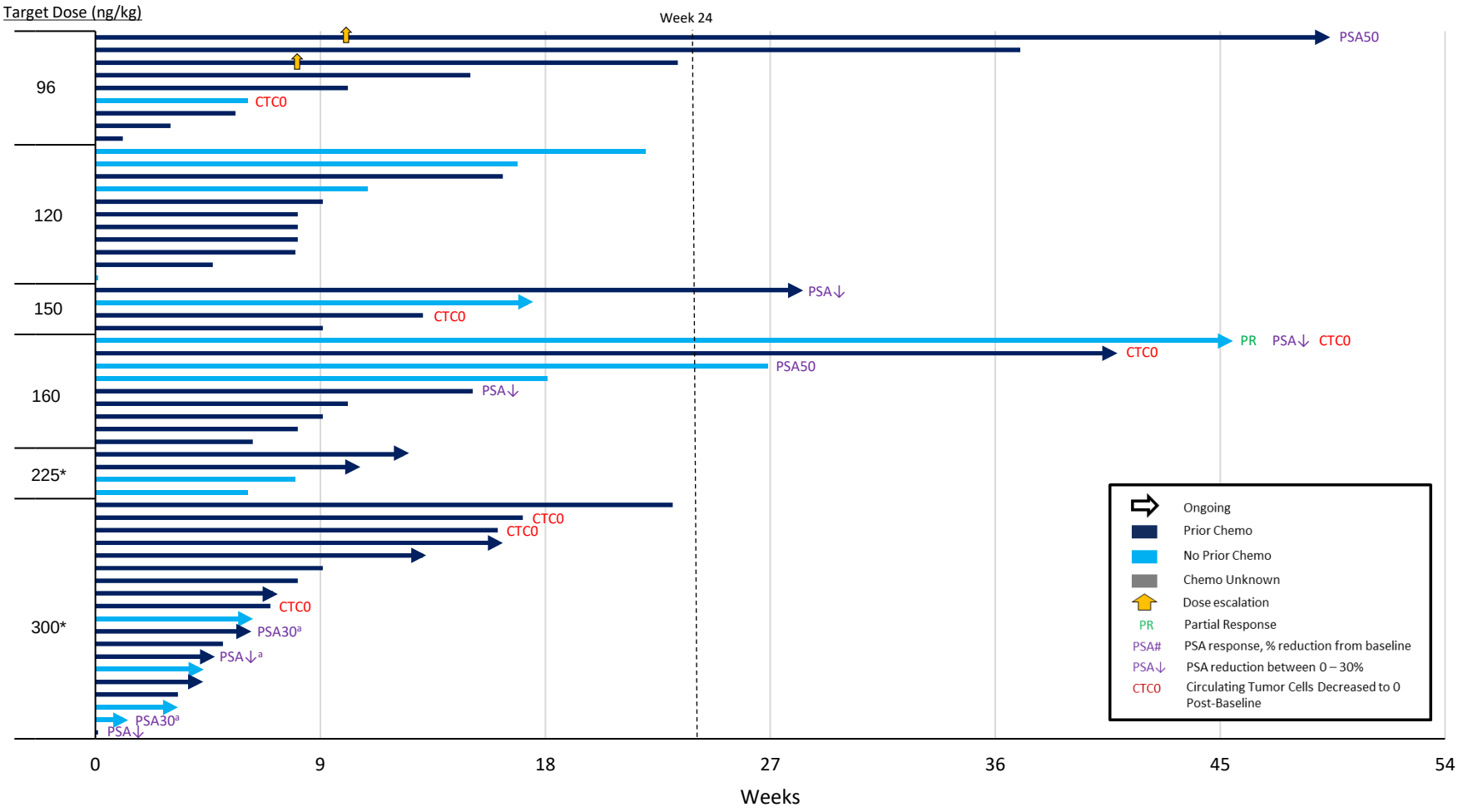
Event, n (%)	All Grades	Grade 3+
Cytokine-Related AEs[a]		
Cytokine Release Syndrome (CRS)[b]	61 (69%)	4 (4%)
Chills	60 (67%)	0 (0%)
Pyrexia	58 (65%)	2 (2%)
Hypotension	35 (39%)	6 (7%)
Infusion Related Reaction (IRR)	20 (22%)	0 (0%)
Flushing	13 (15%)	0 (0%)
Hypoxia	11 (12%)	4 (4%)
Liver Function Tests		
AST Increase	28 (31%)	19 (21%)
ALT Increase	26 (29%)	14 (16%)
Other Adverse Events		
Fatigue	45 (51%)	3 (3%)
Nausea	40 (45%)	1 (1%)
Vomiting	34 (38%)	1 (1%)
Anemia	28 (31%)	10 (11%)
Headache	24 (27%)	0 (0%)
Back Pain	21 (24%)	4 (4%)
Tachycardia	20 (22%)	1 (1%)
Constipation	20 (22%)	0 (0%)
Decreased Appetite	20 (22%)	0 (0%)

[a] Includes AEs that were reported as concurrent symptoms of the CRS events
[b] CRS Grading according to ASTCT 2019 criteria

- 89 patients in safety database
- Dose Limiting Toxicities (DLTs):
  - Observed at doses ranging from 96 to 300ng/kg
  - Did not limit escalation
  - Most Common: Transaminitis G4 (n=6); CRS G3 (n=4)
  - MTD not yet reached
- Median Duration of High-Grade Events
  - CRS: One day
  - Transaminitis: Four days
- No Grade 4 or 5 CRS, no Grade 5 treatment-related AEs
- All Grade 3 CRS events occurred with administration of 1st target dose
- Two of 89 (2%) pts discontinued treatment due to treatment-related AEs

HPN424 Update
Durability and PSA declines observed at higher doses

Preliminary data as of May 31, 2021



* Intended Target Dose after initiation of Prime Dose(s); patients in 300 cohort treated with different step regimens

[a] Unconfirmed

HARPOON Therapeutics

HPN424-1001 Phase I Dose Escalation

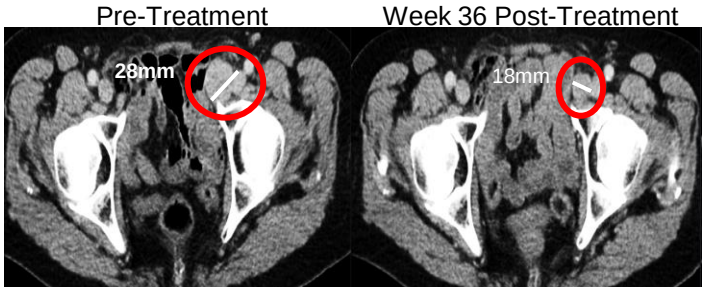
Patient Profile – Patient 057 – Ongoing

Data from clinical database as of April 23, 2021

Patient 057, a 75-year old male, diagnosed January 2002

Baseline Characteristics			
ECOG	1	Reason for Study Entry	Radiographic Progression
PSA (ng/mL)	39	Location of Metastases	Lymph Node
Stage at Diagnosis	M0	Prior Therapies	ADT, Bicalutamide, Apalutamide

Figure 9. Patient 057 Target Lesion Scan



- Initiated HPN424 at 160ng/kg
- Demonstrated RECIST partial response (-32%) at 1st post-baseline scan (Week 9), confirmed PR (-43%) at Week 18, response maintained at Week 36
- Remains on study after 41 weeks of treatment

HPN424-1001 Phase I Dose Escalation

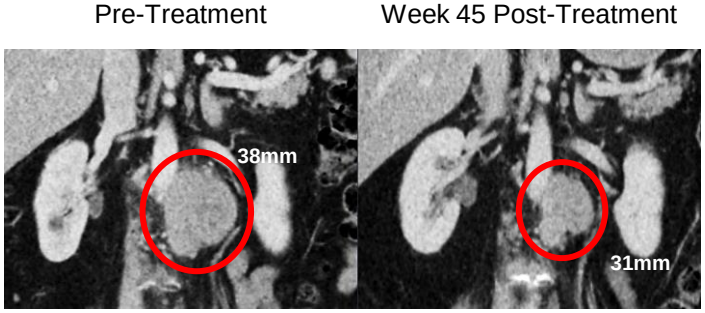
Patient Profile – Patient 054 – Ongoing

Data from clinical database as of April 23, 2021

Patient 054, a 66-year old male, diagnosed August 2014

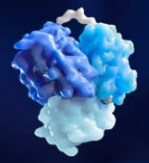
Baseline Characteristics			
ECOG	1	Reason for Study Entry	Radiographic Progression
PSA (ng/mL)	8.9	Location of Metastases	Lymph Node
Stage at Diagnosis	M1	Prior Therapies	ADT, Docetaxel, Abiraterone, Enzalutamide, Talazoparib, ATR Inhibitor

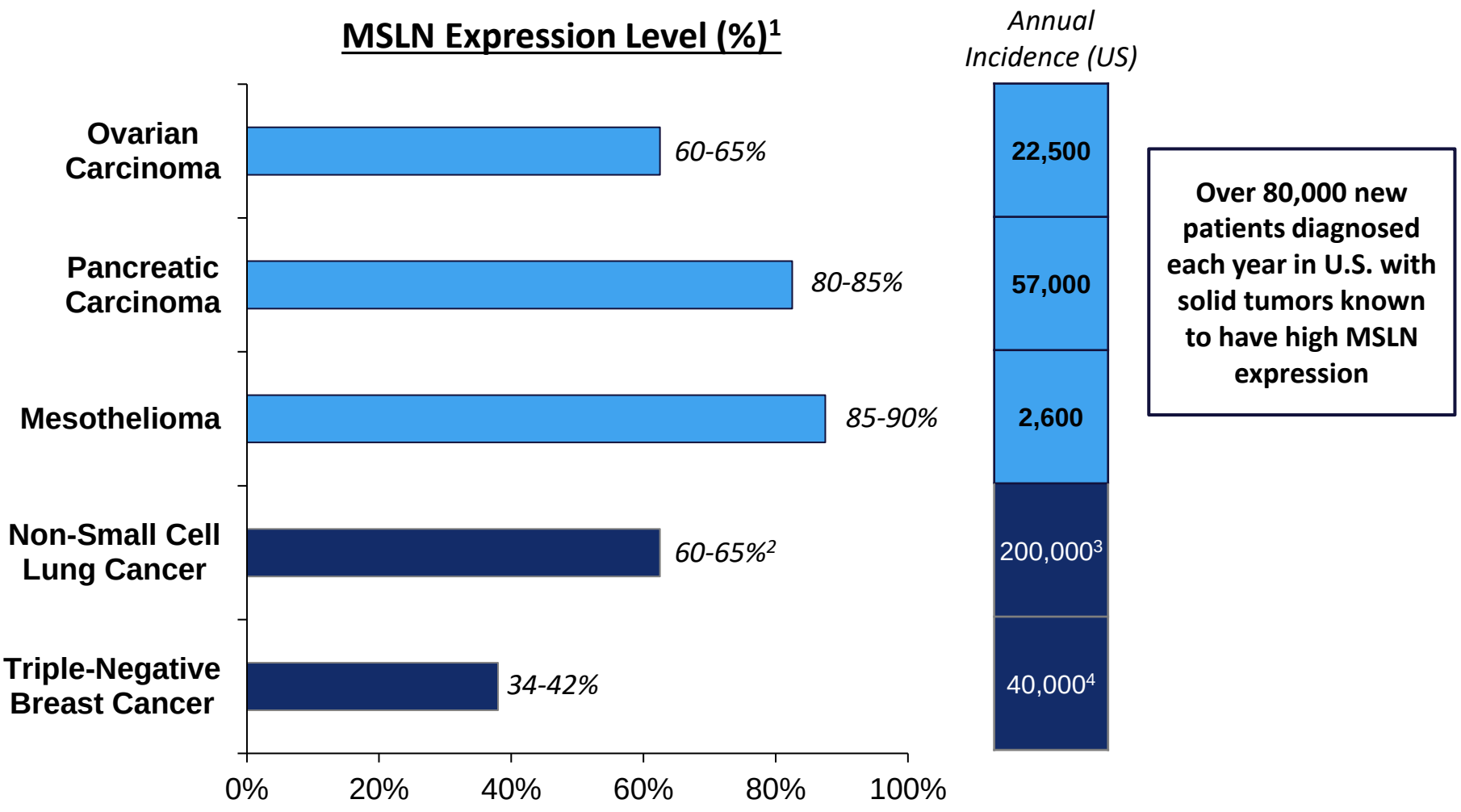
Figure 10. Patient 054 Target Lesion Scan



- Initiated HPN424 at 96ng/kg and escalated to 120ng/kg in Cycle 4
- Demonstrated a steady PSA decline over course of treatment, currently -60% PSA decline from baseline
- Stable disease per RECIST with 18% reduction in target lesions from baseline to Week 45 scan
- Remains on study after 45 weeks of treatment

MSLN - Associated with Tumors with High Unmet Need and Low Survival Rates

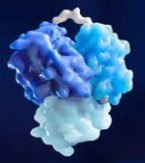


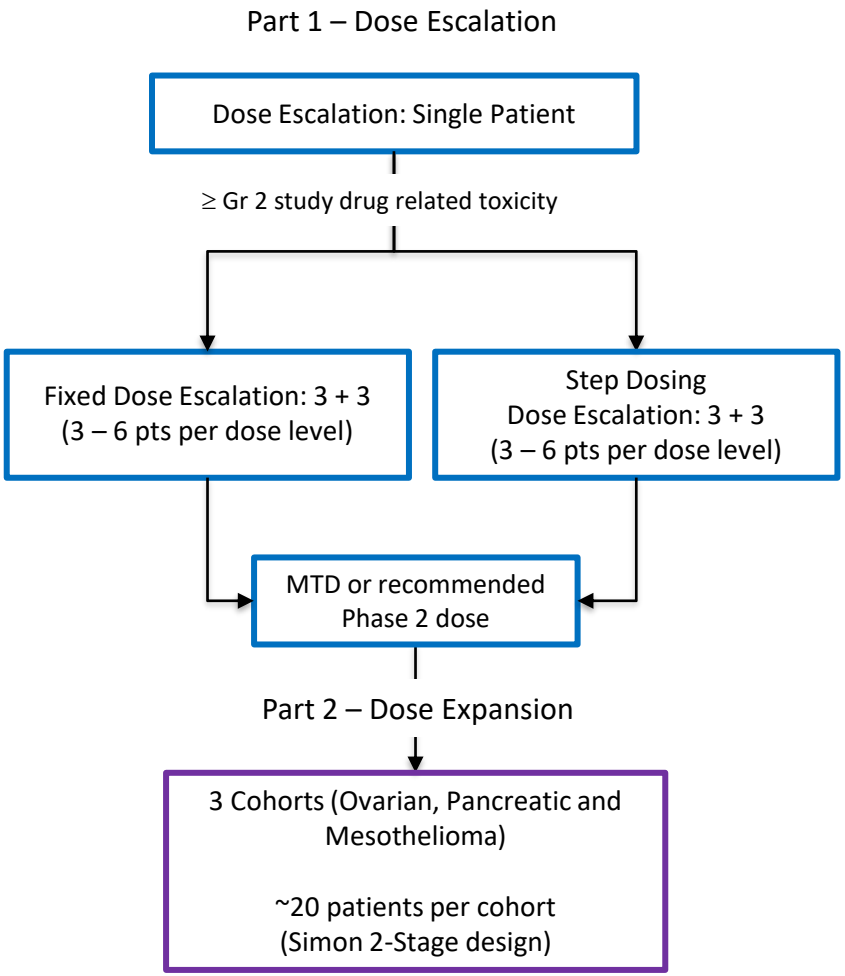


Over 80,000 new patients diagnosed each year in U.S. with solid tumors known to have high MSLN expression

1) *Morello et al. Cancer Discov 2016;6:133-146*
2) *Represents MSLN expression levels across all lung cancer types*
3) *Estimated as 80-85% of SEER-estimated lung cancer incidence*
4) *Estimated as 15% of SEER-estimated breast cancer incidence*

HPN536 Phase 1/2a Dose Escalation





- **Target population (dose escalation)**
  - Platinum refractory or platinum resistant epithelial ovarian, fallopian tube, or primary peritoneal cancer
  - Unresectable, locally advanced or metastatic pancreatic adenocarcinoma progressing on or after frontline treatment
  - Malignant pleural or peritoneal mesothelioma with epithelioid histology progressing on or after frontline platinum-based chemotherapy

- **Trial objectives**
  - Assess safety and tolerability at increasing dose levels
  - Pharmacokinetic and pharmacodynamic data
  - Evaluate preliminary anti-tumor activity

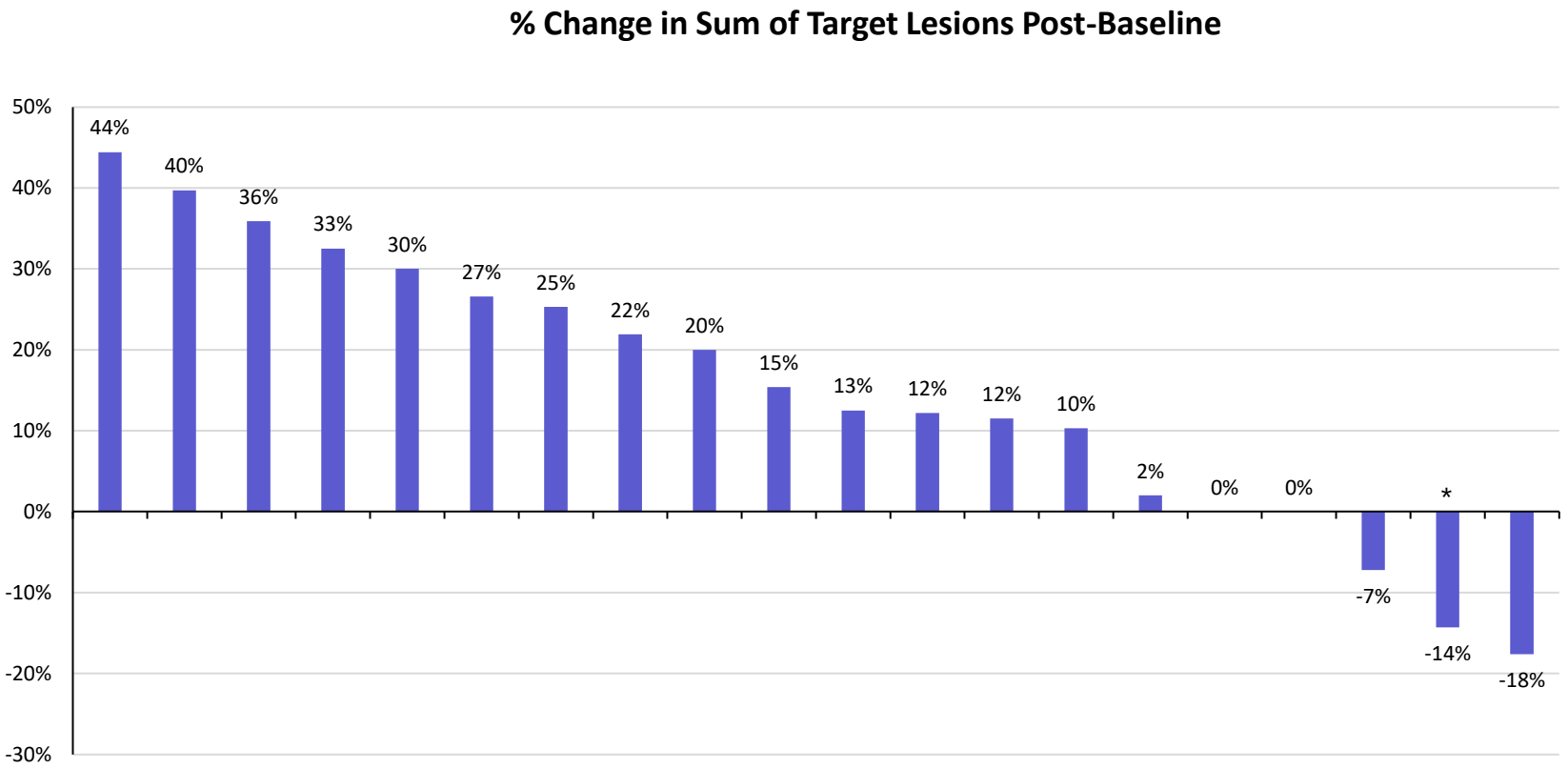
- **As of May 31, 2021, we had treated 60 patients up to 1200ng/kg**

- **As of August 5, we have initiated and are enrolling 1800 ng/kg step dose cohort**

HPN536 Ovarian Cancer Anti-Tumor Activity

Target Lesion Reductions Observed

Data from clinical database as of May 31, 2021



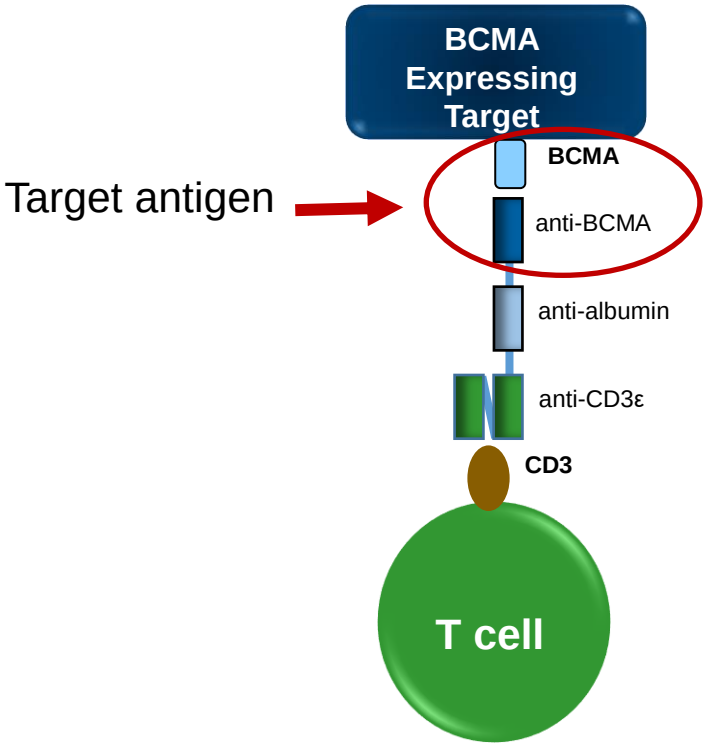
* Patient remains on study

11/20 (55%) of evaluable patients have shown stability of target lesions

HARPOON Therapeutics

HPN217 - Targets BCMA for the Treatment of Multiple Myeloma and Other BCMA-Expressing Tumors

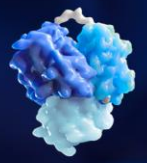
- Designed to bind to human BCMA, CD3, and albumin
- Redirects T cells to kill BCMA-expressing target cells
- Dosed first patient in Phase 1/2 trial in April 2020
- Global licensing and option agreement with AbbVie
  - HARP executing Phase 1/2a clinical trial



HPN217 is a tri-specific single chain molecule of ~50 kDa

Deals with AbbVie - HPN217 & Broad Discovery Collaboration

Three transactions valued at up to $3.0B



Nov 2019 –$100M received and $2.3B in future payments

HPN217 global licensing and option deal

- Option to license worldwide rights to HPN217
- Harpoon responsible for clinical development of HPN217 through Phase 1/2
- Upon exercise of option, AbbVie responsible for future development and commercialization
- **Potential transaction value: $510M**
  - $80M received
  - $200M option fee
  - $230M in future milestones, plus royalties

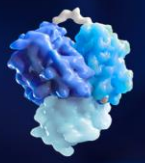
Expanded TriTAC® discovery collaboration

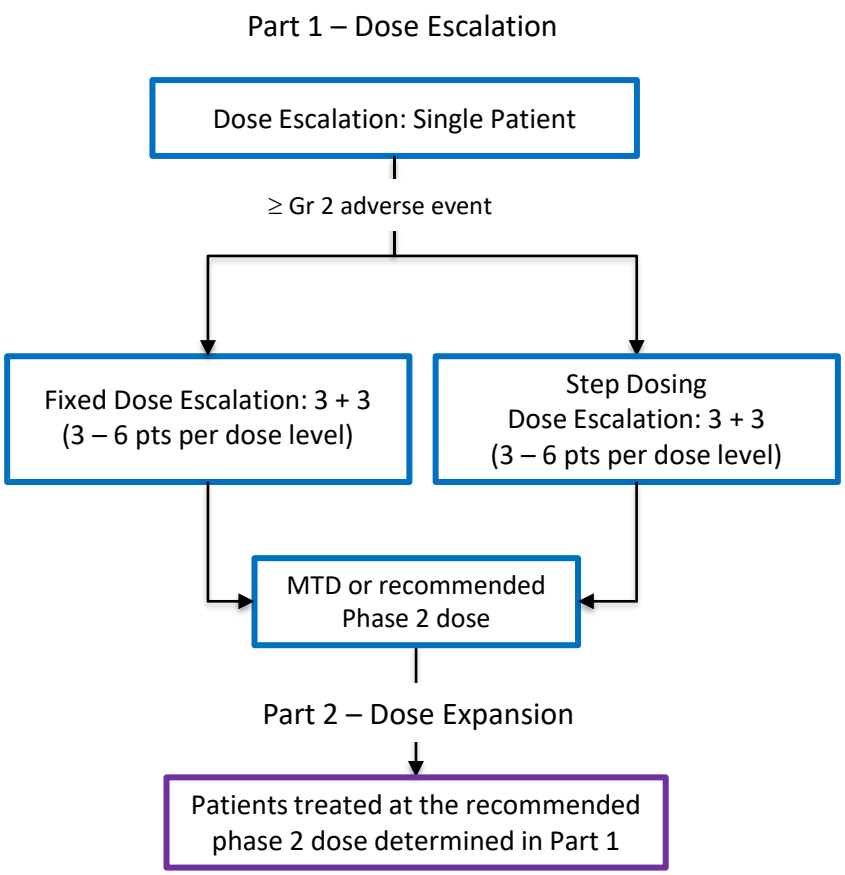
- Grants AbbVie worldwide exclusive rights to up to six new targets
- Harpoon responsible for initial R&D activities. AbbVie responsible for further development and commercialization efforts
- **Expanded Deal Transaction Value: $1.86B**
  - $20M upfront for the rights to two new targets
  - $40M: $10M each for up to four additional targets
  - $300M in future milestones, plus royalties per target (up to 6 total)

Oct 2017 – Up to $617M in upfront and future milestones plus royalties on sales

- $17M upfront for TriTAC discovery collaboration for the rights to two targets
- $300M in future development milestones per target (2)

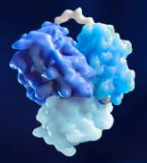
HPN217 - Phase 1/2 Study Design and Current Status





- **Target population**
  - Relapsed/Refractory Multiple Myeloma (R/R MM)
  - Disease progression on the prior systemic regimen
  - At least three prior therapies including a proteasome inhibitor, an immunomodulatory agent, and an anti-CD38 antibody
- **Trial objectives**
  - Assess safety and tolerability at increasing dose levels
  - Pharmacokinetic and pharmacodynamic data
  - Evaluate preliminary anti-tumor activity
- **Dosing and administration**
  - Weekly IV infusion of HPN217
- **As of May 12, 2021, we have enrolled 20 patients across 8 cohorts, up to 2150 µg**

HPN328 – Potential Treatment for SCLC and Other Neuroendocrine Tumors

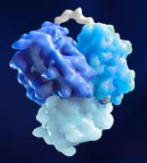


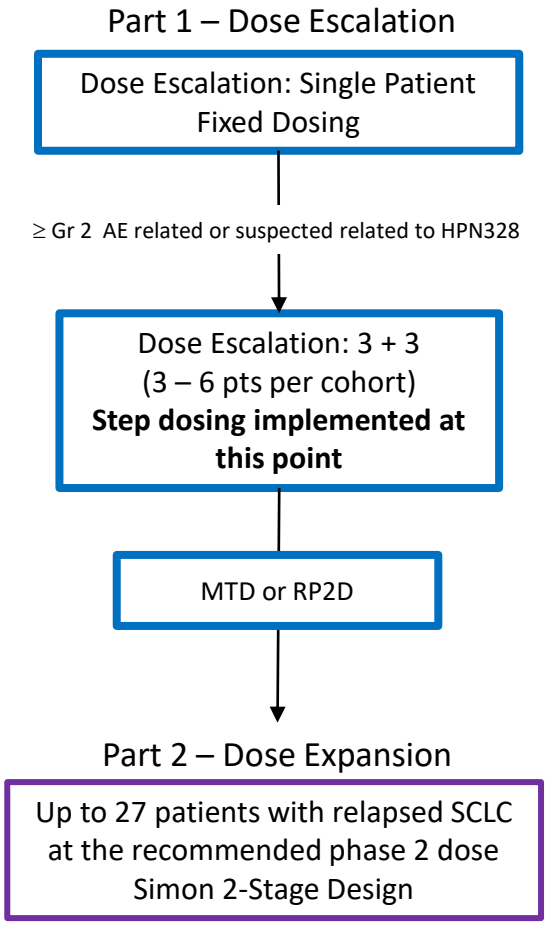
- **Initial target for Small Cell Lung Cancer, remains an unmet medical need**
  - Aggressive disease with limited treatment options
  - 15% of all lung cancers addressable by targeting DLL3
  - Emerging data indicating DLL3 expression in other neuroendocrine tumors besides SCLC

- **DLL3 as a promising target for T-cell engagers**
  - Checkpoint inhibitors releasing T cells leading to increased patient survival
  - Opportunity to treat checkpoint refractory or relapsed SCLC patients and potential for combinations with chemo and checkpoint therapies
  - High prevalence in SCLC
    - Emerging data of DLL3 expression in various neuroendocrine tumors

HPN328 Phase 1/2 Study

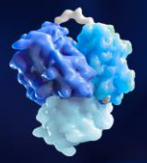
An Open-Label, Multi-Center, Dose Escalation / Expansion, Safety & PK Study





- **Target population**
  - Small cell lung cancer relapsed after platinum chemotherapy
  - Other malignancies with high grade neuroendocrine features R/R to Standard of Care (SOC) or no SOC available
- **Trial objectives**
  - Assess safety and tolerability at increasing dose levels
  - pK and pharmacodynamic data
  - Evaluate preliminary anti-tumor activity
- **As of May 10, four patient have been treated in four dose cohorts, up to 405µg**
  - Patient treated at 45µg showed uPR with 38% shrinkage of target lesion
- **Escalation is ongoing to identify RP2D**
  - As of August 5, patient has been successfully treated at 3600 µg
  - Patient with uPR showed stable disease as overall best response

Pipeline Next Steps

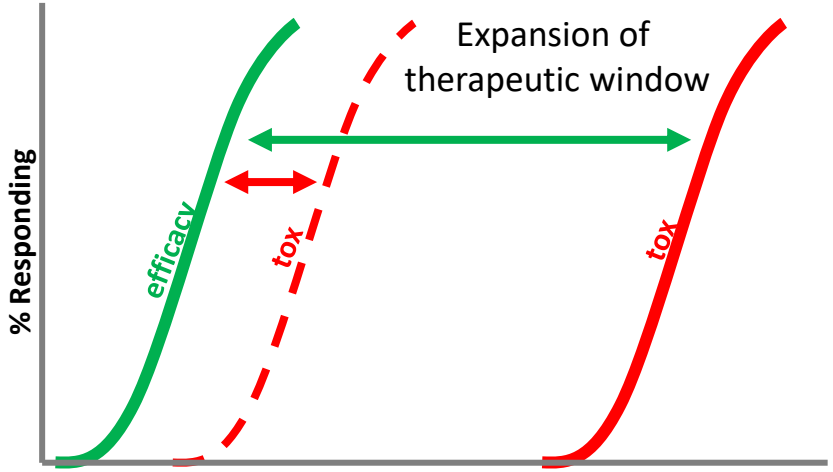


- HPN424: PSMA for prostate cancer
  - Complete dose selection and finalize target patient population for Phase 2 expansion cohort initiation
- HPN536: MSLN for ovarian, pancreatic and mesothelioma
  - Continue dose escalation and further enrich study with mesothelioma patients
- HPN217: BCMA for multiple myeloma
  - Continue dose escalation and identify dose and patients for Phase 2 expansion
- HPN328: DLL3 for small cell lung cancer and other neuroendocrine tumors
  - Continue dose escalation and further enrich study to include prostate cancer patients
- HPN601: EPCAM for GI cancers and other solid tumors
  - Continue IND enabling studies including clinical drug supply

ProTriTAC: Novel Pro-Drug Technology Platform

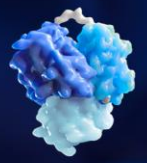
ProTriTAC: Conditionally Active, Targeted Tumor Cell Killing

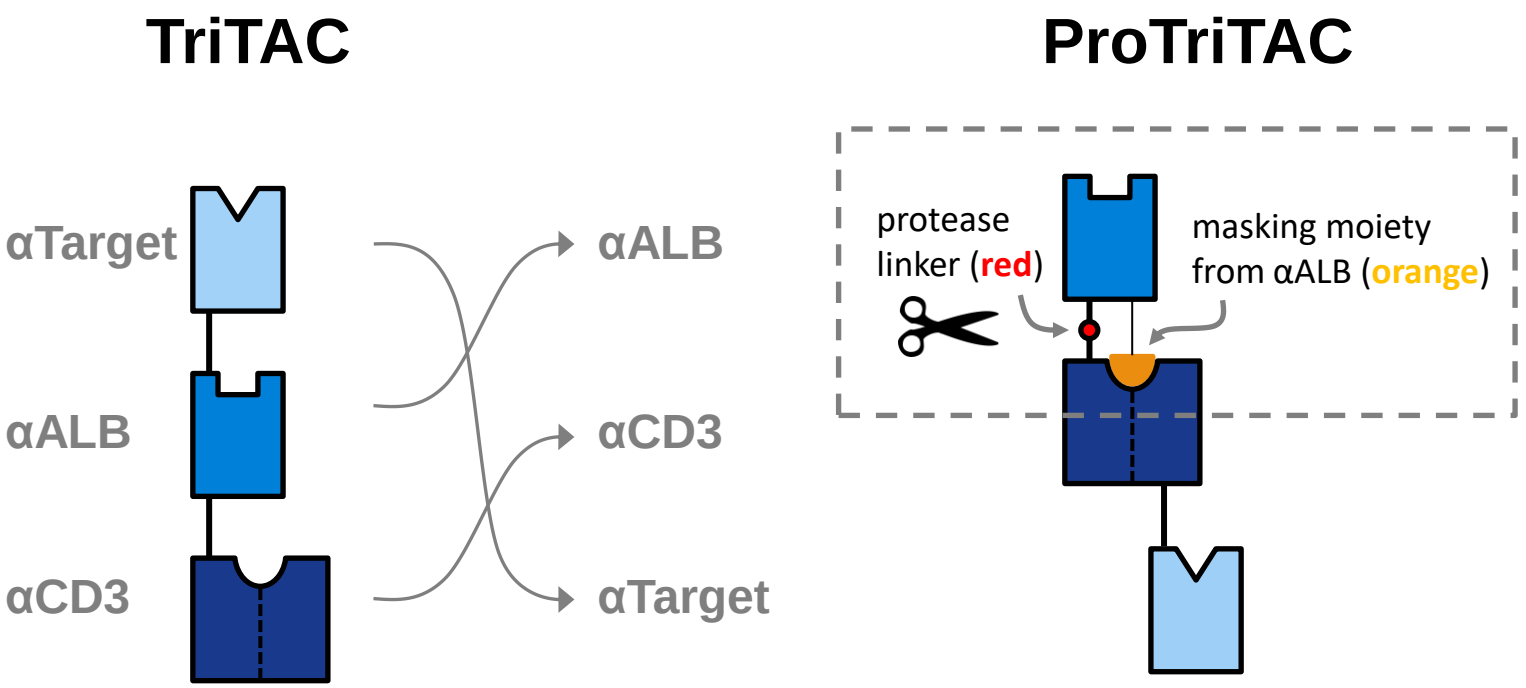
- Many tumor target antigens are also expressed on healthy, essential tissue
- Targeting with non-tumor tissue with immunotherapies can result in unacceptable toxicities



- Localized activation of T cell engagers at the tumor site can
  - Expand the therapeutic window by reducing potential off-target side effects
  - Broaden the available drug targets previously considered “undruggable”
  - Allow combinations that were previously limited by unacceptable toxicity profile

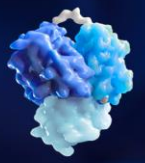
Development of Next-Generation Protease-Activated TriTAC Prodrug Platform





Started with same TriTAC binders → Rearranged binders → Added **protease linker** *and* **masking moiety**

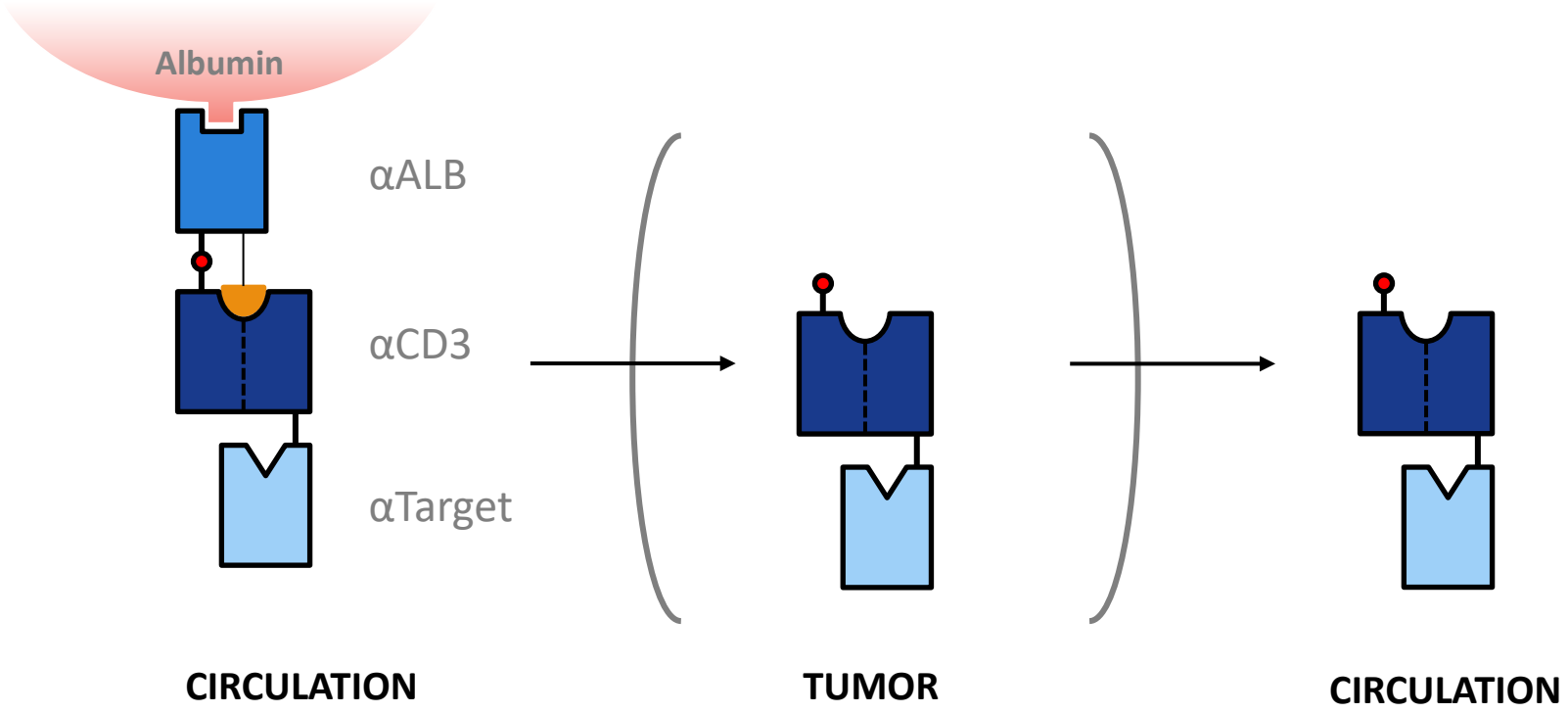
ProTriTAC Increases Therapeutic Index by Linking Prodrug Activation to Half-Life Extension



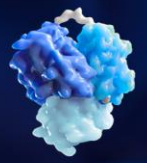
Long-lived, inactive prodrug

Activation by tumor proteases & T cell-directed killing

Rapid clearance in circulation



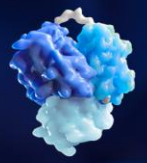
Financial Snapshot – Strong Cash Position



		Notes
Cash, Cash Equivalents and Marketable Securities	$175.2M[1]	• Expected to fund operations into 1H 2023 • No debt
Shares Outstanding	32.5M	• As of July 31, 2021
Market Capitalization	$254M	• As of Sep 30, 2021
Non-affiliated Institutional Ownership	64.7%	• As of July 31, 2021 as reported by Factset

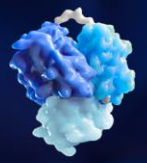
[1] As of June 30, 2021

2H 2021 Clinical Milestones



Milestone	Timing
HPN424: Trial update	YE 2021
HPN424: Initiate expansion cohort	YE 2021
HPN536: Trial update	YE 2021
HPN536: Initiate expansion cohort	YE 2021
HPN217: Phase 1/2 data presentation	2H 2021
HPN217: Initiate expansion cohort	YE 2021
HPN328: Trial update	YE 2021

Harpoon Therapeutics – Investment Overview



Therapeutic Focus	Clinical-stage immunotherapy company
Platform Technologies	T cell engager technology, “off-the-shelf” therapies for solid tumors -TriTAC®: Tri-specific T cell Activating Construct platform -ProTriTAC®: Pro-drug form of TriTAC for tumor-specific activation
Multiple Product Candidates	HPN424 (PSMA TriTAC) Phase 1/2a in prostate cancer HPN536 (mesothelin TriTAC) Phase 1/2a in ovarian cancer and other solid tumors HPN217 (BCMA TriTAC) in Phase 1/2 in multiple myeloma HPN328 (DLL3 TriTAC) in Phase 1/2 in small cell lung cancer and other neuroendocrine tumors
Multiple Anticipated Clinical Catalysts in 2H 2021	HPN424 – Trial update, initiation of expansion cohort HPN536 – Trial update, initiation of expansion cohort HPN217 – Trial update, initiation of expansion cohort HPN328 – Trial update
Strong Financial Position	Cash balance of $175.2 million expected to fund operations into 1H 2023

HARPOON
Therapeutics

Spearheading Immunotherapies