Third Quarter 2024
Operating & Financial Results Conference Call / Webinar

November 7th , 2024
4:30 PM Eastern Time

Lantern Pharma

NASDAQ :LTRN

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 able to secure sufficient future funding when needed and as required to advance and support existing and planned clinical trials and operations, (iv) the risk that we may not be successful in licensing potential candidates or in completing potential partnerships and collaborations, (v) 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, (vi) 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 (vii) 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.

Contents

Speakers

2024 3rd Quarter Highlights

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Lantern Pharma

NASDAQ: LTRN

- ✓ Lantern is advancing **three AI-guided precision-oncology drug candidates** in **active Phase 1 and Phase 2 clinical trials,** while evaluating additional ADC-based preclinical molecules for development.
- ✓ Preliminary patient data and clinical readouts for the **Phase 2 LP-300 Harmonic™ Trial** showed an **86% clinical benefit rate** in the initial 7 patient lead-in cohort, and additional patients continue to be enrolled in the US.
- ✓ **The Harmonic™ Trial** has been expanded to both **Japan and Taiwan** with an expected 10 sites in East Asia; 5 in each country where the population of never-smokers is 33 to 35 percent of new cases in NSCLC.

2024 3rd Quarter Highlights

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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 50 patients dosed to-date across both trials*.
- ✓ LP-184, which will be developed as STAR-001 for CNS and other neuro-oncology indications, received **Fast Track Designation in Glioblastoma (GBM)** from the FDA.
- ✓ Patients with **recurrent GBM** have been enrolled in the **LP-184 Phase 1a trial** at 2 academic centers, including Johns Hopkins, and 1 community site; the data will help guide later stage clinical development planned to be sponsored by **Starlight Therapeutics** during early 2025.

* *As of September 30, 2024*

2024 3rd Quarter Highlights

3 of 3

Lantern Pharma

NASDAQ: LTRN

- ✓ **Biomarker analysis for PTGR1 expression** using qPCR for the first 7 cohorts of patients enrolled in the **Phase 1a LP-184 clinical trial** has begun, and will help guide the advancement of **PTGR1** as a key RNA biomarker that can guide patient response prediction.
- ✓ **Three U.S. FDA Rare Pediatric Disease Designations** were granted to **LP-184** in three ultra rare children's cancers.
- ✓ **Three scientific publications** in Q3 including: a peer-reviewed paper regarding the **unique AI-powered module for ADC development** as part of the RADR® platform; and findings presented at conferences regarding the ongoing development of the synthetically-lethal drug candidates at the **Immuno-Oncology Summit for LP-184 and The Society of Hematologic Oncology for LP-284.**
- ✓ Approximately **$28.1 million** in cash, cash equivalents, and marketable securities as of September 30, 2024.

Financial Updates Q3 2024

Summary Results of Operations

	Three Months Ended September 30, (unaudited) 2024	2023
Operating expenses:		
General and administrative	$ 1,462,930	$ 1,313,727
Research and development	3,716,646	2,209,894
Total operating expenses	5,179,576	3,523,621
Loss from operations	(5,179,576)	(3,523,621)
Interest + Other income, net	673,879	362,171
NET LOSS	**$** (4,505,697)	**$** (3,161,450)
Net loss per common share, basic and diluted	$ (0.42)	$ (0.29)
Weighted Avg. Common Shares Outstanding - Basic and Diluted	10,763,351	10,857,366

Balance Sheet Highlights & Summary

	09/30/2024 (unaudited)	12/31/2023
Cash, Cash Equivalents & Marketable Securities	$ 28,053,765	$ 41,302,672
Prepaid Expenses & Other Current Assets	1,867,195	2,038,653
Total Assets	30,293,264	43,647,616
Total Liabilities	3,695,043	2,739,682
Total Stockholders' Equity	$ 26,598,221	$ 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."

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

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

Lead Candidate	Indication	Discovery	Preclinical	Phase I	Phase II	Orphan Designation	Rare Pediatric Disease
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						

Synthetic lethal drug candidates, LP-184 & LP-284, continue to advance with no dose-limiting toxicities observed in any of the patient cohorts

First-In-Human Trial for **LP-184**

Clinicaltrials.gov (NCT05933265)

Phase 1a

Solid Tumors / Brain & CNS Cancers

40-50

Patients expected to be enrolled

$14+ Bn

Annual US market potential in DDR deficient solid tumors

Multi-Site

- Trial launched and multiple US sites activated, including Fox Chase Cancer Center
- **Cohort 9* dosed with no dose-limiting toxicity observed**
- Patients with recurrent GBM have been enrolled at 2 academic centers, including Johns Hopkins, and 1 community site

First-In-Human Trial for **LP-284**

Clinicaltrials.gov (NCT06132503)

Phase 1a

Non-Hodgkin's Lymphomas

30-35

Patients expected to be enrolled

$4.0Bn

Estimated global annual market potential in NHL

Multi-Site

- Trial launched and multiple sites activated in the US
- **Cohort 4* dosed with no dose-limiting toxicity observed**

**As of September 30, 2024*

Eleven FDA designations demonstrate our data-driven, AI-enabled approach to transformative drug development & strengthen our commercial value

FDA

Designation	Candidate	Indication	Date
Fast Track Designation	LP-184	Glioblastoma	Sep. 2024
Orphan Drug Designation	LP-184	Pancreatic Cancer	Aug. 2021
	LP-184	Glioblastoma	Aug. 2021
	LP-184	Malignant Glioma	Aug. 2021
	LP-184	ATRT	Jan. 2022
	LP-284	Mantle Cell Lymphoma	Jan. 2023
	LP-284	High Grade B-Cell Lymphoma	Nov. 2023
Rare Pediatric Disease Designation	LP-184	ATRT	Jan. 2022
	LP-184	Malignant Rhabdoid Tumors	Sep. 2024
	LP-184	Rhabdomyosarcoma	Sep. 2024
	LP-184	Hepatoblastoma	Sep. 2024

The Harmonic™ Phase 2 trial for LP-300

Accelerating recruitment efforts for a growing indication with limited treatment options

harmonic

NCT05456256

Global Phase 2

Non-Small Cell Lung Cancer

Never Smokers

90 Patients

Two arm, Open-label, Randomized Trial

Multi-Site in US & Asia

Trial Design

60 Patients will receive LP-300 with pemetrexed and carboplatin*

**after progressing from TKI*

30 Patients will receive standard of care (*pemetrexed and carboplatin*)

Primary Outcomes: Overall and progression free survival

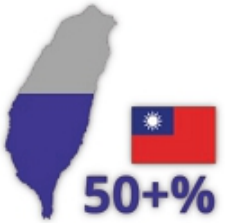
Trial Updates

- Preliminary patient data and clinical readouts released showing an **86% clinical benefit rate** in the initial 7 patient safety lead-in cohort
- Initial patients dosed in first half of 2023
- Multiple additional patients and sites across the US anticipated to be enrolled during Q4 2024

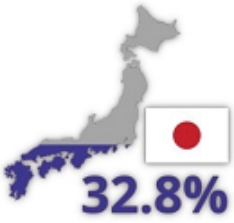
Expanding the phase 2 clinical trial to east Asia: boosting patient enrollment in countries with high incidences of NSCLC in never smokers

2 in 5 of all lung cancer patients in East Asia are **never smokers***

*Approximately



50+%



32.8%

% of **never smokers** among lung cancer patients in Taiwan and Japan

Lung cancer in East Asian never-smokers is a **distinct subtype** that can be largely defined by targetable mutations

(Zhou & Zhou, 2018)

Highlights

- Study expansion to Taiwan and Japan with 5 sites in each country
- All 10 sites to be activated** in Q4 2024

Key Opinion Leaders

Dr. Yasushi Goto
National Cancer Center Hospital

Dr. Chun-Hui Lee
National Cheng Kung University Hospital

Q2-Q3 2024	Regulatory and Site Submissions
Q4 2024**	Site Activation and First Patient Dosed

**anticipated

Advancing the development of enhanced durability and efficacy of responses with LP-184: identifying the best combination agents

- **Combination therapies** can further expand clinical opportunities and increase the therapeutic window of success
- Understanding how best to leverage Mechanism of Action and gene dependencies of drugs to allow identification of optimal combinatorial agents
- Understanding indication, overlapping toxicities and how to administer the combinations is necessary to designing clinical trials

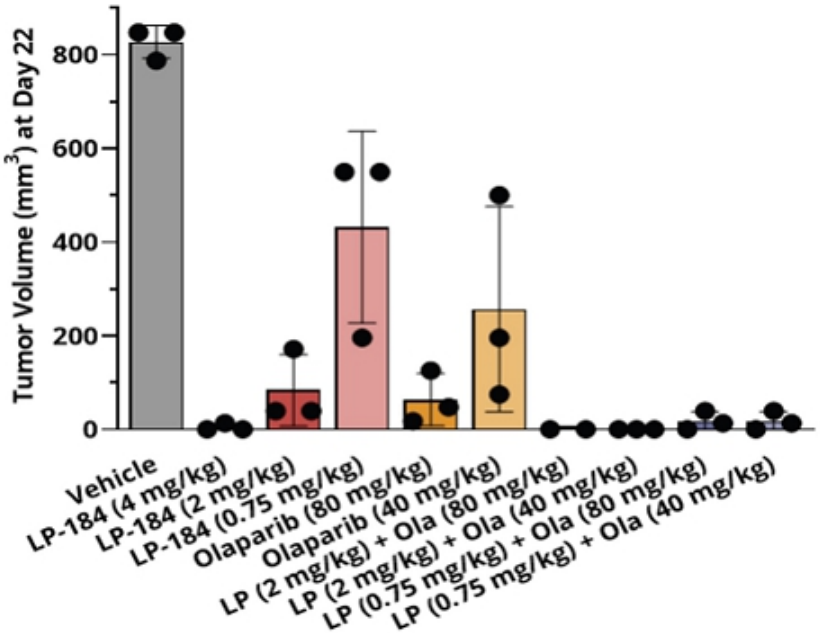
Collaborators

PARPi Combinations	Dr. Shailja Pathania (UMass Boston) Dr. Daohong Zhou (UT Health San Antonio)
Spironolactone Combinations	Dr. John Laterra and Dr. Eric Rabbe (Johns Hopkins Medicine)
Immunotherapy Combinations	Dr. Shiaw-Yih Lin (The University of Texas MD Anderson Cancer Center, Making Cancer History®)

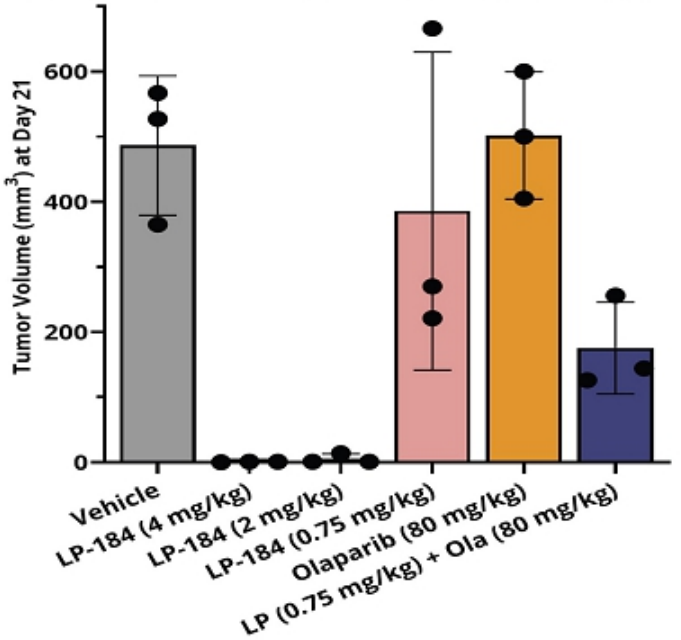
LP-184 and olaparib combination achieves 3 to 14-fold greater tumor regression compared to olaparib alone in TNBC PDX models

Efficacious tumor regression is achieved using 5x lower doses of LP-184 in combination as compared to doses used as monotherapy

Tumor Volume in HBCx-10 PARPi sensitive TNBC PDX Model Treated with LP-184 (days 1, 8), Olaparib (daily), or Combination



Tumor Volume in HBCx-28 PARPi resistant TNBC PDX Model Treated with LP-184 (days 1, 4, 8, 11), Olaparib (daily), or Combination



Kulkarni, A. et al., Cancer Research Communications, 2024

LP-184 can combat PARPi resistance

Resistance mechanisms	Cause of resistance	Clinical evidence
(i) Increased drug efflux	- Upregulation of ABC transporters	- No evidence
(ii) Decreased PARP trapping	- Loss or decreased trapping of PARP1 - Loss of PARG	- Trapping-diminishing PARP1 mutation in PARPi-resistant tumour - No evidence
(iii) Restoration of HR	- Reactivation of *BRCA1/2* - Loss of 53BP1 - Loss of Shieldin factors - Loss of CTC/Polα - Loss of DYNLL1/ATMIN	- Mutations in patients and PDXs - Low expression and mutations in PDXs - Low expression and mutations in PDXs - No evidence - No evidence
(iv) Stabilization of stalled forks	- Loss of PTIP - Loss of EZH2	- No evidence - No evidence

LP-184 is not a substrate of major ABC transporters

A BRCA2 reversion mutant xenograft model responded to LP-184

Loss of 53BP1-Shieldin confers sensitivity to LP-184

Trends in Cell Biology

https://www.sciencedirect.com/science/article/pii/S0962892419301242

Key Insights

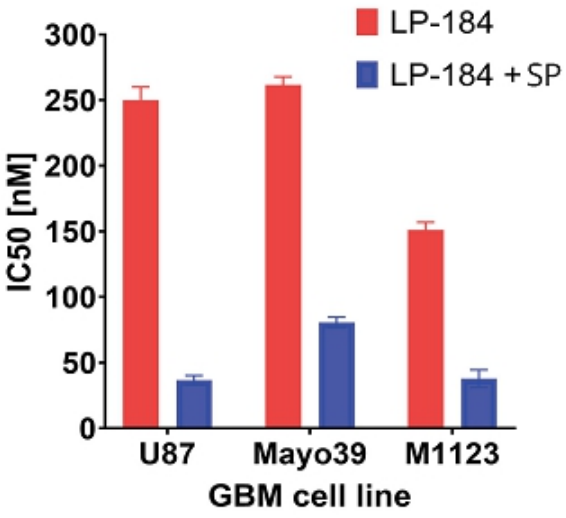
- Inactivation of SLFN11 is a predictive biomarker for PARPi resistance and resistance to several DNA damaging agents such as cisplatin.
- SLFN11 expression or inactivation does not impact LP-184 sensitivity

Combination of spironolactone and LP-184 enhances anti-tumor efficacy in glioblastoma *in vitro*

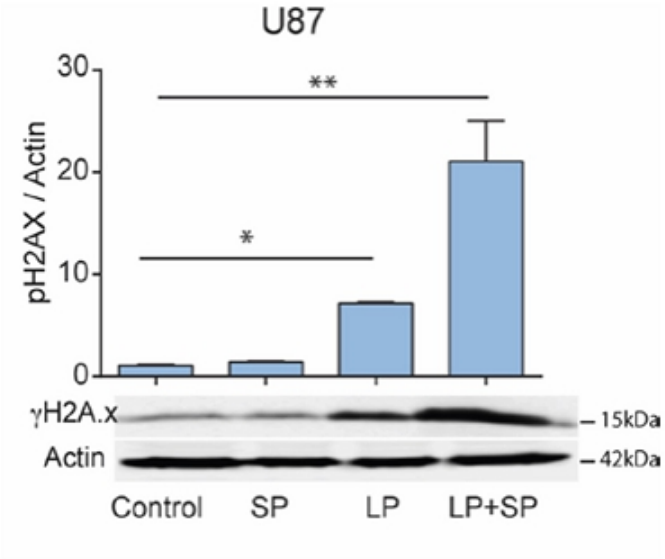
JOHNS HOPKINS MEDICINE

Treatment of GBM cells with Spironolactone 24h before LP-184 led to....

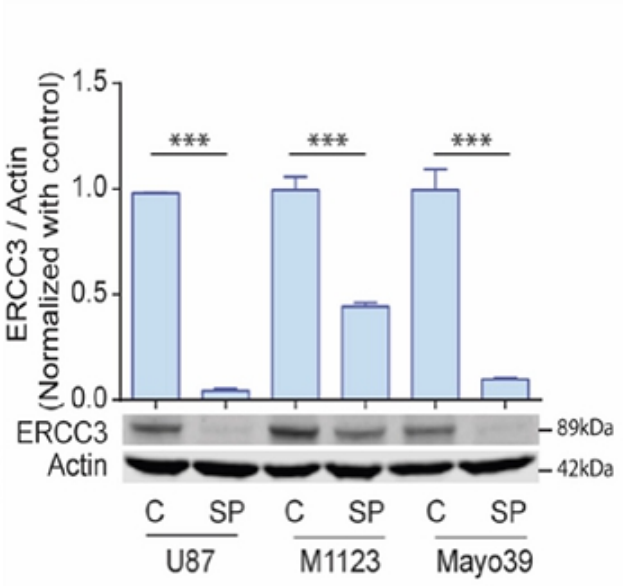
A 3-6x increase in LP-184 sensitivity



B 3x increase in γH2AX DNA damage response to LP-184



C Depletion of ERCC3 protein by up to 95%



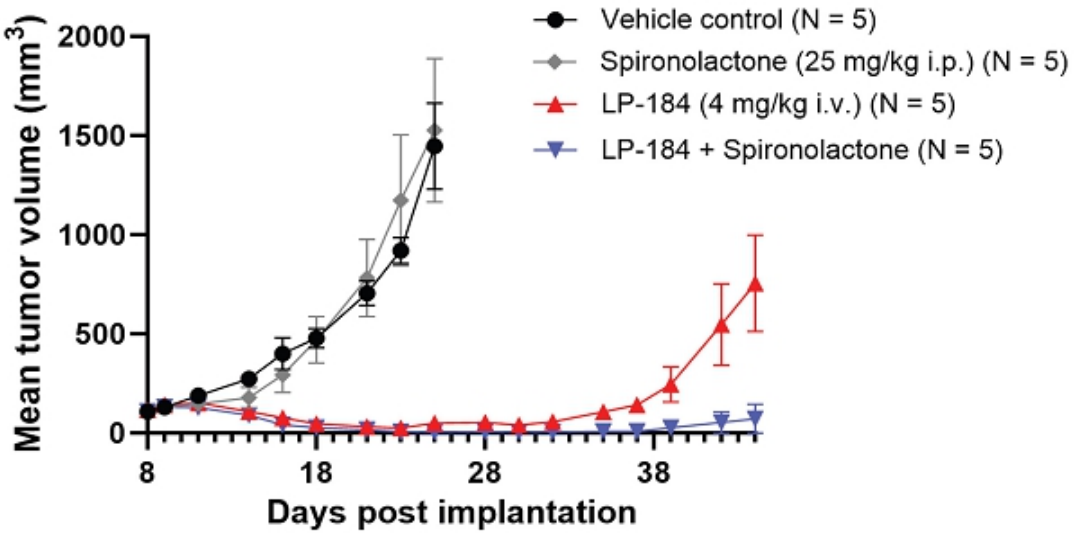
In collaboration with Dr. John Laterra

Lal B et al., *Clinical Cancer Research*, 2023

Combination of spironolactone and LP-184 enhances anti-tumor efficacy in glioblastoma *in vivo*

JOHNS HOPKINS MEDICINE

Complete tumor regression with prolonged duration of response



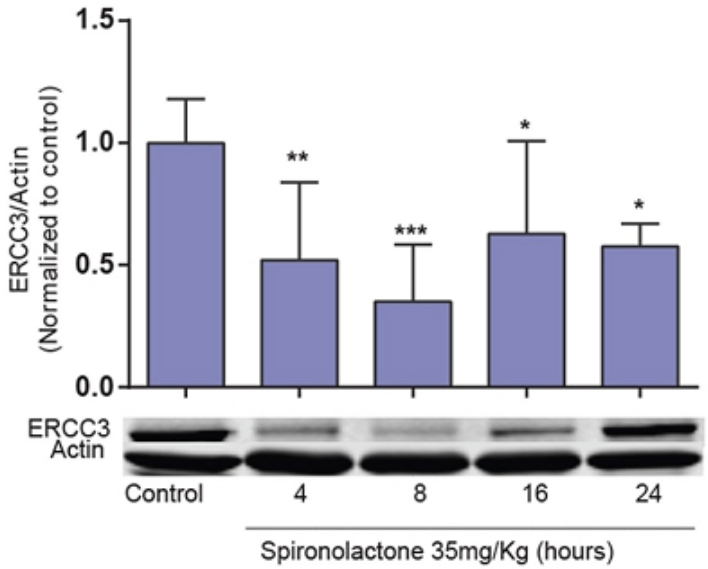
LP-184 dosing days 9, 11, 14, 16;
SP dosing days 8, 9, 10, 11, 14, 15, 16, 17, 18.

- Spironolactone monotherapy had no effect on tumor growth compared with vehicle-treated controls in U87 subcutaneous xenografts
- Spironolactone treatment lead to depletion of ERCC3 protein and up to 6 fold increased sensitivity to LP-184 treatment
- LP-184 alone and combined with Spironolactone induced complete or near complete tumor regression
- Combining Spironolactone with LP-184 generated more durable responses with no tumor recurrence in 4 out of 5 animals

In collaboration with Dr. John Laterra
Lal B et al., *Clinical Cancer Research*, 2023

Clinical practices for administering spironolactone with LP-184 in GBM trials: timing insights for optimal efficacy

Western blot shows kinetics of ERCC3 degradation and recovery reaching a maximum of 70% protein level depletion at 8 hours post administration



Mayo39 subcutaneous GBM bearing mice were administered SP (35mg/KG), ip, single injection.
Tissue samples were collected at 4, 8, 16 & 24 hours post injection.

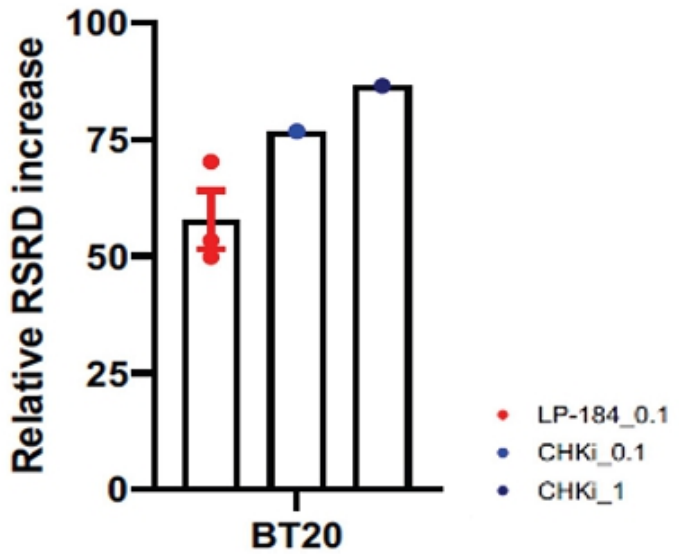
- To optimize the administration of Spironolactone in combination with LP-184 for glioblastoma trials, the most practical and effective dosing schedule involves administering Spironolactone both the day before and the day of LP-184 administration
- This timing aligns with the data indicating that the expression of ERCC3 reaches its lowest point approximately 8 hours after Spironolactone administration in both **subcutaneous** and **orthotopic GBM Models**, supporting its effectiveness when given at this interval

In collaboration with Dr. John Laterra
Lal B et al., *Clinical Cancer Research*, 2023

LP-184 induces replication stress response defect similar to cell cycle checkpoint inhibitors in TNBC Cells

THE UNIVERSITY OF TEXAS MD Anderson Cancer Center
Making Cancer History®

Cell Cycle Analysis of BT20 TNBC Cells Treated with LP-184 and CHKi Prexasertib



BT20 TNBC cells were treated with LP-184 (0.1 uM) or CHKi Prexasertib (0.1 uM and 1 uM) for 24h. Cells were fixed, stained with the DNA-binding dye propidium iodide, and analyzed by flow cytometry to determine the distribution across cell cycle phases. Percentage of cells remaining in S-phase arrest due to unresolved replication intermediates were compared across treatment conditions.

1. Induction of replication stress response defects (RSRD) has been shown to enhance sensitivity to anti-PD-1 therapies
2. LP-184 exhibits key features that support the induction of RSRD
3. RPA exhaustion has been suggested by collaborative studies as a factor resulting in PARPi synergy
4. Accumulation of cytosolic DNA has been detected in LP-184 treated cells during quantitative measurements of double-strand breaks (DSBs)
5. However it remains unclear whether LP-184 also triggers aberrant firing at the origin of replication

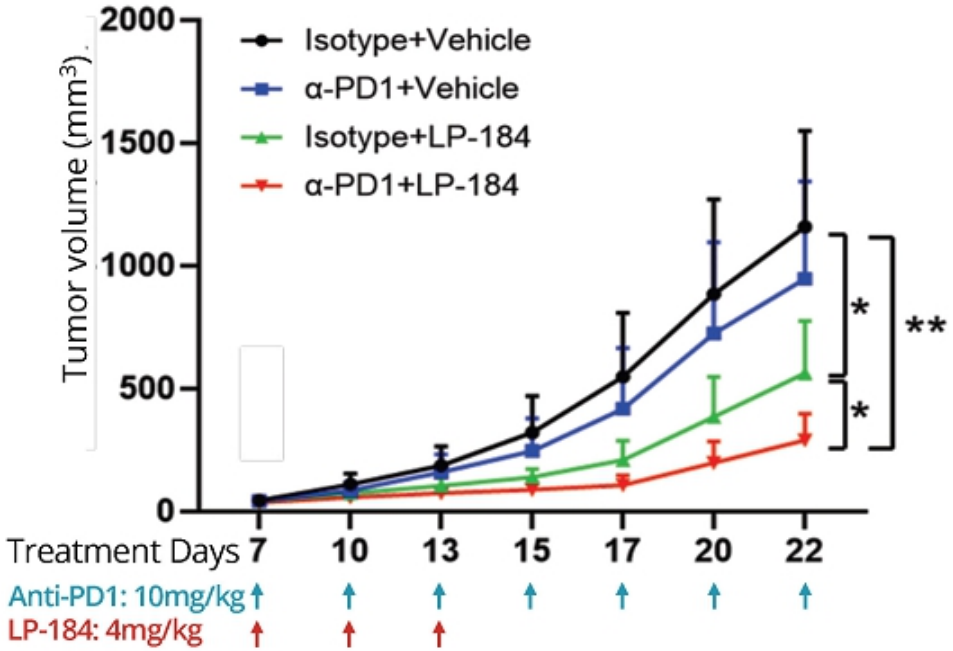
In collaboration with Dr. Shiaw-Yih Lin, MD Anderson Cancer Center

LP-184 demonstrates anti-tumor efficacy in mouse TNBC models and potential to sensitize tumors non-responsive to anti-PD1 therapy

THE UNIVERSITY OF TEXAS MD Anderson Cancer Center
Making Cancer History®

T11 mouse TNBC tumors treated with LP-184 and anti-PD1 antibody

(A)



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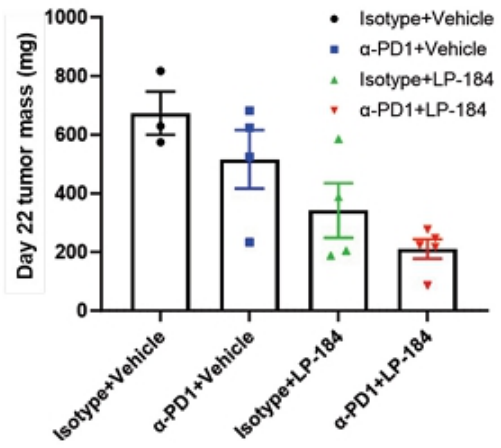

Treatment arm	Day 22 TGI
▲ Anti-PD1 (10mg/kg)	17%
■ LP-184 (4mg/kg)	51%
▼ **LP-184 + anti-PD1**	**72%**

In collaboration with Dr. Shiaw-Yih Lin, MD Anderson Cancer Center

LP-184 reshaped the tumor microenvironment by decreasing M2 macrophages (Pro-Antitumor profile) and increased T cell infiltration and T cell function when combined with ICB therapy

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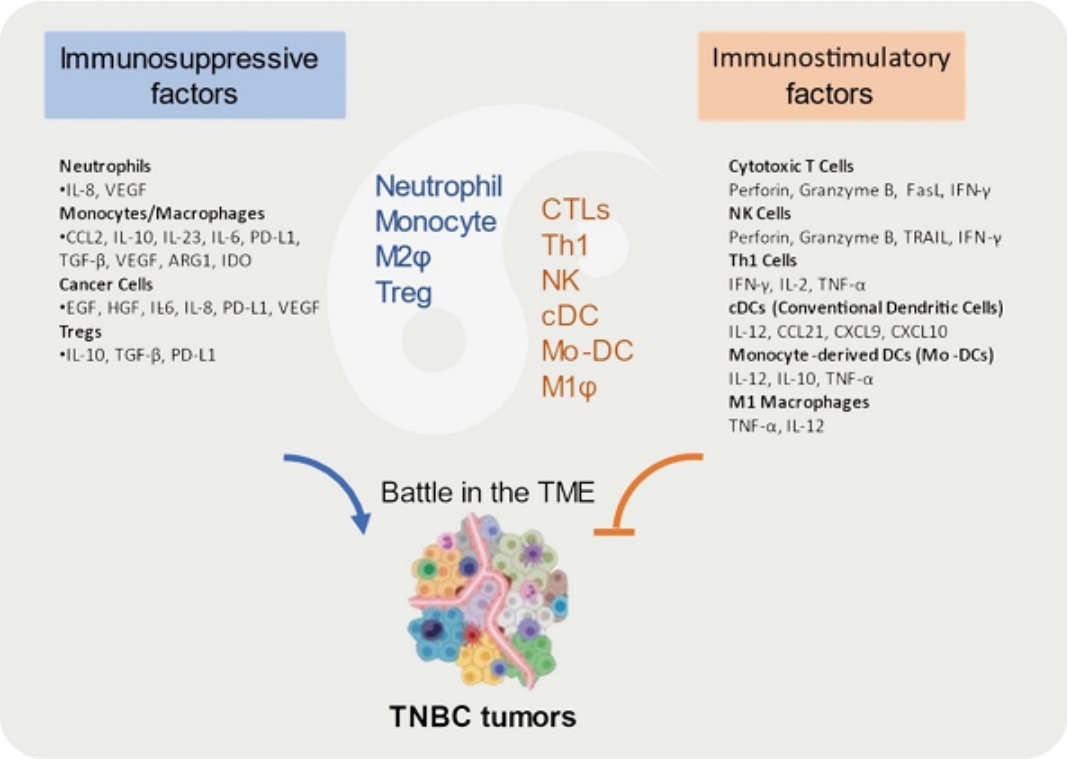
Model of cold and hot tumor microenvironment of mouse TNBC tumors



Relative to vehicle treatment:

- LP-184 decreased M2 macrophages by **50%**
- LP-184 increased T cell infiltration by **3 fold**
- LP-184 enhanced expression of TNFa/ Perforin/ Granzyme by **1.5 fold**

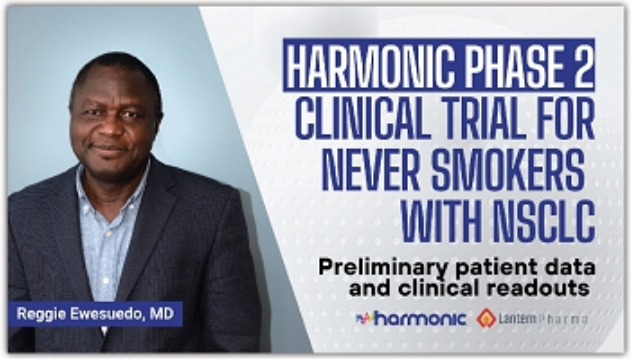
In collaboration with Dr. Shiaw-Yih Lin, MD Anderson Cancer Center

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

July Webinar Wednesday

Starlight Therapeutics – Born from AI, Lighting the Way in CNS Cancer Treatment

August Webinar Wednesday



Harmonic Phase 2 Clinical Trial for Never Smokers with NSCLC – Preliminary Patient Data and Clinical Readouts

September Webinar Wednesday

Childhood Cancer Awareness Month Webinar - LP-184 with Three additional RPDDs in rare children's cancers

Future Webinar Wednesdays

DEC 11th **Power of AI in Drug Development** – Predicting Blood Brain Barrier Permeability with RADR®

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


PLOS ONE

Expanding the repertoire of Antibody Drug Conjugate (ADC) targets with improved tumor selectivity and range of potent payloads through in-silico analysis

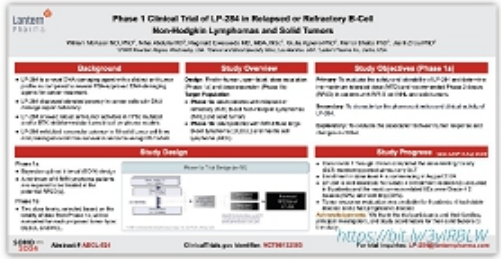
Abstract

https://bit.ly/4eeJo0D

PUBLICATION | PLOS ONE JOURNAL

Expanding the repertoire of Antibody Drug Conjugate (ADC) targets with improved tumor selectivity and range of potent payloads through in-silico analysis

PLOS ONE

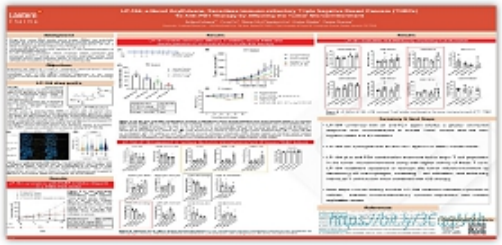

Phase 1 Clinical Trial of LP-284 in Relapsed or Refractory B-Cell Non-Hodgkin Lymphomas and Solid Tumors

https://bit.ly/3vIR8LW

POSTER | SOHO ANNUAL MEETING 2024

Phase 1 Clinical Trial of LP-284 in Relapsed or Refractory B-Cell Non-Hodgkin Lymphomas and Solid Tumors

SOHO ANNUAL MEETING


https://bit.ly/3E

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

Immuno-Oncology SUMMIT 2024

2024-25 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 planned Phase 1 / 2 adult & pediatric clinical trials
- Expand RADR® AI platform and develop additional monetizable collaborations
- Further ADC preclinical and IND development to support future Phase 1 launch / partnership opportunities
- Explore licensing and partnership opportunities with biopharma companies
- Develop combination programs for LP-184, LP-284, and LP-300 with existing approved drugs
- Continue efficient internal clinical operations capabilities
- Maintain disciplined fiscal management

Lantern Pharma®

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