Second Quarter 2024
Operating & Financial Results Conference Call / Webinar

With additional focus on preliminary patient data and clinical readouts for Phase 2 LP-300 Harmonic™ Trial

August 8th, 2024
4:30 PM Eastern Time



Forward Looking Statements

This presentation contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements include, among other things, statements relating to: future events or our future financial performance; the potential advantages of our RADR® platform in identifying drug candidates and patient populations that are likely to respond to a drug candidate; our strategic plans to advance the development of our drug candidates and antibody drug conjugate (ADC) development program; estimates regarding the development timing for our drug candidates and ADC development program; expectations and estimates regarding clinical trial timing and patient enrollment; our research and development efforts of our internal drug discovery programs and the utilization of our RADR® platform to streamline the drug development process; our intention to leverage artificial intelligence, machine learning and genomic data to streamline and transform the pace, risk and cost of oncology drug discovery and development and to identify patient populations that would likely respond to a drug candidate; estimates regarding patient populations, potential markets and potential market sizes; sales estimates for our drug candidates and our plans to discover and develop drug candidates and to maximize their commercial potential by advancing such drug candidates ourselves or in collaboration with others. Any statements that are not statements of historical fact (including, without limitation, statements that use words such as "anticipate," "believe," "contemplate," "could," "estimate," "expect," "intend," "seek," "may," "might," "plan," "potential," "predict," "project," "target," “model,” "objective," "aim," "upcoming," "should," "will," "would," or the negative of these words or other similar expressions) should be considered forward-looking statements. There are a number of important factors that could cause our actual results to differ materially from those indicated by the forward-looking statements, such as (i) the risk that our research and the research of our collaborators may not be successful, (ii) the risk that observations in preclinical studies and early or preliminary observations in clinical studies do not ensure that later observations, studies and development will be consistent or successful, (iii) the risk that we may not be successful in licensing potential candidates or in completing potential partnerships and collaborations, (iv) the risk that none of our product candidates has received FDA marketing approval, and we may not be able to successfully initiate, conduct, or conclude clinical testing for or obtain marketing approval for our product candidates, (v) the risk that no drug product based on our proprietary RADR® AI platform has received FDA marketing approval or otherwise been incorporated into a commercial product, and (vi) those other factors set forth in the Risk Factors section in our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the Securities and Exchange Commission on March 18, 2024. You may access our Annual Report on Form 10-K for the year ended December 31, 2023 under the investor SEC filings tab of our website at www.lanternpharma.com or on the SEC's website at www.sec.gov. Given these risks and uncertainties, we can give no assurances that our forward-looking statements will prove to be accurate, or that any other results or events projected or contemplated by our forward-looking statements will in fact occur, and we caution investors not to place undue reliance on these statements. All forward-looking statements in this presentation represent our judgment as of the date hereof, and, except as otherwise required by law, we disclaim any obligation to update any forward-looking statements to conform the statement to actual results or changes in our expectations.

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Speakers

Dream team

Panna Sharma
CEO and President

David Margrave
CFO

Reggie Ewesuedo
VP of Clinical Development



2024 2nd Quarter Highlights

1 of 3

Lantern Pharma®

NASDAQ: LTRN

- ✓ Active clinical trials across three AI-guided drug candidates with additional ADC-based preclinical molecules in evaluation for development
- ✓ Preliminary patient data and clinical readouts for Phase 2 LP-300 Harmonic™ Trial released showing an 86% clinical benefit rate in the initial 7 patient safety lead-in cohort
- ✓ Issued a Certificate of Patent by the Japanese Patent Office directed to Lantern Pharma's drug candidate LP-284, including claims covering the new molecular entity

2024 2nd Quarter Highlights

2 of 3

Lantern Pharma®

NASDAQ: LTRN

- ✓ Phase 1 clinical trials for both synthetic lethal drug candidates, LP-184 and LP-284, continue to advance with no dose-limiting toxicities observed in any of the patient cohorts enrolled and over 40 patients dosed to-date
- ✓ Achieved significant advancement towards key milestone in the development of molecular diagnostic for use with drug candidate LP-184 in future oncology clinical trials to improve patient selection and stratification
- ✓ Launched strategic drug development collaboration leveraging our AI platform, RADR®, with Oregon Therapeutics to optimize the development of first-in-class drug candidate XCE853 – a potent inhibitor of cancer metabolism

2024 2nd Quarter Highlights

3 of 3

Lantern Pharma®

NASDAQ: LTRN

- ✓ Starlight Therapeutics, a wholly owned subsidiary of Lantern Pharma focused on CNS and brain cancers advanced with initiating site selection and feasibility for a Phase 1B/Phase 2 trial in recurrent GBM with drug candidate, STAR-001
- ✓ Launched Webinar Wednesdays, a webinar series that focuses on the areas of artificial intelligence and oncology drug development with leading physicians, scientists and Lantern collaborators
- ✓ Approximately $33.3 million in cash, cash equivalents, and marketable securities as of June 30, 2024

Lantern's diverse & unique AI-driven pipeline of 11 drug programs including RADR® collaborations and Starlight Therapeutics

Lantern Pharma (NASDAQ: LTRN)

Lead Candidate	Indication	Discovery	Preclinical	Phase I	Phase II	Orphan Designation	Rare Pediatric Disease
LP-300	Non-Small Cell Lung Cancer for Never Smokers				harmonic		
LP-184	Recurrent Advanced Solid Tumors (*Pancreatic, TNBC, Bladder, & Other Solid Tumors*)					* *for Pancreatic & HGG*	
LP-284	Recurrent Non-Hodgkin's Lymphomas (*Mantle cell, Double-hit lymphomas, & HGBL*)					*for Mantle Cell & HGBL*	
ADC	Select Solid Tumors						

RADR® Collaborations

Elraglusib *owned by – Actuate Thera.*	Multiple Solid Tumors		Collaboration partner ACTUATE THERAPEUTICS
TTC-352 *owned by– TTC Oncology*	ER+ Breast Cancers		Collaboration partner ttc oncology
XCE853 *owned by – Oregon Thera.*	Protein Disulfide Isomerase (PDI) Inhibitor		Collaboration partner OREGON THERAPEUTICS
ADC	Cryptophycin Conjugate for Solid Tumors		Collaboration partner UNIVERSITÄT BIELEFELD

Starlight's pipeline is focused on multiple CNS indications in both adult and pediatric patients

Starlight Therapeutics

ADULT CNS CANCERS

Lead Candidate	Indication	Discovery	Preclinical	Phase I	Phase II	Orphan Designation	Rare Pediatric Disease
STAR-001	Glioblastoma (GBM)*					●	
	Brain Metastases (TNBC)**						
	Brain Metastases (NSCLC)**						

** Multiple GBM patients have been enrolled in the ongoing phase 1a being conducted by Lantern Pharma*

*** The MTD from the ongoing Phase 1A LP-184 clinical trial is expected to support the later expansion to brain metastases*

PEDIATRIC CNS CANCERS

STAR-001	Atypical Teratoid Rhabdoid Tumors (ATRT)			Pediatric CNS indications will enter clinical trials after the adult trials begin		●	●
	Diffuse Midline Glioma (DMG)						
	High-Grade Hemispheric Glioma						

Financial updates Q2 2024

Solid financial position and capital efficiency fuel continued growth and give Lantern cash runway into at least Q3 2025

Summary Results of Operations

	Three Months Ended June 30, (unaudited) 2024	2023
Operating expenses:		
General and administrative	$ 1,519,724	$ 1,632,080
Research and development	3,888,737	3,558,217
Total operating expenses	5,408,461	5,190,297
Loss from operations	(5,408,461)	(5,190,297)
Interest + Other income, net	448,955	443,899
NET LOSS	**$** (4,959,506)	**$** (4,746,398)
Net loss per common share, basic and diluted	$ (0.46)	$ (0.44)
Weighted Avg. Common Shares Outstanding - Basic and Diluted	10,758,805	10,857,040

Balance Sheet Highlights & Summary

	06/30/2024 (unaudited)	12/31/2023
Cash, Cash Equivalents & Marketable Securities	33,262,119	41,302,672
Prepaid Expenses & Other Current Assets	2,029,458	2,038,653
Total Assets	35,586,929	43,647,616
Total Liabilities	4,655,492	2,739,682
Total Stockholders' Equity	30,931,437	40,907,934

"We believe our solid financial position will fuel continued growth and evolution of our RADR® AI platform, accelerate the development of our portfolio of targeted oncology drug candidates and allow us to introduce additional targeted product and collaboration opportunities in a capital efficient manner."

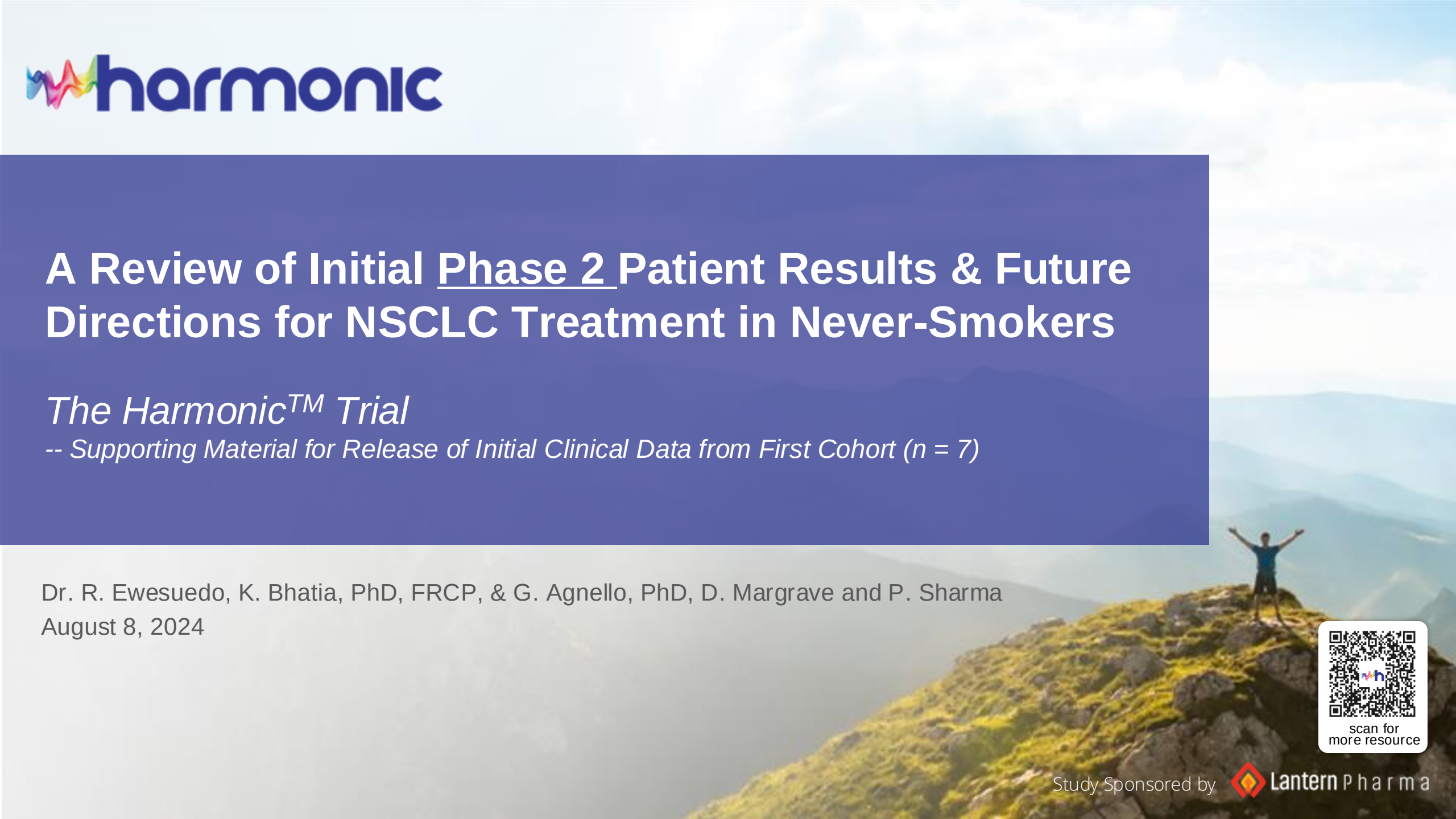
A Review of Initial Phase 2 Patient Results & Future Directions for NSCLC Treatment in Never-Smokers

The Harmonic™ Trial

-- Supporting Material for Release of Initial Clinical Data from First Cohort (n = 7)

Dr. R. Ewesuedo, K. Bhatia, PhD, FRCP, & G. Agnello, PhD, D. Margrave and P. Sharma

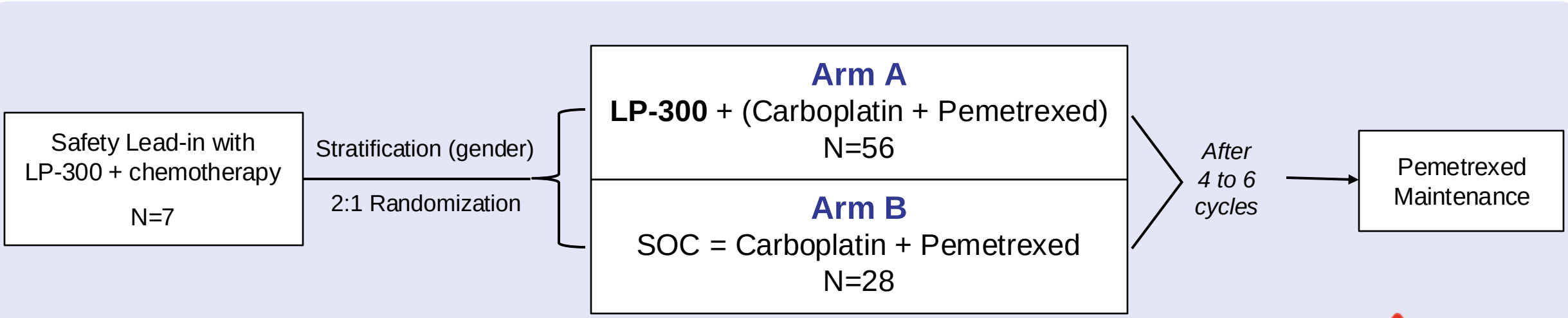
August 8, 2024



scan for more resource

Study Sponsored by Lantern Pharma

Schema of LP-300 Phase 2 Open Label, Randomized Clinical Study Design



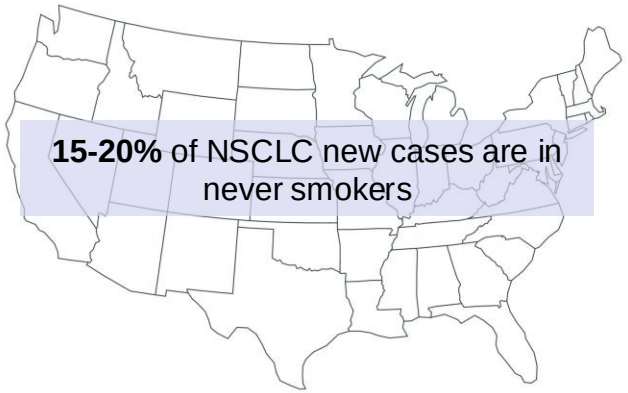
- LP-300, pemetrexed and carboplatin dosed IV on Day 1 of each 21 days cycle for 4-6 cycles (based on institutional practice for SOC)
- After 4-6 cycles, pemetrexed maintenance dosed IV on Day 1 of each 21 days cycle
- Tumor assessments after every 3 cycles (9 weeks), then every 4 cycles (3 months) after 1 year of pemetrexed maintenance

For More Information Please Visit – https://clinicaltrials.gov/study/NCT05456256

Clinical Trial Sites – The Harmonic™ Phase 2 Trial for LP-300

United States# – Initial Lead in Cohort (n=7)

- Fairfax, VA
- Fountain Valley, CA
- Dallas, TX
- Philadelphia, PA
- Los Angeles, CA
- Beverly Hills, CA



15-20% of NSCLC new cases are in never smokers



33+% of NSCLC new cases are in never smokers**



50%** of NSCLC new cases are in never smokers**



Harmonic™ Clinical trial iPhone App

Download on the App Store

Japan Expansion Cohorts*

- National Cancer Center Hospital
- Okayama University Hospital
- Kanagawa Cancer Center Hospital
- Hokkaido Cancer Center
- Tohoku University Hospital

Taiwan Expansion Cohorts*

- National Defense Medical Center
- Taipei Veterans General Hospital
- National Taiwan University Hospital (Hsin-Chu Branch)
- National Cheng Kung University Hospital
- Chi Mei Medical Center

 # United States clinical sites for Harmonic will continue to be updated
** Expansion cohorts in Asia are expected to commence enrollment in Q4 '24 / Q1 '25*
*** Zhou & Zhou, 2018*

Safety Lead-in for Phase 2 Clinical Trial, Summary

No Dose Limiting Toxicities or Serious Adverse Events were observed & Lantern received approval from the DSMB (Data & Safety Monitoring Board) to proceed to next phase of the trial

- Overall, LP-300 in combination with the chemo doublet has been well tolerated with primarily Grade 1 or 2 adverse events (AEs)

Category	Adverse Events	LP-300 + Pemetrexed + Carboplatin (n=7)
Adverse Events	Serious Adverse Events	**0**
	Dose Limiting Toxicities	**0**
Most common related AEs	White blood count decreased	2 (29%)
	Platelet count decreased	2 (29%)
	Constipation	2 (29%)
	Fatigue	2 (29%)
Related ≥ Grade 3 AEs	White blood count decreased	1 (14%)
	Neutrophil count decreased	1 (14%)

Initial Cohort / Lead-in Phase – Summary Results & Key Takeaways

KEY PATIENT CHARACTERISTICS

- ✓ Patients who are never smokers with lung cancer and histopathological evidence of stage III or IV primary lung adenocarcinoma
- ✓ Molecular alterations, including EGFR, MET exon 14 skipping, ROS1, BRAF, ALK, and NTRK fusions
- ✓ Relapsed after one or more lines of therapy with tyrosine kinase inhibitors

STUDY ENDPOINTS

- ✓ Primary: Progression-free survival (PFS) and overall survival (OS)
- ✓ Secondary: Objective response rate (ORR), duration of response (DOR), and clinical benefit rate (CBR)

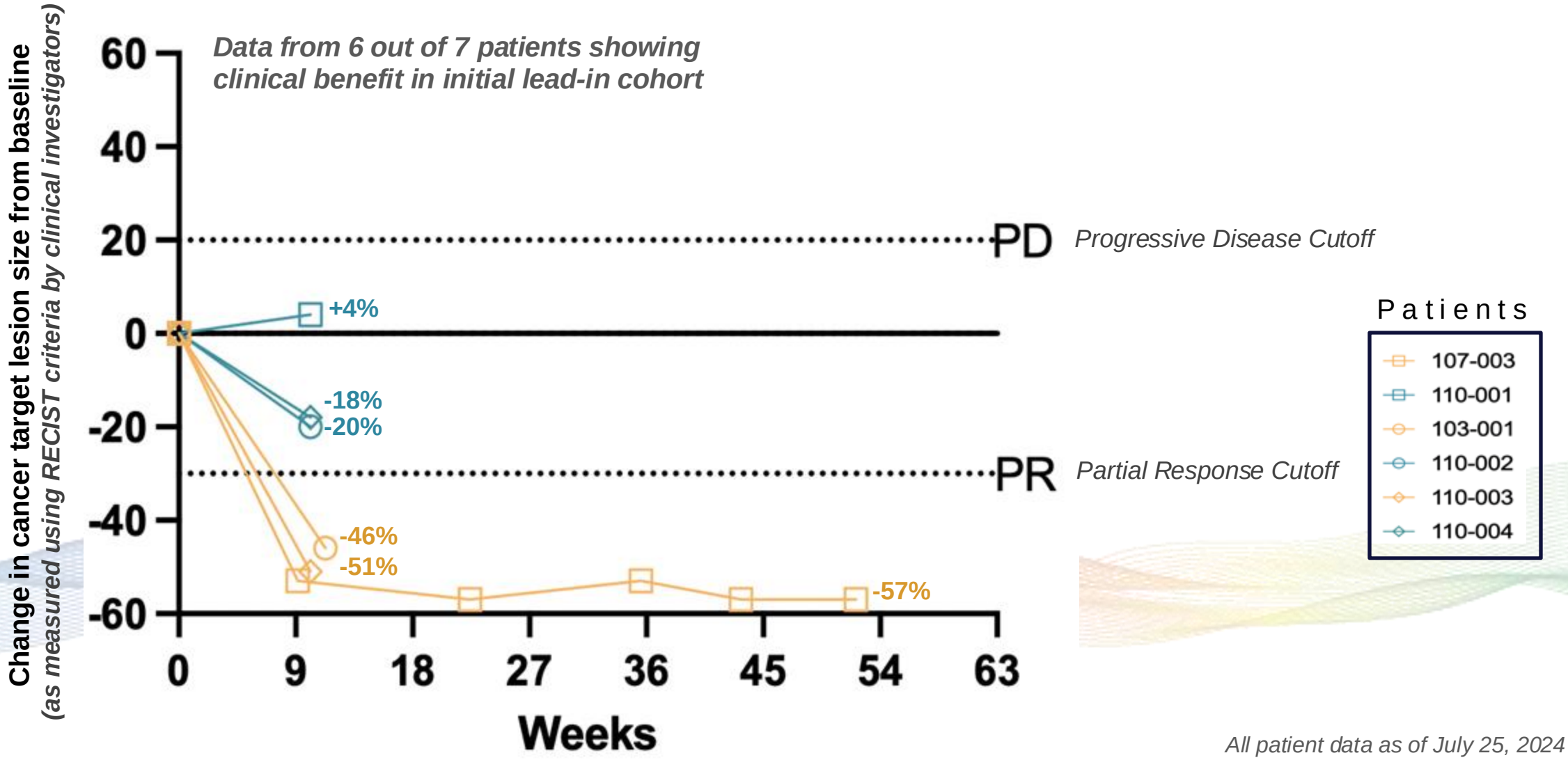
Tumor Response	LP-300+ Carboplatin + Pemetrexed
Partial Response	3/7 (43%)
Stable Disease	3/7 (43%)
Progressive Disease (clinical)	1/7 (14%)
Clinical Benefit Rate (CBR)	**6/7 (86%)**
Objective Response Rate (ORR)	**3/7 (43%)**

All patient data as of July 25, 2024

Patient Highlights from Initial Cohort

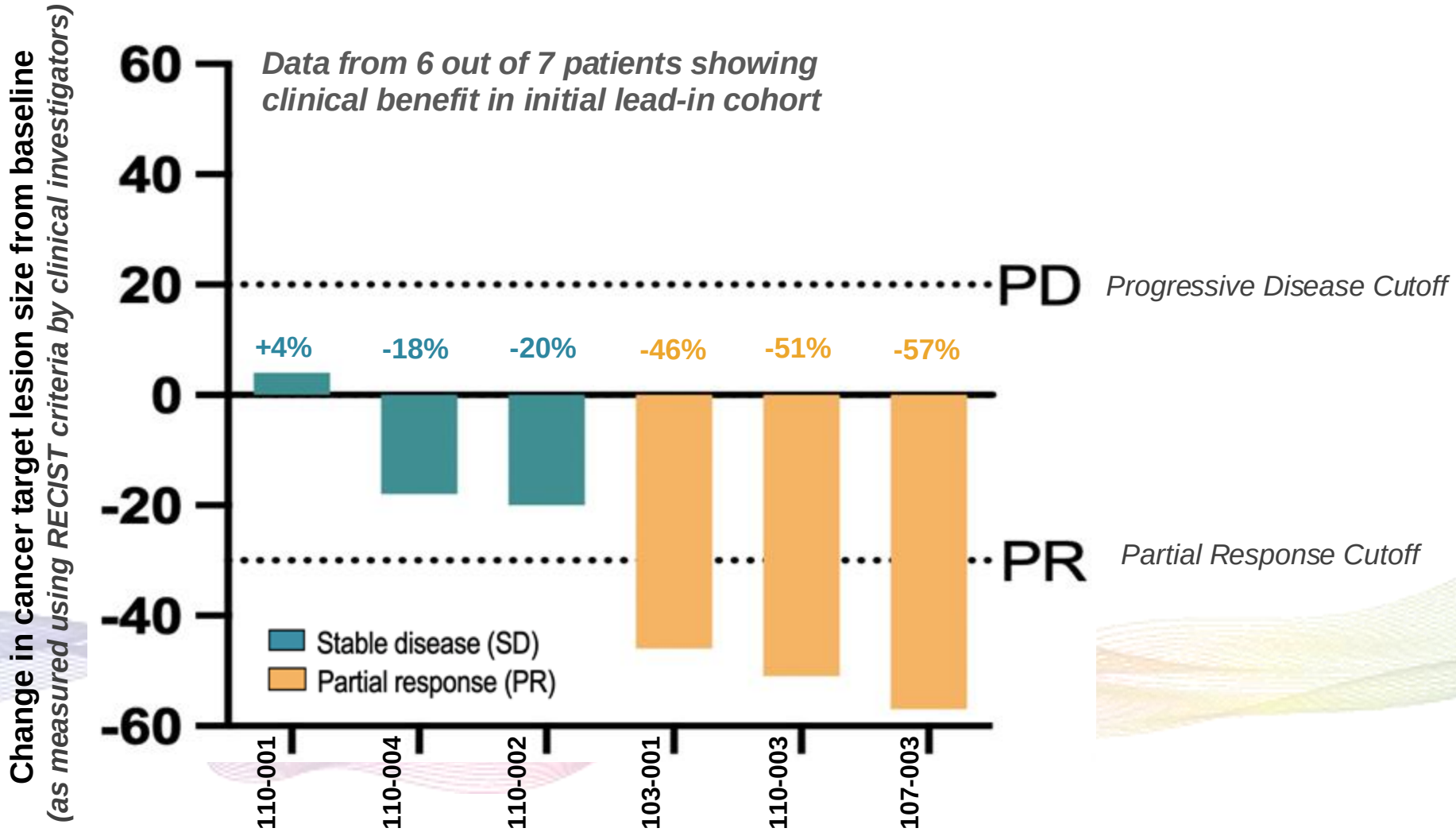
- 7 patients enrolled from different geographies
- Sites included were in CA, VA, TX
- 3 Female and 4 Male
- Average age of 62
- Median prior lines of therapy: 2 (1 to 4)
- Recent historical trials in similar patient groups receiving the chemo doublet have had an ORR of 26% to 36% with a PFS of 5.1 months

Harmonic™ Clinical Trial – Percent change in cancer lesion size over time



All patient data as of July 25, 2024

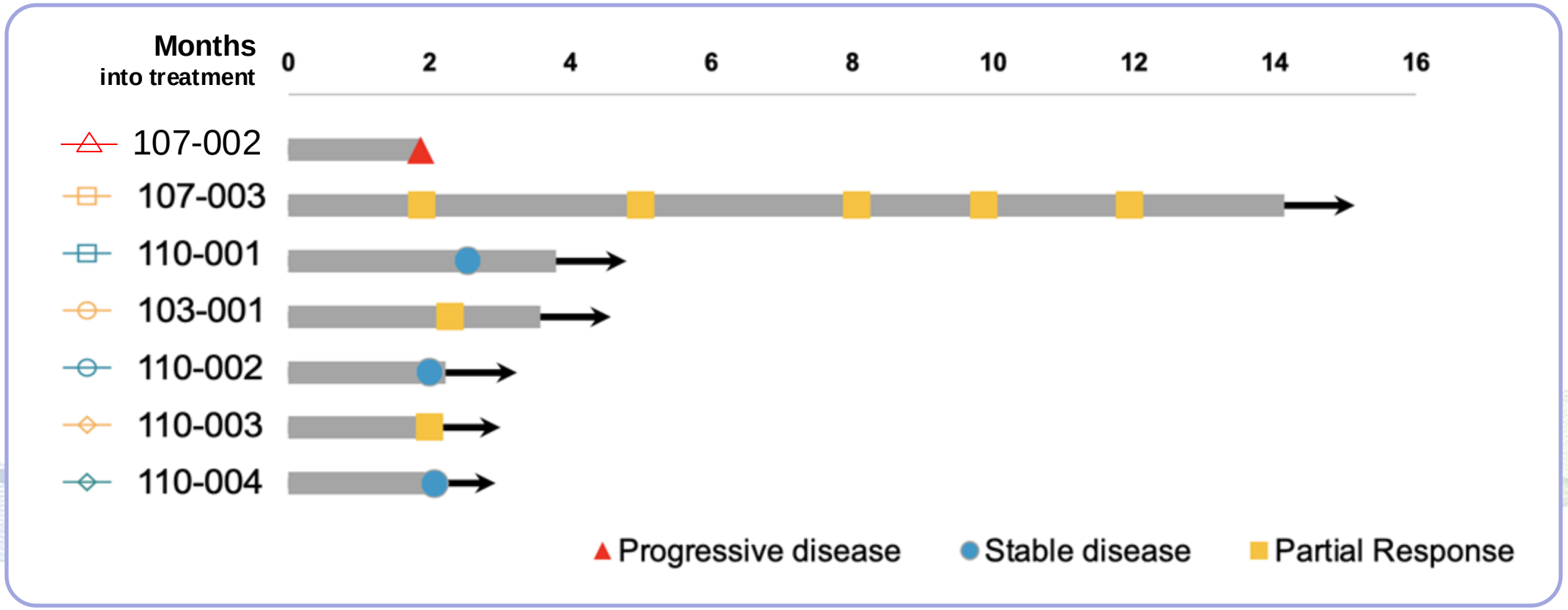
Harmonic™ Clinical Trial – Percent change in cancer lesion size by patient



All patient data as of July 25, 2024

Harmonic™ Clinical Trial – Initial patient cohort response over time

Initial patient responses in the Harmonic™ trial include an 86% disease control rate in the cohort of lead-in patients and a 43% objective response rate (ORR) including one patient maintaining a 50+% reduction in tumor size over 14 months



All patient data as of July 25, 2024

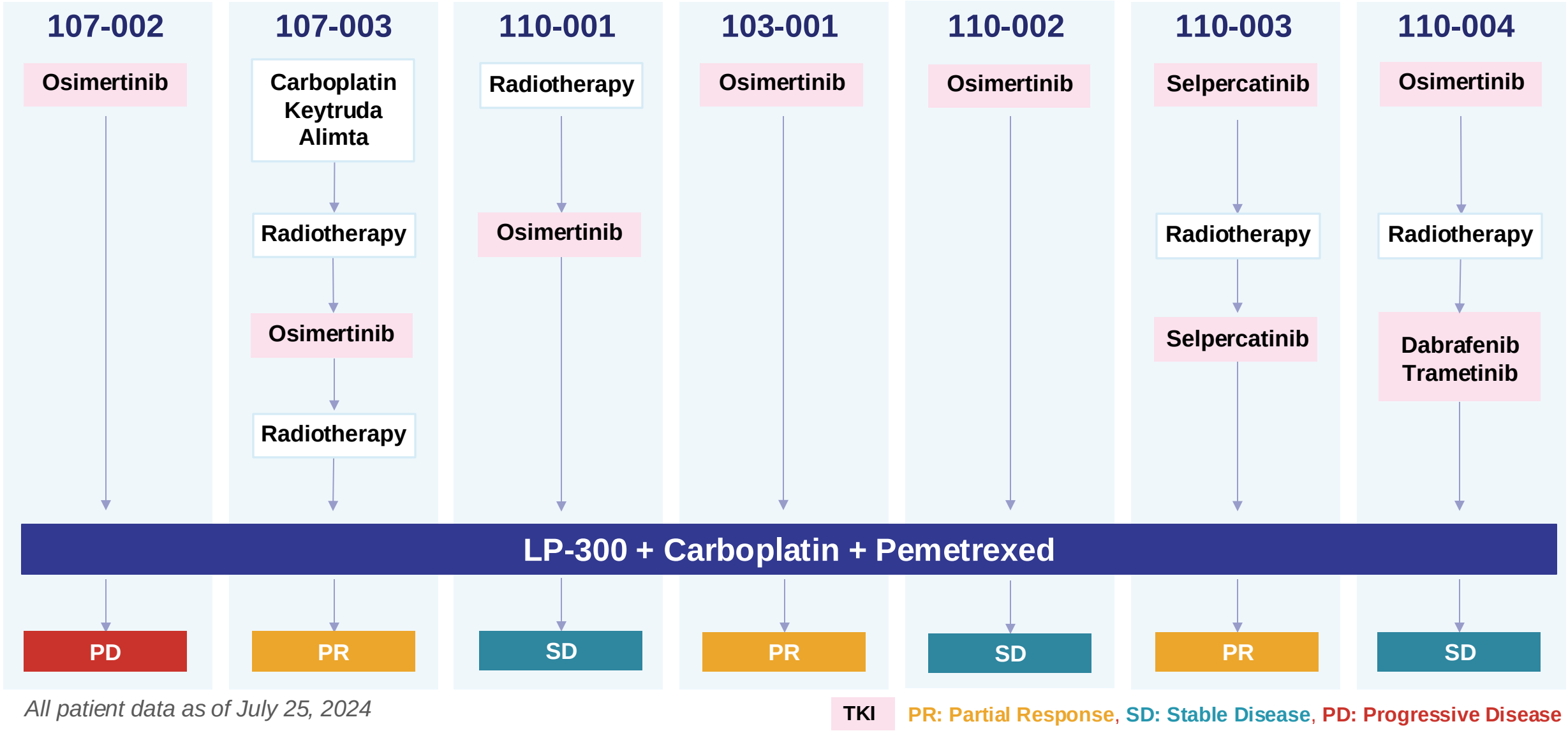
Patient Demographics And Tumor Response Evaluation

SUBJECT	Known mutations / biomarkers of interest	Overall Response	Target lesion (TL) response	Non-Target lesion response	New lesions	TL1	TL2	TL3	TL4	TL5	Time of Scan
107-002	✓ **EGFR** ✓ MSI high not detected	PD	**NA (Clinical Progression)**								9 wks
107-003	✓ **EGFR** L858R, ✓ MSI Stable ✓ **TMB 3.4/Mb (Low)**	PR	-53%	NE	No	-8% (lung)	-100% (adrenal)	NA	NA	NA	9 wks
		PR	-57%	NE	No	-17%	-100%	NA	NA	NA	52 wks
110-001	✓ **EGFR** L858R ✓ **MSI high not detected**	SD	+4%		No	+4% (paraspin)	NA	NA	NA	NA	9 wks
103-001	✓ **EGFR** (GOF) ✓ **TMB 7.9/Mb (intermediate)** ✓ PD-L1 (IHC) 30% TPS	PR	-46%	NE	No	-32% (lung)	-56%* (lymph node)	-63%* (lymph node)	NA	NA	9 wks
110-002	✓ **EGFR** (GOF) ✓ MSI stable ✓ **TMB 6.3/Mb (intermediate)**	SD	-20%		No	-8% (lymph node)	-40% (lymph node)	NA	NA	NA	9 wks
110-003	✓ TLE1-**RET** rearrangement ✓ 30-40% PD-L1 ✓ **TMB 4.3/Mb (low)**	PR	-51%	PR	No	-28% (pleura)	-56% (pleura)	-79% (lung)	-56% (liver)	NA	9 wks
110-004	✓ BRCA2, **EGFR**, BRAF ✓ 0% PD-L1	SD	-18%		No	-40% (panc.)	+23% (lung)	NA	NA	NA	9 wks

PR: Partial Response, **SD: Stable Disease**, **PD: Progressive Disease**, TL: Target Lesion

*** Lymph nodes that reduced in size to < 10mm (normal)**

Initial Cohort for Phase 2 – Prior cancer treatments / history & response



All patient data as of July 25, 2024

TKI

PR: Partial Response, SD: Stable Disease, PD: Progressive Disease

Initial Observations From Phase 2 Safety Lead-In Cohort

- **7** patients enrolled, dosed and evaluated in lead-in phase of study, which is completed
- **6 out of 7** patients have had clinical benefit
- **3** are partial responses with an average tumor size reduction of **~51%**
- **3** are stable disease and have resulted in **~13%** tumor size reduction
- We have an overall clinical benefit rate of **86**% and an ORR of **43**% from this initial cohort
- **0** DLTs and **0** SAEs in excess of SOC (standard-of-care) chemotherapy doublet have been observed

1. *This preliminary benchmark is showing a trend of improved outcomes over current standard of care therapies post TKI failure for NSCLC patients (if these initial observations carry over to the broader study).*
2. *We are considering applying for FDA Breakthrough Therapy designation if the clinical data trends remain as we advance enrollment.*
3. *A key ongoing consideration is measuring for durability of response that is being observed in the patients with clinical benefit.*
4. *We have also observed that responses among patients have been correlated with TMB (tumor mutation burden) levels that are measured as either low or intermediate and not high TMB. High TMB is usually associated with response to immunotherapies and checkpoint inhibitors.*
5. *The percentage of never-smokers with NSCLC is growing and there is a significant need for new treatments for this patient population.*

Never Smokers Do Not Respond Well to Immunotherapy

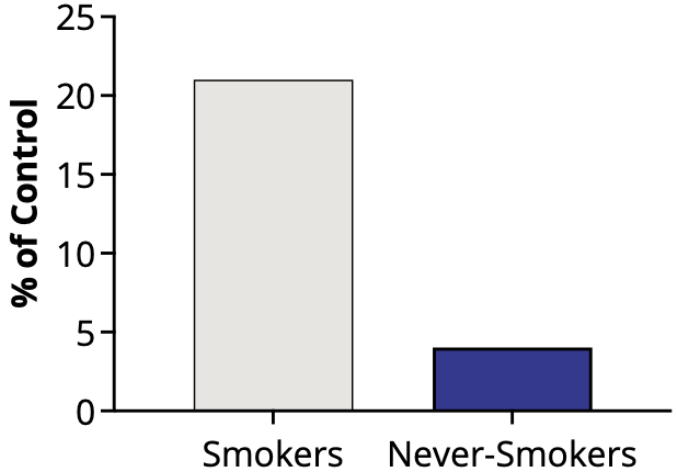
- Relative to smokers with NSCLC, never smokers are **less likely to have high expression of PD-L1**, a key biomarker for immunotherapies; they are therefore much less likely to be eligible for or respond to such therapy.

- Meta-analysis of 1,981 NSCLC patients spanning three Phase III trials: "…PD-1 inhibitors were more efficacious in smoking NSCLC patients compared with chemotherapy. **No better survival of nonsmoking patients was observed in the treatment of PD-1 inhibitors than chemotherapy**." (Li et. al. 2018)

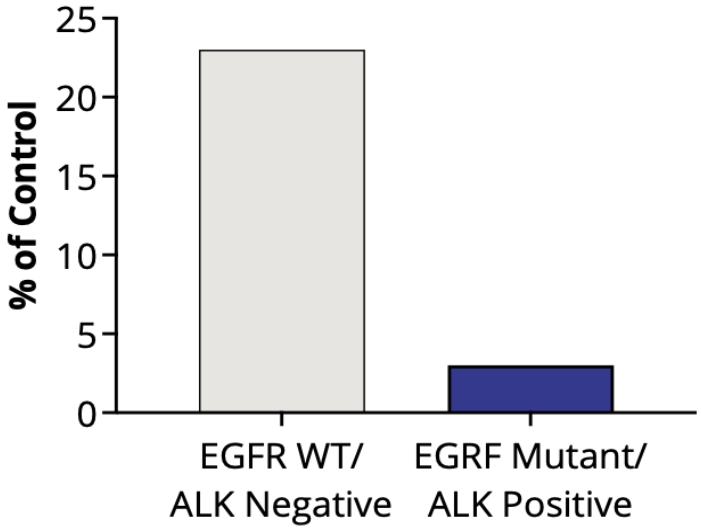
- Retrospective analysis of 58 NSCLC patients treated with immune checkpoint inhibitors: Low overall response rates to **PD-1/PD-L1 inhibitors in never smokers and those harboring common never smoker mutations (EGFR, ALK).** (Gainor et. al. 2018)

Li et. al., (2018), *Onco Targets Ther.*, 11: 3691 - 3696
Gainor et al., (2016), *Clinical Cancer Research*, *22*(18): 4585–4593

PD-1 Inhibitor Response by Smoking Status



PD-1 Inhibitor Response by Mutation Status



Key Highlights of LP-300

LP-300 is being investigated in a Phase 2 clinical trial, Harmonic™ in never smokers with NSCLC

…modulates receptor tyrosine kinases, DNA damage repair enzymes, and cellular redox processes

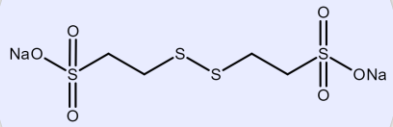
…possesses chemo-sensitizing properties and can reset cancer cell sensitivity

Never smokers with lung adenocarcinoma have a higher rate of TKI driver mutations in EGFR and ALK

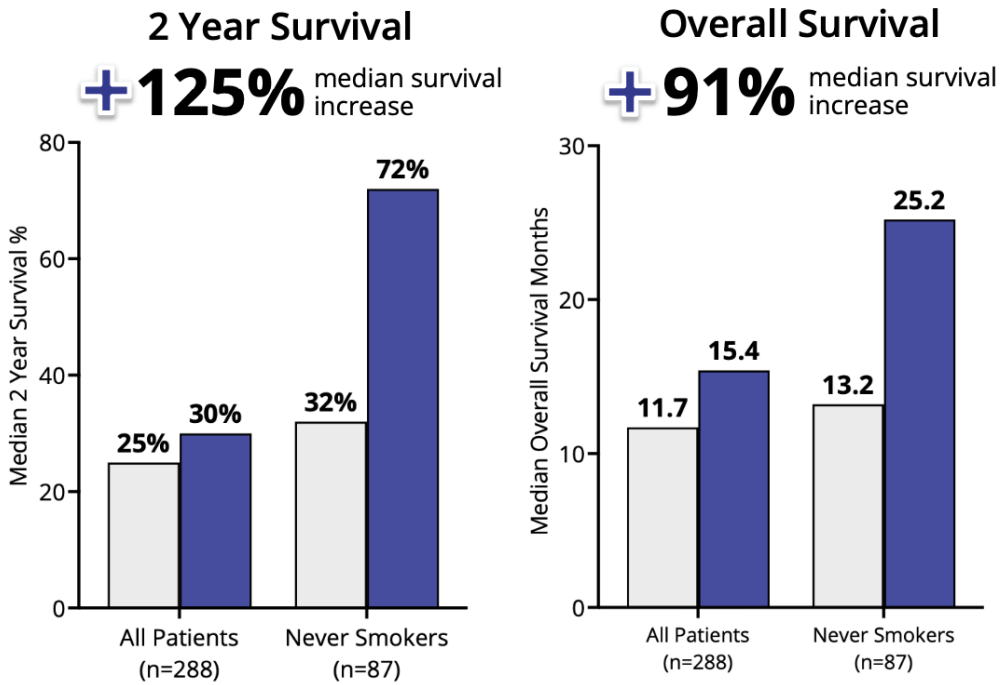
…dosed in 5 Phase 1 and 5 Phase 2 and 3 trials and was well tolerated in over 1,000 people

…showed statistical survival increase in never smoker NSCLC patients in retrospective subgroup analysis

LP-300



LP-300 + Chemo doublet showed increased survival rates over chemo doublet alone in never smoking patient subgroups with NSCLC



Survival rates of never smoking patients with NSCLC receiving **Chemo** or **LP-300 + Chemo** as a retrospective subgroup analysis

Appendix: Comparative & Benchmarking Data For NSCLC Patients Treated With Chemo Doublet

(Pemetrexed and Carboplatin Treatment)

Historical Response Data For Pemetrexed + Carboplatin in NSCLC Patients post TKI treatment

STUDY ID (Sponsor)	median ORR (%) (**Carboplatin + Pemetrexed**)	median DOR (months) (**Carboplatin + Pemetrexed**)	median PFS (months) (**Carboplatin + Pemetrexed**)	Hazard Ratio (HR for PFS) (**Carboplatin + Pemetrexed**)
MARIPOSA-2 Study + *bispecific Ab +/- TKI (amivantamab/lazertinib)* -- *Janssen (J&J)*	36	5.6	4.2	0.48 (0.53, for patients with no history of smoking)
KEYNOTE-789 Study (+/- Pembro) -- Merck	27.1	5.6	5.5	0.8 (95% CI: 0.65-0.97)
CheckMate -722 Study (+/- Nivolumab)	26.7	5.6	5.4 4.4 – In patients w/ PD-L1<50%	0.75 (95% CI: 0.54-0.97) 0.88
HERTHENA-Lung +/- ADC (patritumab deruxtecan)	29.8	6.4	5.5	NA

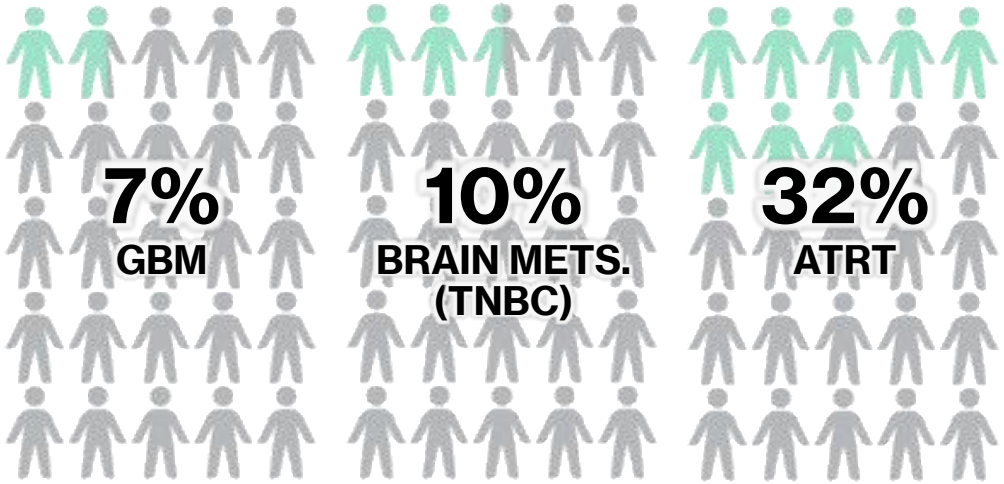
ORR = objective response rate; DOR = duration of response; PFS = progression free survival; HR = hazard ratio; CI = confidence interval

Born from billions of datapoints & AI, Starlight has blockbuster potential to provide new treatment options for 500,000+ patients

There are over **120 types of central nervous system (CNS) and brain cancers** and a majority have **no effective treatment options**

- No effective single-agent therapies have been approved for adult glioblastoma (GBM) in over 18 years
- Effective therapies are needed to improve outcomes for brain metastases patients
- There are no approved therapies for atypical teratoid rhabdoid tumors (ATRT)

5 Year Survival Rates of CNS And Brain Cancers Remain Low Despite Advances in Cancer Therapies



- **500,000+ Potential CNS Patients** Globally*
- **Multiple Clinical-stage** CNS Cancer Indications
- STAR-001 has been Granted **FDA Orphan Drug Designation for GBM & ATRT and Rare Pediatric Disease Designation for ATRT**
- **World Class Collaborators** from Johns Hopkins, UT Health San Antonio, and Children's Brain Tumor Network
- **4** US Patents & Patent Applications and **10+** Foreign Pending Patent Applications

Estimated Annual Global Numbers

Lantern pharma 2024 webinar series – *Webinar Wednesdays* – featuring world-class collaborators and researchers





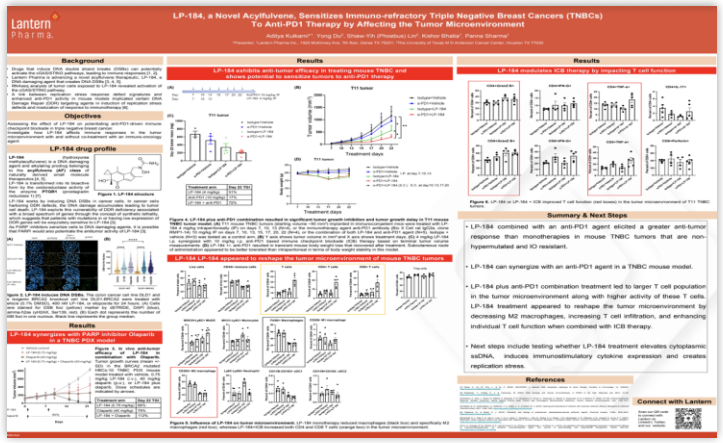
Future Webinar Wednesdays

AUG 28th **Harmonic Phase 2 Clinical Trial for Never Smokers with NSCLC** – Preliminary patient data and clinical readouts

SEP 25th **Power of AI in Drug Development** – Predicting Blood Brain Barrier Permeability with RADR

OCT 30th **LP-184 in Synergy with Immune Checkpoint Inhibitors**

Publications highlighting the clinical value of RADR® insights & de-risking the development of Lantern's drug candidates



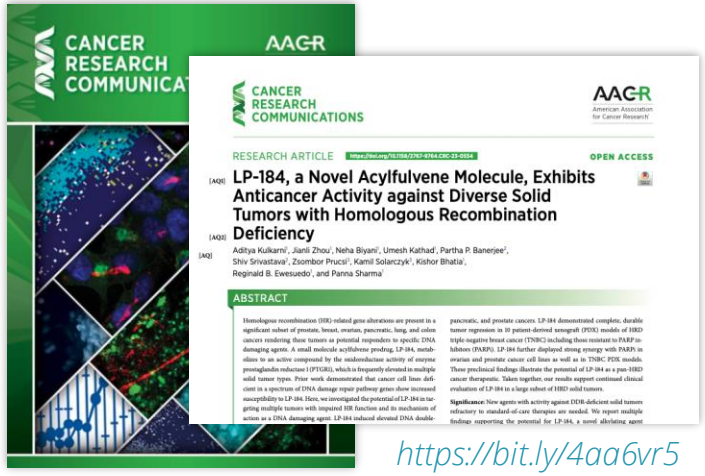
https://bit.ly/3v115QT

POSTER | IMMUNO-ONCOLOGY SUMMIT 2024

LP-184, a Novel Acylfulvene, Sensitizes Immuno-Refractory Triple Negative Breast Cancers (TNBCs) To Anti-PD1 Therapy by Affecting the Tumor Microenvironment

August 2024

Immuno-Oncology SUMMIT 2024
AUGUST 7-9, 2024 | PHILADELPHIA, PA + VIRTUAL



https://bit.ly/4aa6vr5

PUBLICATION | CANCER RESEARCH COMMUNICATIONS

LP-184, a novel acylfulvene molecule, exhibits anticancer activity against diverse solid tumors with homologous recombination deficiency

May 2024

AACR American Association for Cancer Research

2024 Objectives

A Breakthrough Year for Lantern

TOP TEN

- Complete Phase 1a clinical trial for LP-184; commence Phase 1b and investigator led trial(s)
- Accelerate enrollment in first-in-human clinical trial for LP-284 in NHL + other cancers
- Commence enrollment of **The Harmonic™ Trial** in targeted sites in Asia
- Progress Starlight Therapeutics towards Phase 1 / 2 adult & pediatric clinical trials
- Expand RADR® AI platform to 100+ billion datapoints and develop additional collaborations
- Further ADC preclinical and IND development to support future Phase 1 launch and/or partnership
- Explore licensing and partnership opportunities with biopharma companies
- Develop combination programs for LP-184, LP-284, and LP-300 with existing approved drugs
- Grow and mature efficient internal clinical operations capabilities
- Continue disciplined fiscal management

Lantern Pharma®

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