Lantern Pharma®

Corporate Overview

August 9th , 2024

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 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.

Lantern's AI platform, RADR®, is transforming the **cost, pace, and timeline** of cancer drug discovery and development

12

Lead drug programs* powered by AI

5

Clinical stage lead drug candidates*

100+

Issued patents & pending applications

$33.3M**

Cash/cash eq./ marketable securities

2.5 years

Avg. time for new LTRN programs to Ph. 1 Trial

$1.75M

Avg. cost for new LTRN programs to Ph. 1 Trial

** Includes drug programs being developed in collaboration*

*** at 6/30/2024*

Only **6%***

of clinical trials using **traditional** drug discovery approaches succeed

**Clinical Development Success Rates and Contributing Factors 2011–2020, BIO Stats*

Current Challenges

Costly

Average cost to bring a new cancer drug to market is **$2.8 billion**

Risky

Out of 20,000 trials from 2012-2022, **19,200 trials failed**

Slow

Early-Stage development takes **3-5+ Years,** late-stage development takes **6-12+ Years**

Current oncology drug development is being improved by **data-driven**, and **AI-enabled approaches** and technology

Lantern is Transforming Drug Discovery Timelines & Costs with AI

AI insights and biomarkers can increase the odds of clinical trial success by **12X***

*(*Parker et al., 2021)*

RADR® can **predict and stratify real-world patients** for clinical trials with **88% accuracy**

Lantern can **compress the timeline** of early-stage drug development by **70%** and **reduce the cost** by **80%**

Lantern has launched **10 new programs in 2 years**, and has active ongoing ph.1 and ph.2 clinical trials

LANTERN'S DRUG DEVELOPMENT MODEL AND OBJECTIVES

Large Scale/Multi-omics Oncology Data → Proprietary AI platform RADR® → Accelerated timelines; reduced costs and risks

Lantern's AI-Driven Business Model has Multiple Routes Towards Success

RADR®

AI Platform

Areas of Focus	Successes to Date
1 Rescue & Reposition Drug Candidates	Based on previous clinical data and observations, **LP-300 was rescued for never smokers with NSCLC** and is in a Phase 2 trial
2 Discover & Develop New Molecules Including ADCs	**LP-284's unique mechanism of action** was predicted by RADR® and was **developed to Phase 1 trial** in 2 years
3 Accelerate & De-risk Trials with Biopharma Partners	Predicting patient response with greater than **88% accuracy**, Lantern is accelerating the development of Elraglusib

Targeted Clinical Trials

By Lantern and/or other biopharma partners

High-value Partnering & Licensing Opportunities

With biopharma and tech companies

Precision
Medicine
Platform

Response Algorithm for Drug Positioning & Rescue

A proprietary integrated data analytics, experimental biology, oncology-focused, machine-learning-based platform focused on drug development

60+ Billion

Data points from oncology focused real-world patient and clinical data and preclinical studies

80%+
Prediction Success

130K+
Patient Records

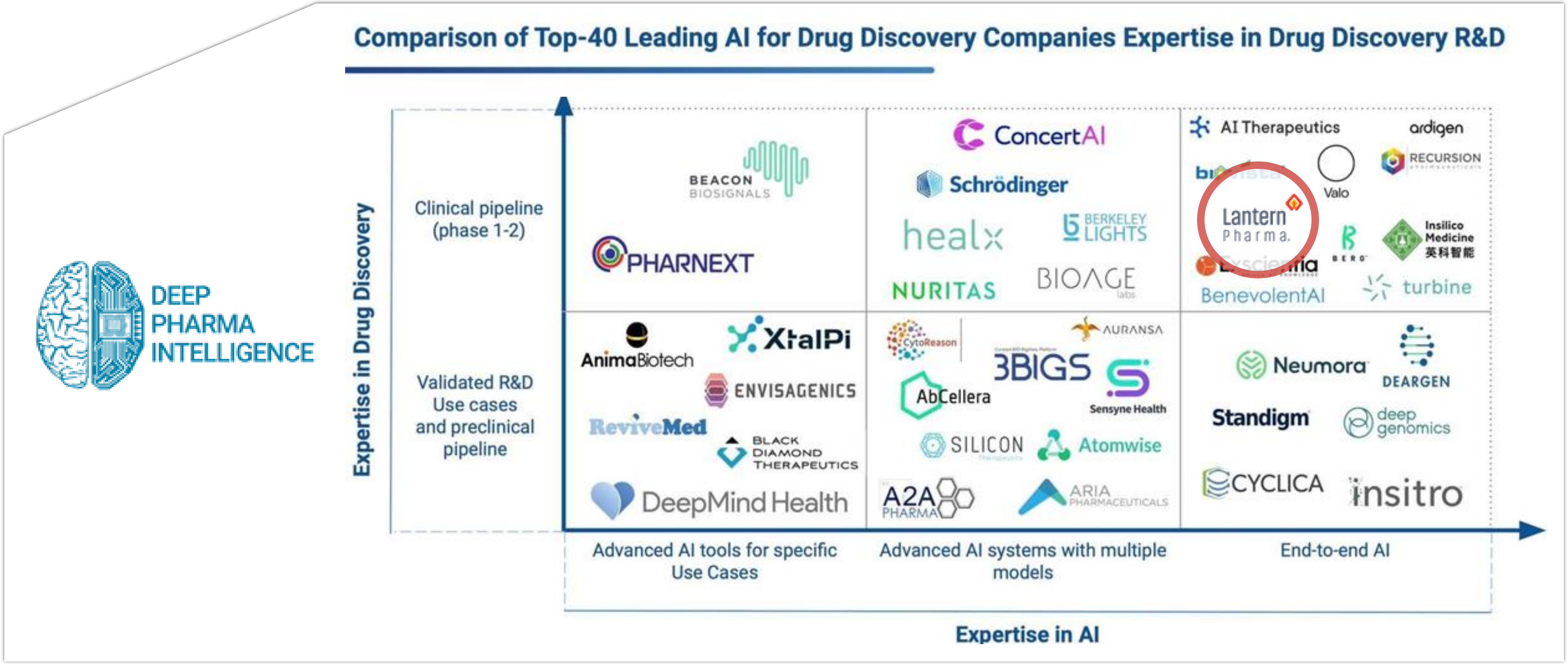
200+
Advanced ML Algorithms

8,163+
Data Sets

AI-Powered RADR® Modules for Oncology Drug Discovery and Development

- **m1** Discover mechanism of action of any compound or drug
- **m2** Identify/prioritize a compound's disease indications or subtypes
- **m3** Determine optimal drug combos to improve therapeutic potential
- **m4** Generate ML-driven biomarker signatures for patient selection
- **m5** Characterize specialized attributes of a molecule such as BBB permeability
- **m6** Enhance the selection of optimal combination of ADC components
- **m7** Discover drug combos for checkpoint inhibitors to improve therapeutic index

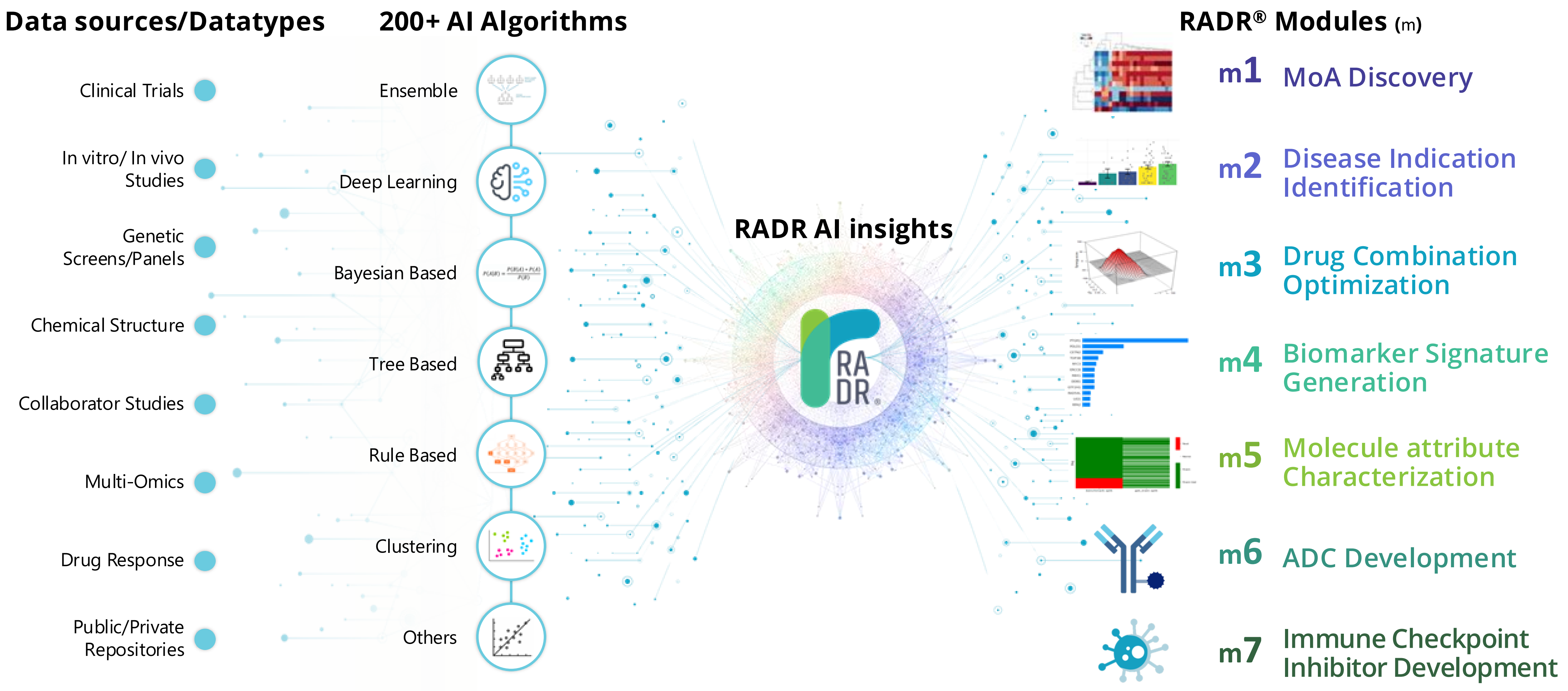
Lantern Pharma is a Top 10 End-to-End AI Drug Discovery Company



According to Deep Pharma Intelligence (May 04, 2022)

RADR®'s AI Framework

RADR®'s AI framework develops actionable insights using billions of datapoints



RADR® Case Study – Actuate Therapeutics

Advanced RADR® machine learning models predict clinical trial patient responses at 88% accuracy

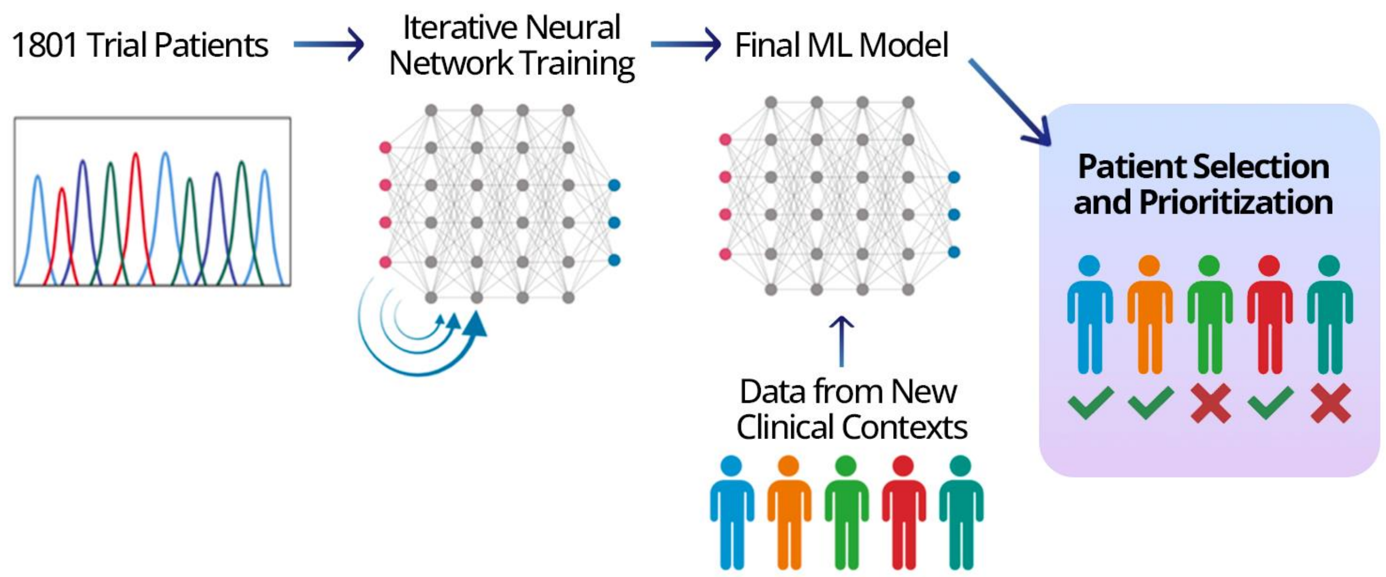
ACTUATE THERAPEUTICS x RADR®

Lantern is accelerating the development of Actuate Therapeutic's drug candidate, Elraglusib* (9-ING-41), using AI insights produced by RADR®

- Predicted patient response with greater than **88% accuracy**
- Identified metastatic melanoma patients resistant to PD-1 therapies may benefit from Elraglusib
- Insights and new data including RNA, ctDNA, and protein biomarkers are informing design of an upcoming Phase 2 clinical trial
- Lantern received equity in Actuate as part of the collaboration

Posters: AACR ASCO®

Model generation for patient response prediction



Elraglusib is a widely researched GSK-3β inhibitor. Currently, Elraglusib is in multiple active Phase I/II clinical trials as a monotherapy and in combination with other agents (NCT03678883)

Collaborations

Strategic collaborations that are providing unique real-world insights and accelerating timelines

World-Class Academic and Research Institutions

- Johns Hopkins Medicine
- Fox Chase Cancer Center, Temple Health
- UT Health San Antonio, Greehey Children's Cancer Research Institute
- Danish Cancer Society
- Universität Bielefeld

Biopharma Collaborations

- Actuate Therapeutics
- ttc oncology
- Oregon Therapeutics

Lantern's Diverse & Unique AI Driven Pipeline of Drug Programs

Lantern has 12 disclosed and collaborative lead drug programs including the Phase 2 Harmonic™ trial

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

Lead Candidate	Indication	Discovery	Preclinical	Phase I	Phase II	Collaboration partner
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

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)**						

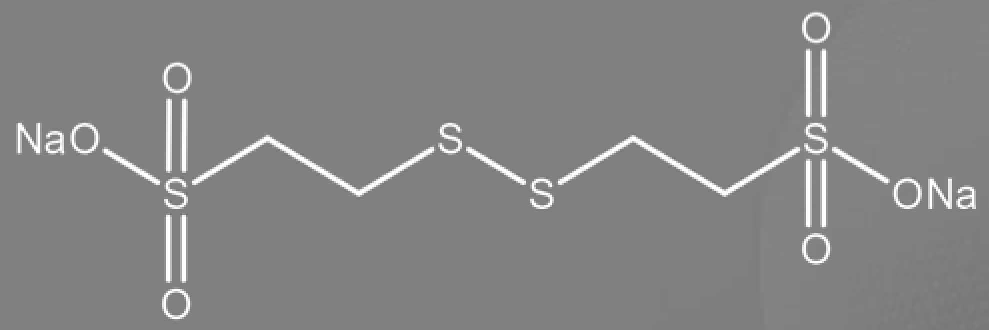
*Multiple GBM patients have been enrolled in the ongoing phase 1a being conducted by Lantern Pharma

**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						

LP-300 for the Treatment of Non-Small Cell Lung Cancer (NSCLC) in Never Smokers



Lead Indication	Relapsed NSCLC for Never Smokers
Clinical Status	Phase 2 (multiple patients dosed)
Market Potential*	$1.3 billion (USD)
Indication Size*	20,000-40,000 Cases
Target/ MOA	Tyrosine Kinases & Cell Redox Enzymes
Molecule Type	Disulfide Small Molecule
Combination	With carboplatin and pemetrexed
IP Estate	Claims extending to at least 2032

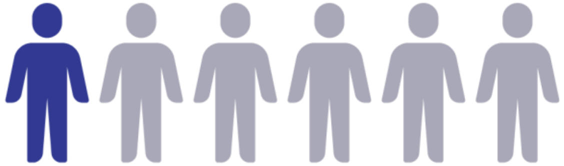
**Estimated Annual US*

Disease Overview – NSCLC in Never Smokers – LP-300

NSCLC in never smokers is one of the largest unaddressed cancer populations

Global Annual Market Potential: $2.5+ Billion

Lung cancer is the **#1** **cause of death** among cancer patients in the US



1 in 6 lung cancer deaths will occur in patients that are **never smokers with NSCLC**

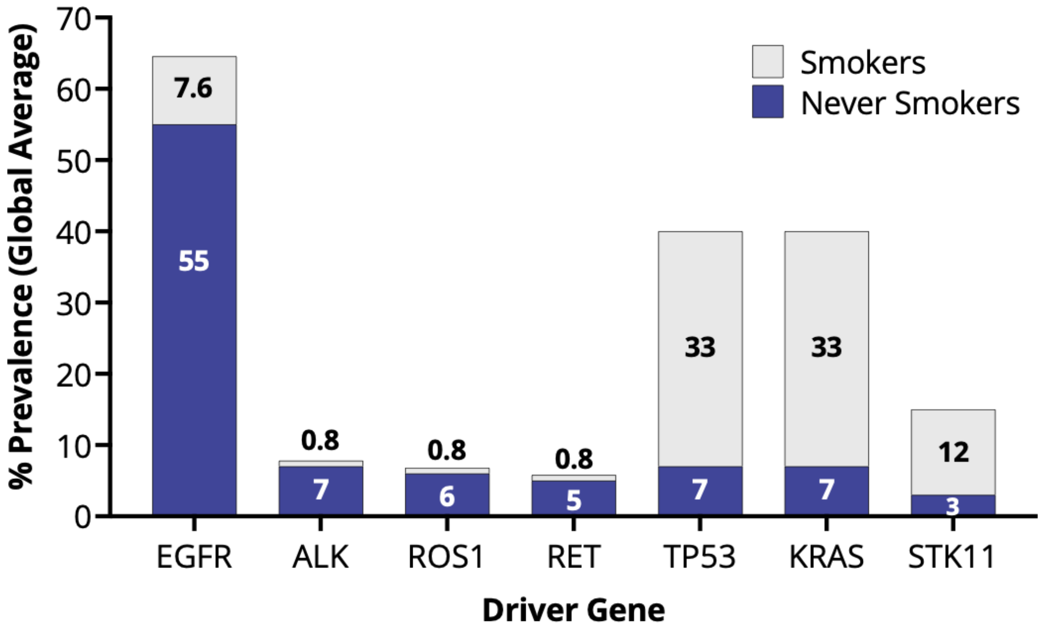
20,000-40,000 never smokers will be diagnosed with NSCLC each year In the US

Cancer.gov

NSCLC in Never Smokers is a Different Disease

Lung Cancer in never smokers has **higher percentage of genetic mutations in Tyrosine Kinases (TK),** a family of cancer-promoting genes, such as EGFR, ALK, ROS and MET

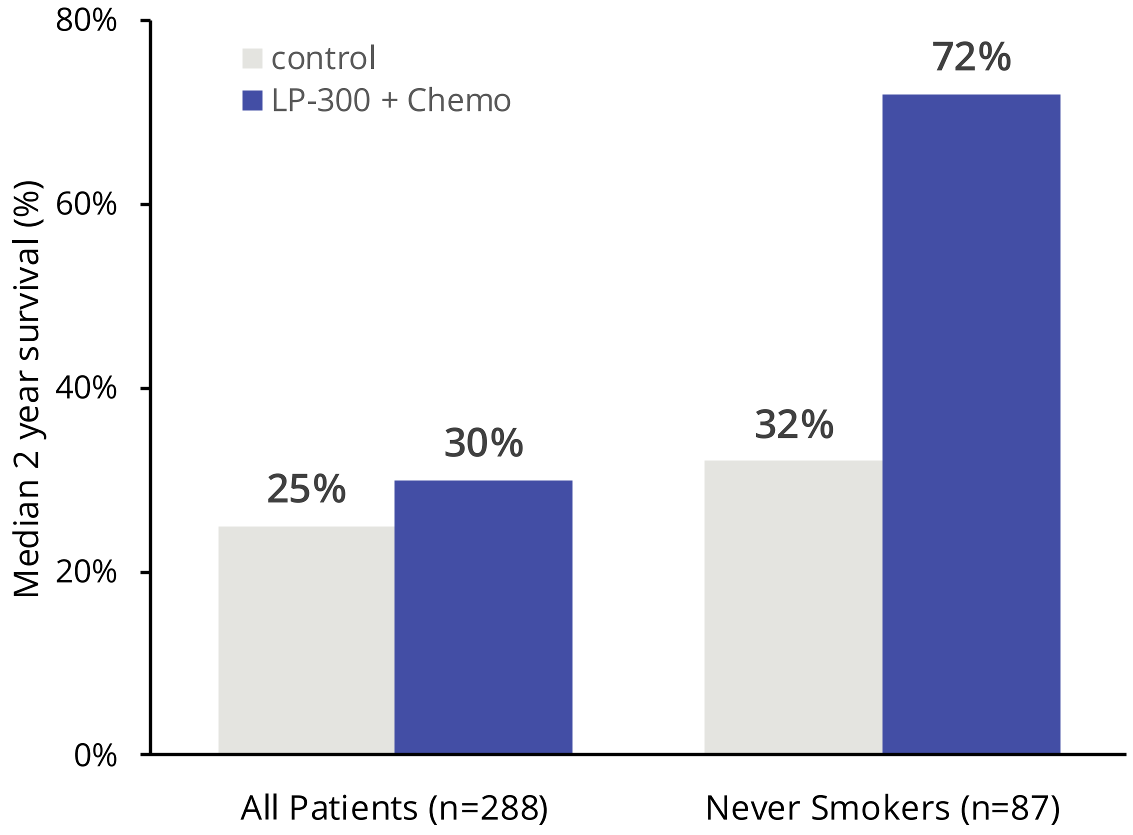
Mutation Frequency by Smoker Status



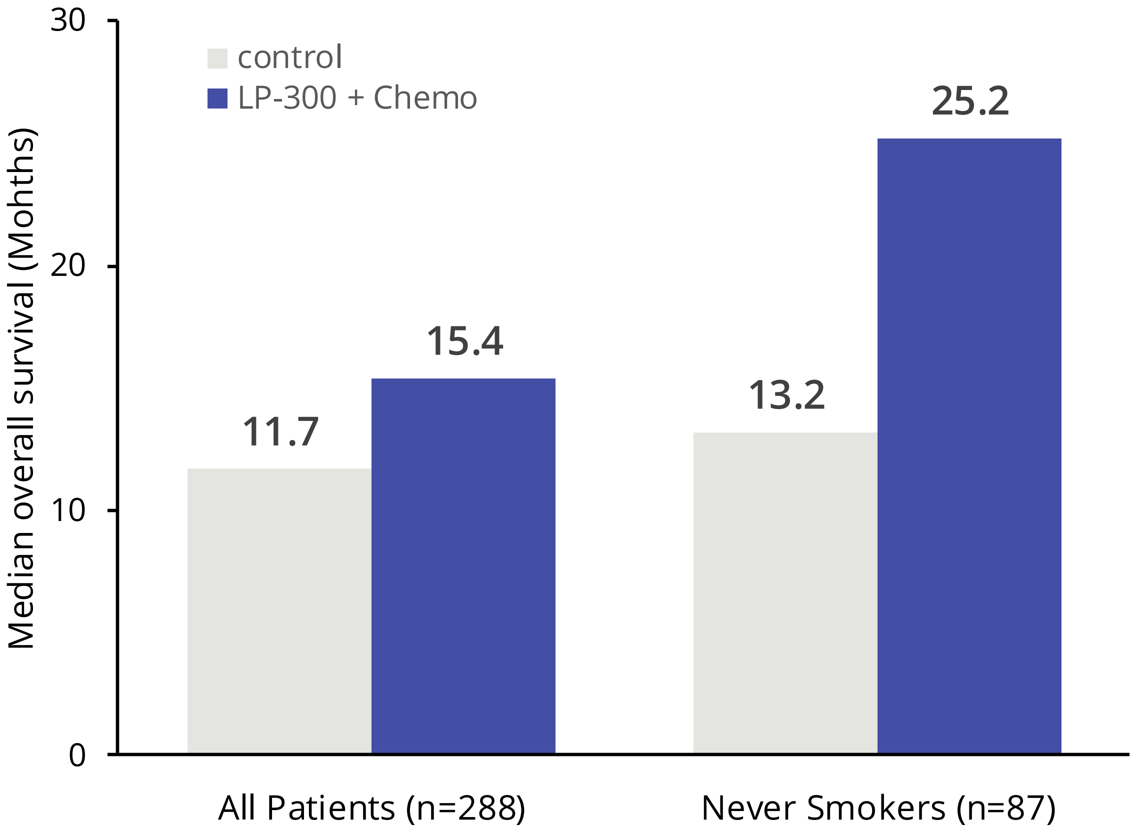
LP-300 Nearly Doubled Survival Outcomes for Never Smoker Subgroups with NSCLC in Previous Clinical Trial*

**Subpopulations receiving paclitaxel/cisplatin*

+ **125% increase** in median 2 year survival



+ **91% increase** in median overall survival



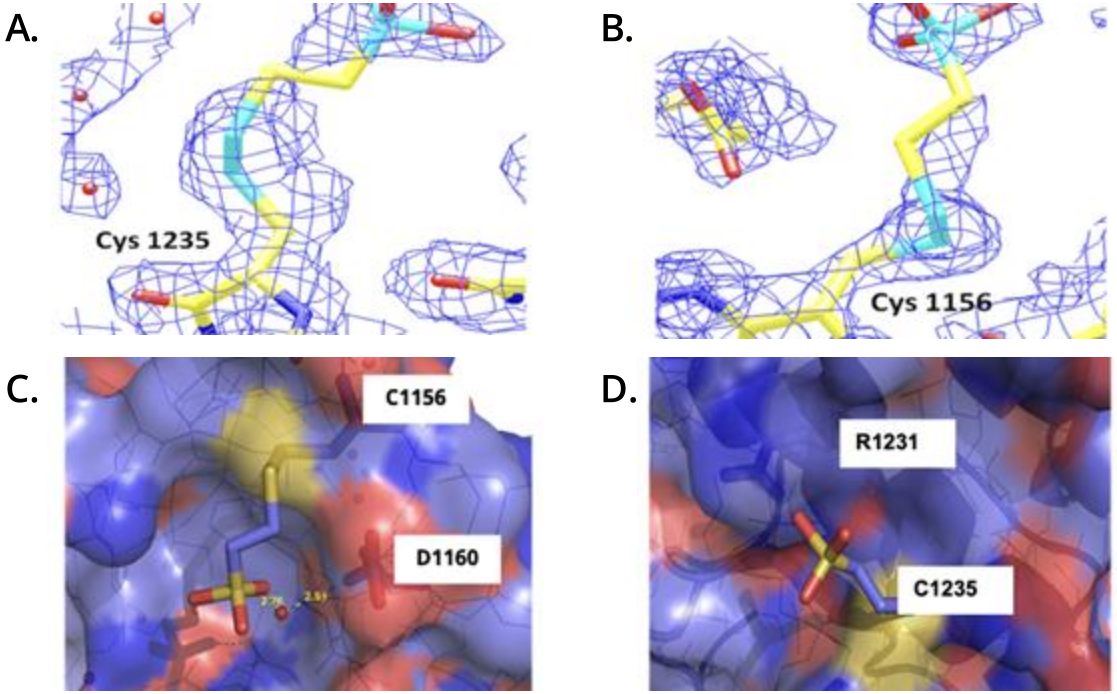
**Overall study did not meet clinical efficacy endpoints*

Clinicaltrials.gov (NCT00966914)

Mechanism of Action – LP-300

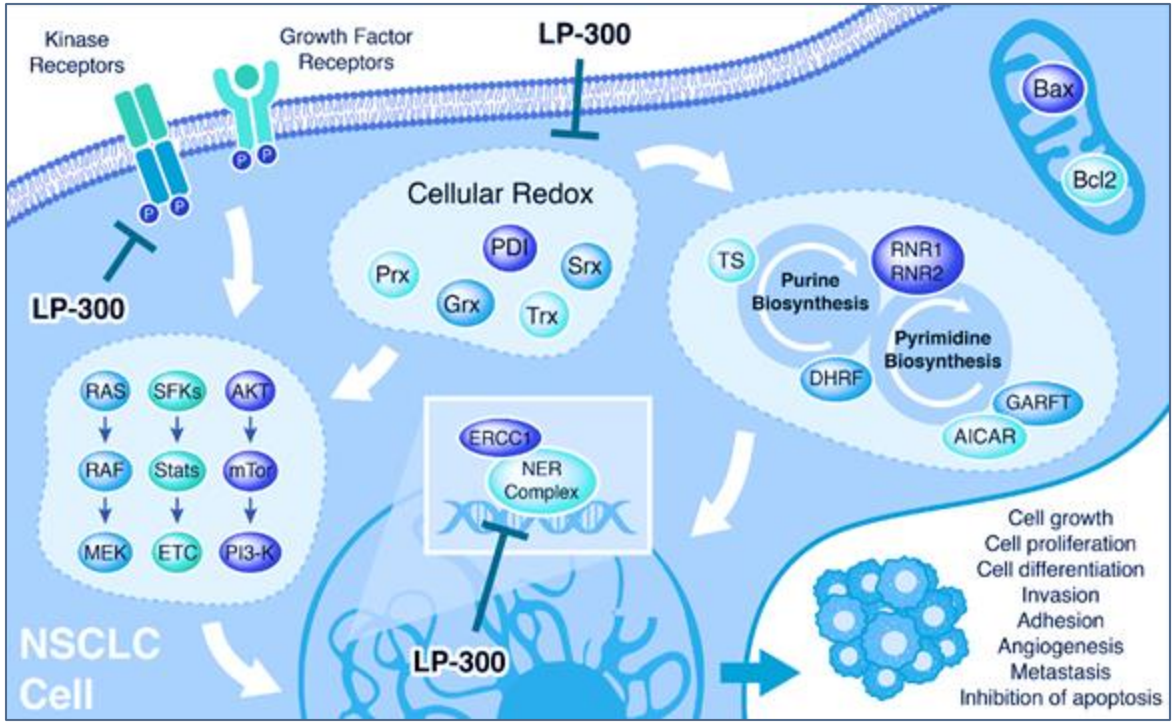
LP-300's multimodal MoA resensitizes NSCLC to chemo in the never smoker population

1. LP-300 Directly Engages with TKI Receptors via Cysteine Modification



A-B. LP-300 adduct at **Cys1235 Cys1156** **C.** Molecular surface of ALK with the LP-300-derived adduct at **Cys1156** *(yellow highlight)* **D.** Binding site of the LP-300-derived adduct at **Cys 1235** *(yellow highlight)*

2. LP-300 Modulates Cellular Redox in Key Signaling Pathways in NSCLC



- Restoring apoptosis sensitivity
- Oxidative stress modulation
- Anti-angiogenesis
- Reduced DNA synthesis and gene expression
- Reduce glutathione/thioredoxin mediated tumor resistance to therapy
- Nephrotoxicity protection against chemotherapy

Clinical Trial – 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

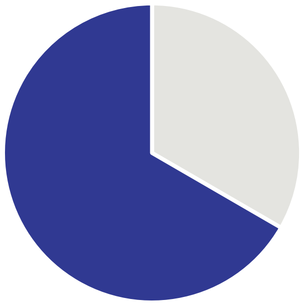
Never Smokers

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 2024
- Received regulatory approval to expand the trial in both Japan and Taiwan in Q1 2024

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%)

**Based on data from 7 patient safety lead-in cohort*

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

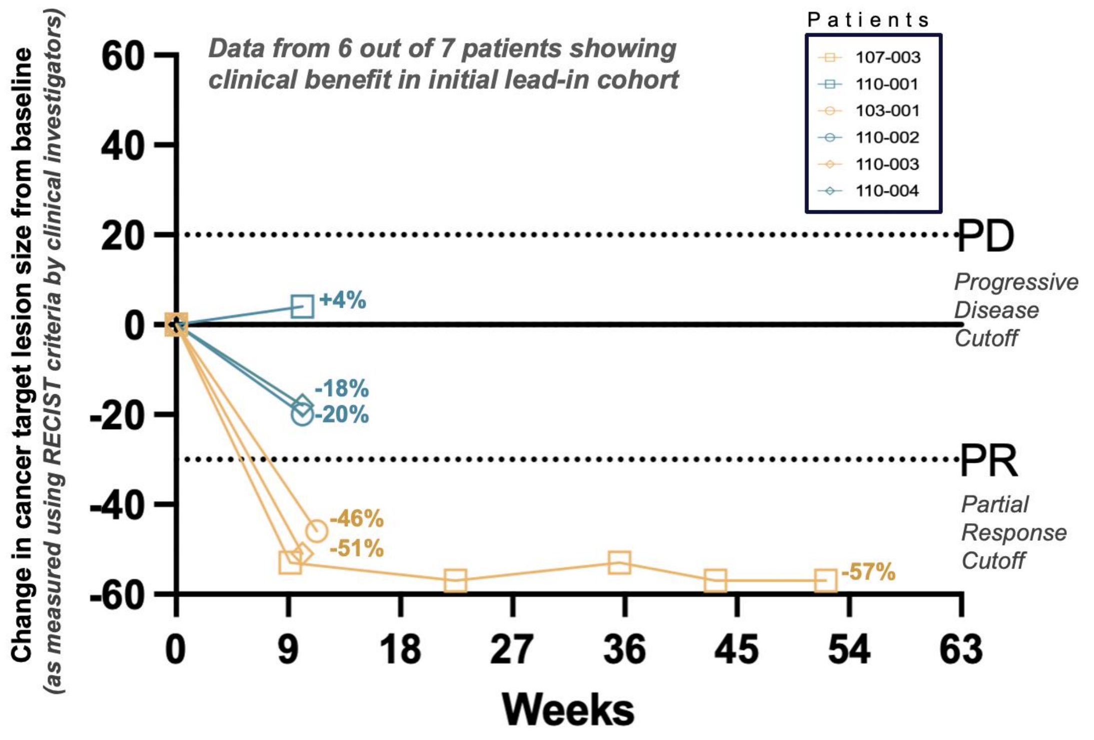
Patient Highlights from Initial Cohort

- 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

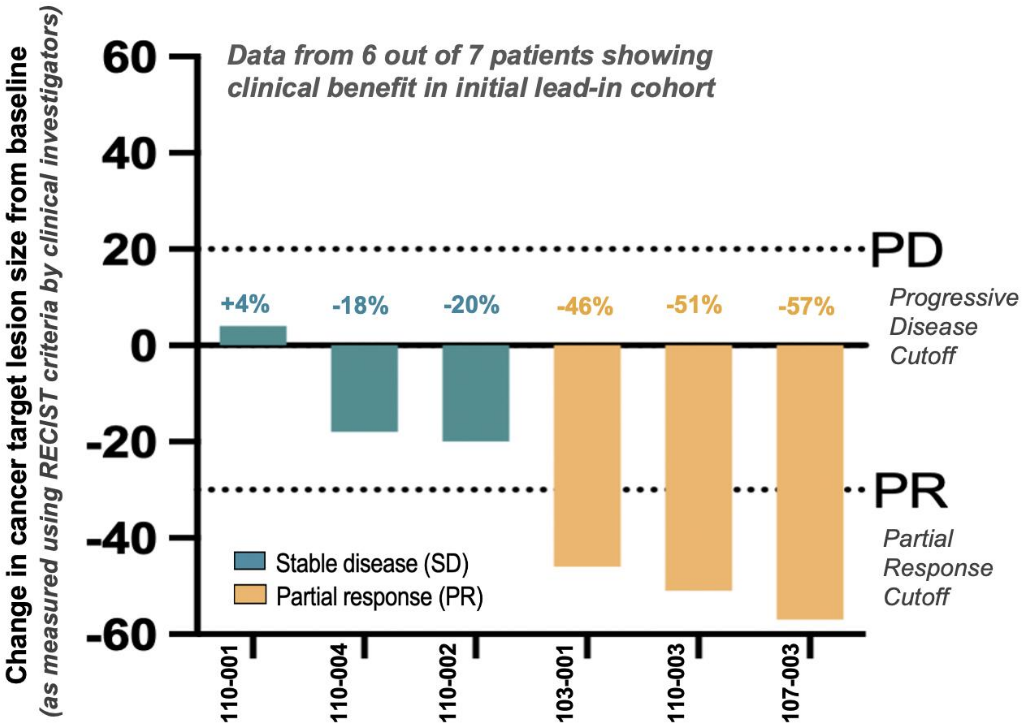
6 Out of 7 Patients Showed Clinical Benefit in Initial Lead-in Cohort

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

Percent change in cancer lesion size over time

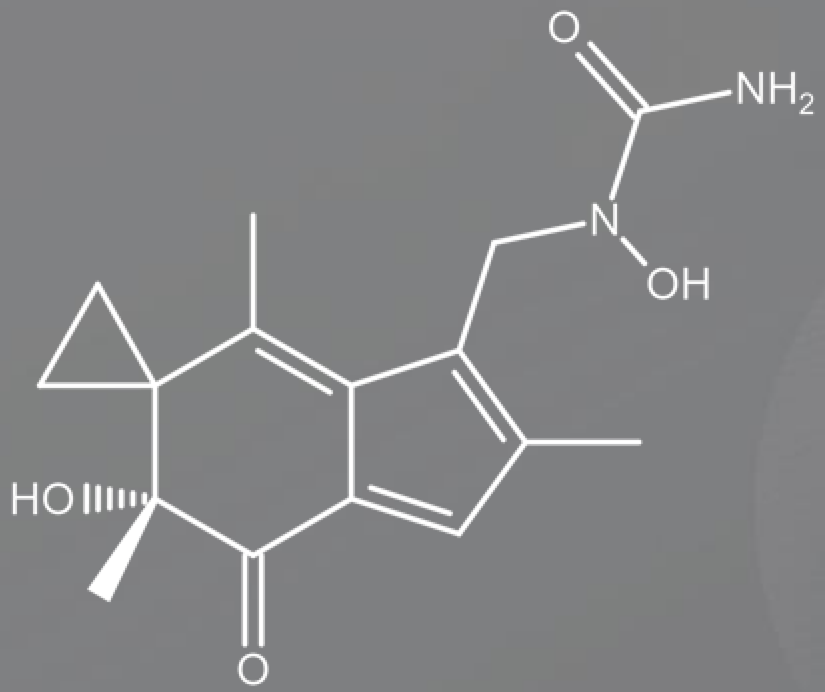


Percent change in cancer lesion size by patient



All patient data as of July 25, 2024

LP-184 for the Treatment of Advanced Solid Tumors



Lead Indications	DDR deficient solid tumors including Pancreatic cancer, Bladder cancer, and TNBC
Clinical Status	Phase 1a (multiple patients dosed with no dose-limiting toxicity observed)
Market Potential*	$14+ Billion
Indication Size*	170,000 + Cases, Estimated 400,000 + Cases Global
Target/ MOA	Double-stranded DNA breaks; alkylates DNA in the 3′ of Adenine
Molecule Type	Acylfulvene Class
Combination Potential	Checkpoint inhibitors, PARP inhibitors, Spironolactone, Chemotherapy and Radiation Therapy
IP Estate	10+ patents/pending apps., Claims extending into 2041

**Estimated Annual USA*

Disease Overview – Advanced Solid Tumors with DDR Deficiencies

LP-184 has Blockbuster Potential Across Multiple Cancers as a Single Agent or in Combination Therapy

Annual US Market Potential: $14+ Billion

(DDR Deficient Solid Tumors)

1 in 4 people have solid tumors with DDR Deficiencies

Pancreatic Cancer

Triple Negative Breast Cancer

Bladder Cancer

Lung Cancer

Advanced Solid Tumors

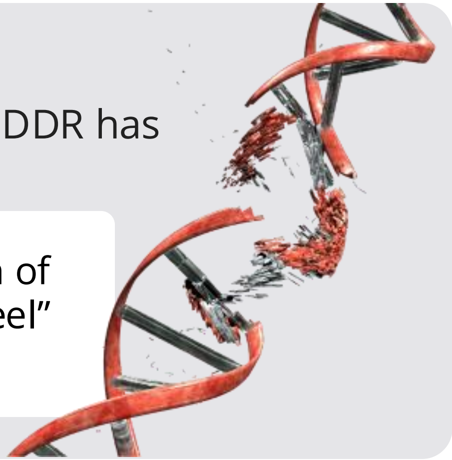
- Advanced solid tumor cancers, having spread beyond the primary site, are often more challenging to treat than earlier stage tumors due to their advanced progression
- Current treatment options include: surgery, chemotherapy, radiation therapy, targeted therapy, and immunotherapy

DNA Damage Response (DDR) Deficiency

DDR is essential for maintaining genomic stability by repairing different types of DNA damage. Inhibition of DDR has been shown to increase the effectiveness of anticancer immunotherapies

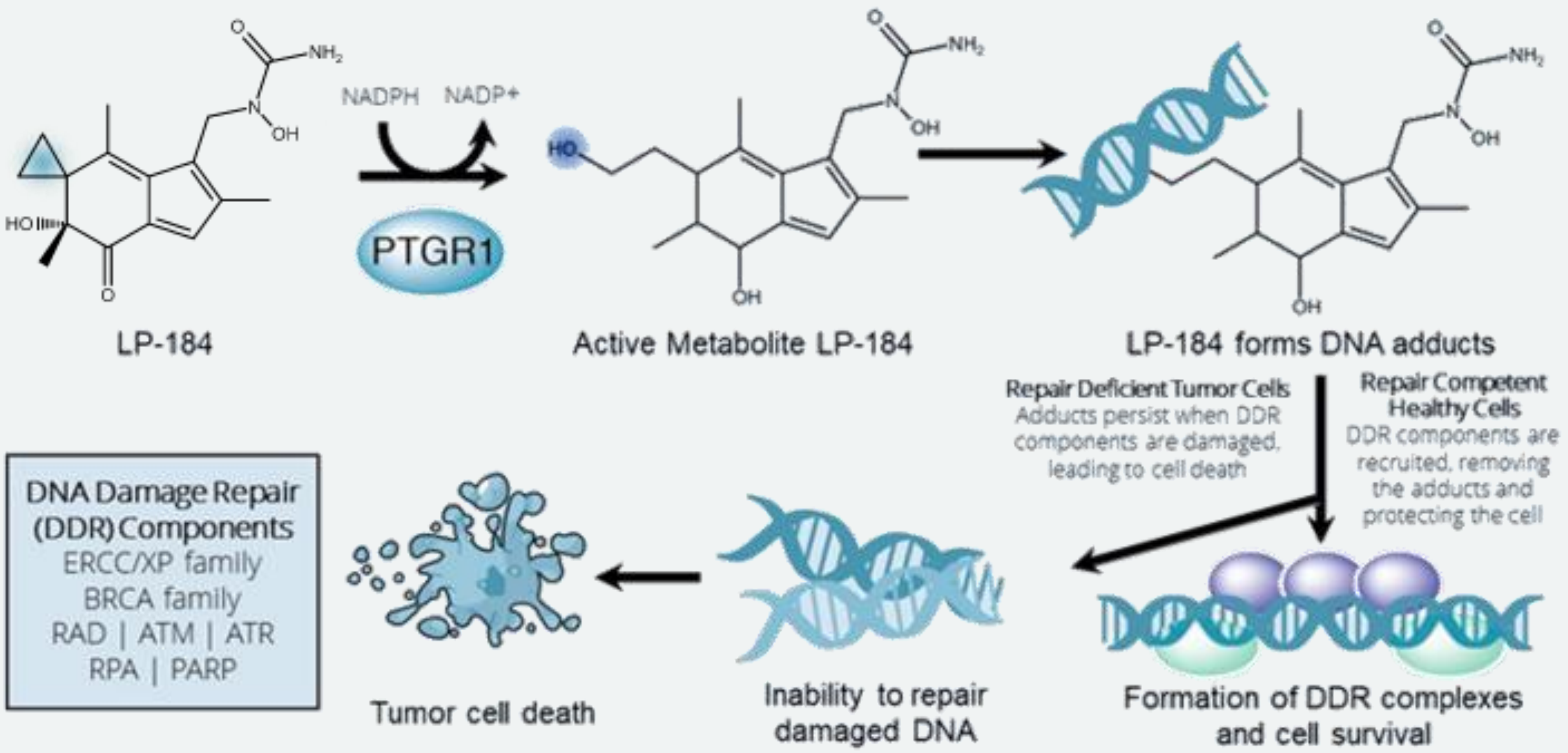
Cancer cells with high underlying levels of DNA damage are **more dependent on DDR** for survival when compared to normal cells

DDR Deficiencies result in the accumulation of DNA damage, which produces an "Achiles Heel" for drugs leveraging synthetic lethality



Mechanism of Action – LP-184

LP-184 has a unique mechanism of action – leveraging **synthetic lethality**



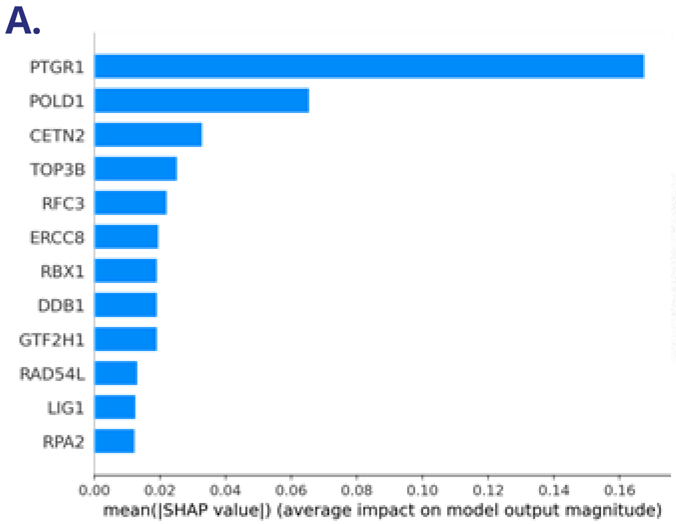
AI insights generated by RADR® – LP-184

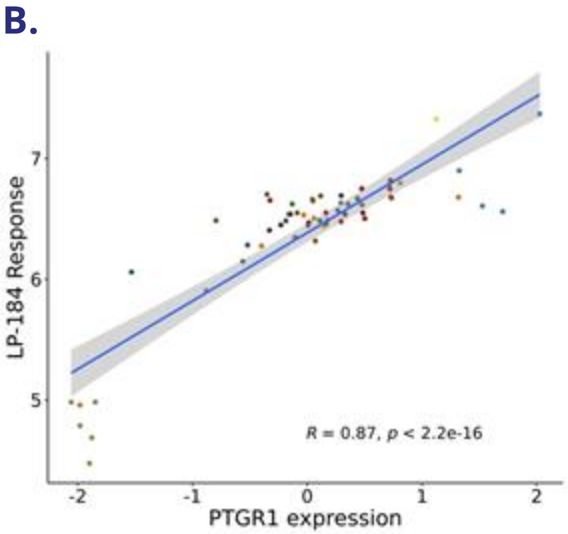
LP-184's MoA was predicted by RADR® and validated with *In vitro* and *In vivo* studies

In silico

Precision Medicine Platform

Using RADR® , PTGR1 was Identified as a Biomarker that Predicts LP-184 Response



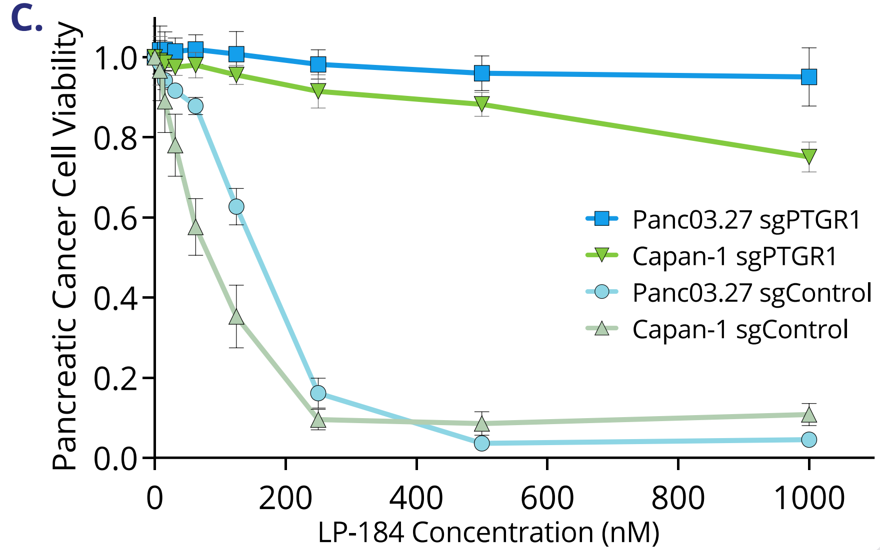


- **Prostaglandin Reductase 1 (PTGR1)** is an oxidoreductase enzyme that is frequently elevated in cancers
- PTGR1 activates LP-184 into its highly potent and cytotoxic form
- RADR® insights predicted that LP-184 activity positively correlates with PTGR1 transcript levels in the NCI60 cancer cell line panel

In vitro

FOX CHASE CANCER CENTER TEMPLE HEALTH

Validated using CRISPR Experiments



- CRISPR-mediated depletion of PTGR1 expression in a pancreatic cancer cell line is sufficient to **fully diminish LP-184 activity**
- This **confirmed the RADR® insights** and that LP-184 was highly potent in cells with PTGR1

Preclinical Results – LP-184

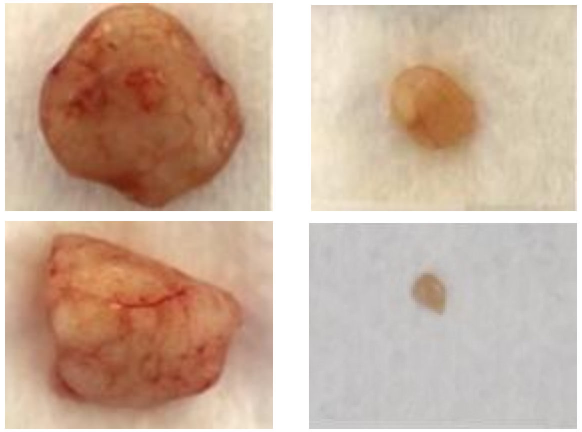
LP-184 treatment results in complete regression in DDR deficient pancreatic cancer PDX models

Pancreatic Cancer

In-vitro PDX pancreatic mouse models treated with LP-184 - CTG-1522 and CTG-1643 models showed **a tumor growth inhibition of >100%**

A.

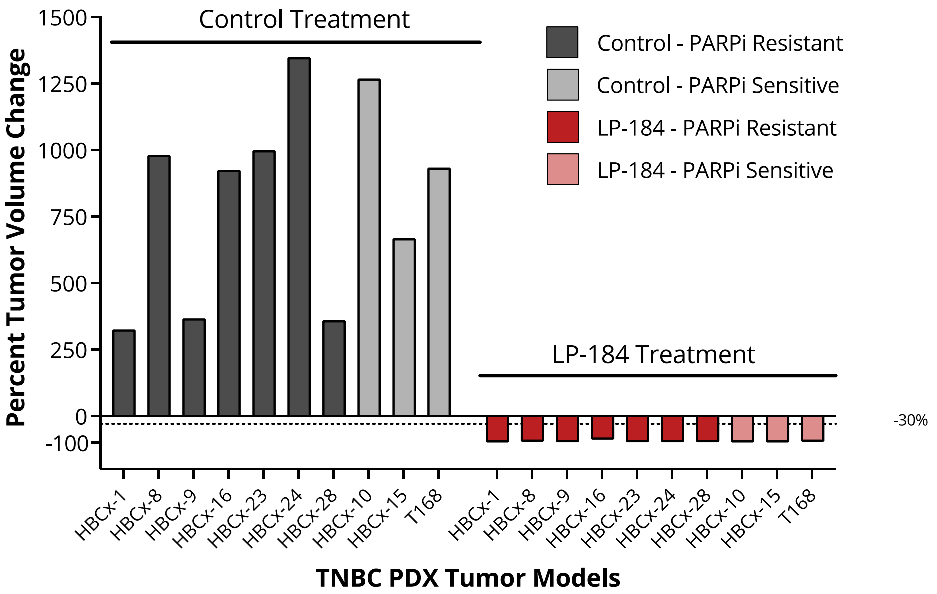
	Vehicle	**LP-184**	
CTG-1522 Tumors			***CTG-1522*** *– ATR Frameshift mutation, non responder to FOLFIRINOX*
CTG-1643 Tumors			***CTG-1643*** *- BRCA1 Frameshift mutation*



Triple Negative Breast Cancer (TNBC)

Across 10 TNBC PDX mouse models (*All 10 TNBC PDX models were **HR deficient***) LP-184 treatment resulted in 107-141% tumor growth inhibition

B.



In collab. with FOX CHASE CANCER CENTER TEMPLE HEALTH

Poster: AACR

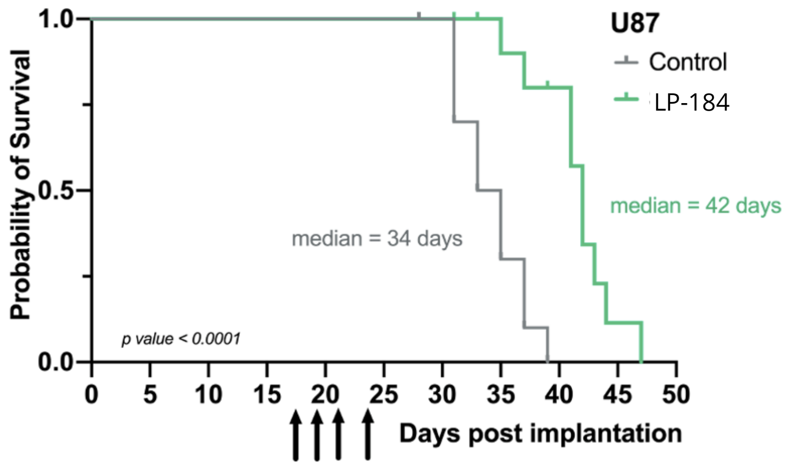
- LP-184 exhibits nanomolar potency in PTGR1 overexpressing tumors with DDR deficiencies
- Positioned for 2nd and 3rd line treatment, where there is unmet need for novel therapies
- FDA **Orphan Drug Designation** granted for LP-184 to treat pancreatic cancer
- Combination therapy potential with SOC agents: Spironolactone, PARP inhibitors, Gemcitabine, Irinotecan, and Oxaliplatin

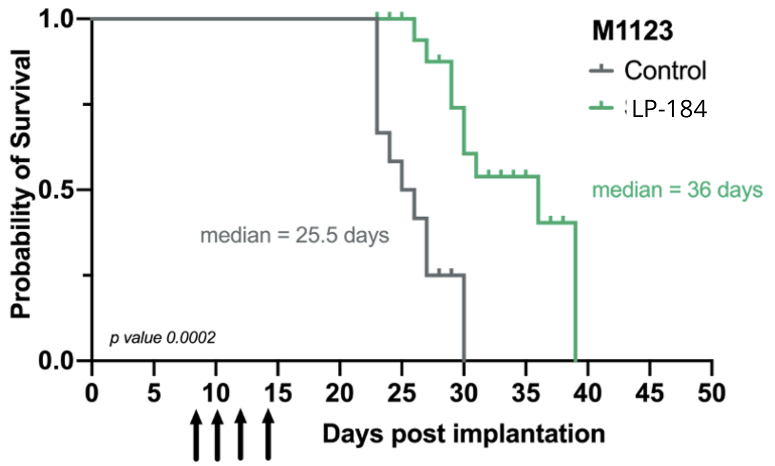
Preclinical Results – LP-184

LP-184 shows significantly improved survival and tumor shrinkage in GBM xenografts

LP-184 treatment increases orthotopic GBM xenograft survival by over **20%**

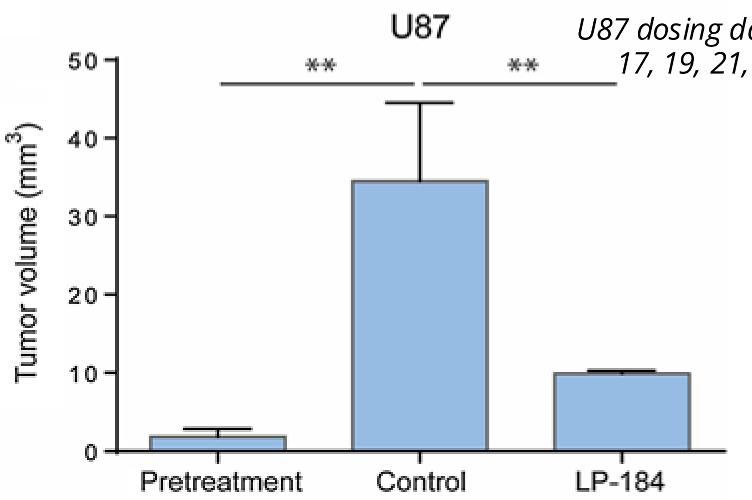
Mice with orthotopic M1123 or U87 xenografts received control or LP-148 (4mg/kg i.v.) on days indicated by arrows



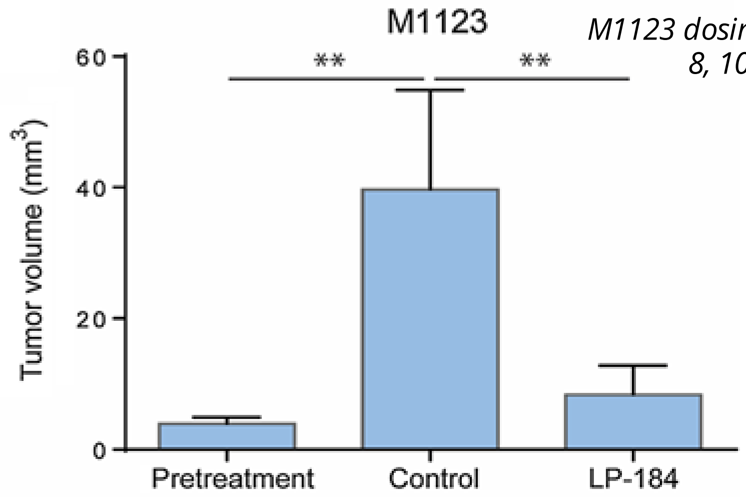


LP-184 treatment leads to significant tumor shrinkage in intracranial models

Tumor response on day 28 in U87 and on day 19 in M1123 intracranial models displayed active tumor shrinkage



U87 dosing days 17, 19, 21, 24

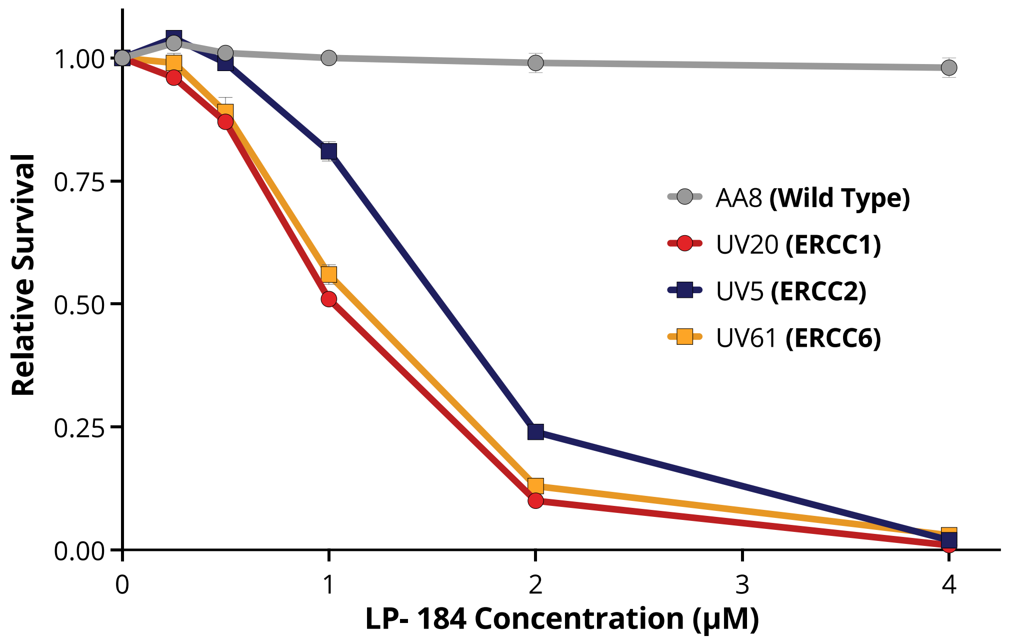


M1123 dosing days 8, 10, 12, 15

Preclinical Results – LP-184

Cancer models with common DNA damage response deficiencies are highly sensitive to LP-184 treatment

LP-184 in **NERD** Cancers



- **LP-184 shows exquisite potency** in cancers with deficiencies in Nucleotide Excision Repair (NERD) pathways
- There are currently **no approved therapies** for NERD cancers

LP-184 in **HRD** Cancers

PDX Cancer model	IC50 (nM)	HRD Mutations
NSCLC	31	ATM
Prostate	31	PMS2
Pancreatic	45	ATR, BRIP1, PARP1
NSCLC	54	CHEK1, FANCA, NBN, RAD50
Prostate	54	BRCA2, ATM, FANCA, FANCI, FANCM
Prostate	54	BRCA2, CDK12, FANCI, RAD54L,
NSCLC	57	ATM, FANCD2, NBN
Pancreatic	57	BRCA1, BRIP1,
Prostate	92	ATM, ATR, PALB2,
Pancreatic	110	BRCA2, ATM, BLM, FANCA
Pancreatic	270	BRCA2, CDK12, PALB2
Pancreatic	2,900	ATM, BRCA1, BRCA2

- PDX-derived cell lines with mutations in key HR and NER genes are **highly sensitive to LP-184**
- Only 1 model was not highly sensitive to LP-184 (highlighted in blue)

Clinical Trial – LP-184 Phase 1 Basket Trial

Launched Phase 1 basket trial for a blockbuster molecule with a market potential of $10+ billion in annual sales

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

[Clinicaltrials.gov (NCT05933265)]

Phase 1a

Solid Tumors / Brain & CNS Cancers

40-50
Patients expected to be enrolled

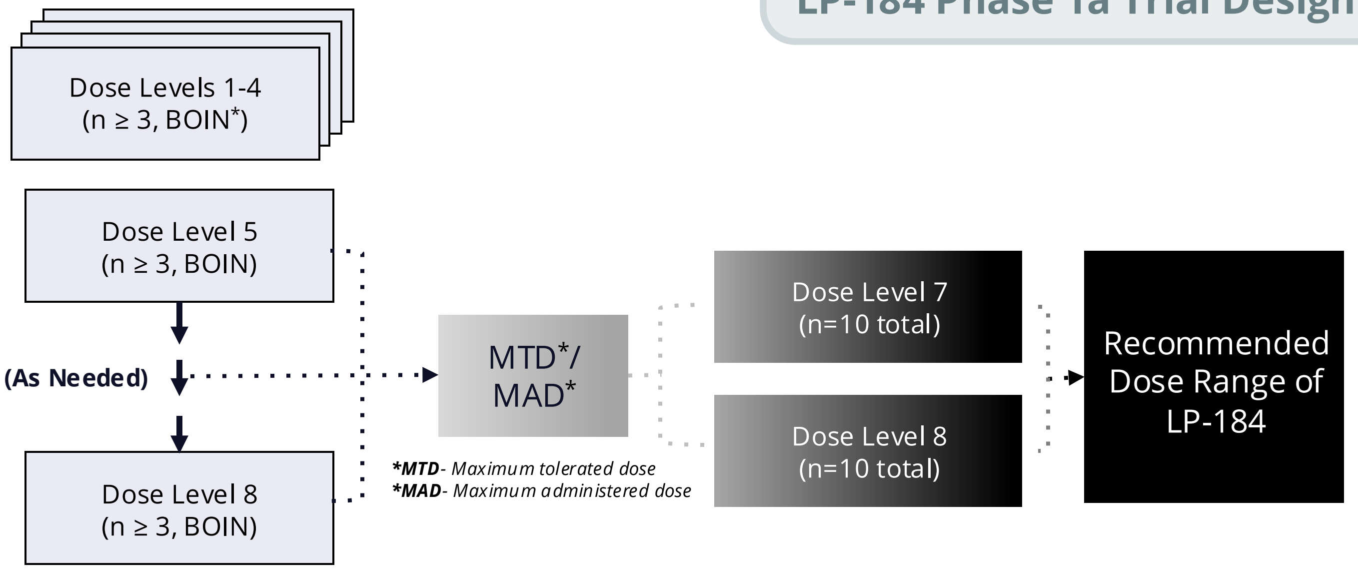
$14+ Bn
Annual US market potential in DDR deficient solid tumors

Multi-Site

Trial Highlights

- Trial launched and multiple US sites activated, including Fox Chase Cancer Center
- Multiple patients dosed
- Following determination of the maximum tolerated dose (MTD) and/or recommended phase 2 dose (RP2D), the dose will be confirmed prior to initiating enrollment in Phase 1b
- **Potential future studies: Phase 2 in GBM (through Starlight) and Phase 1b/2 in other solid tumors** to be initiated after determination of MTD

LP-184 Phase 1a Trial Design

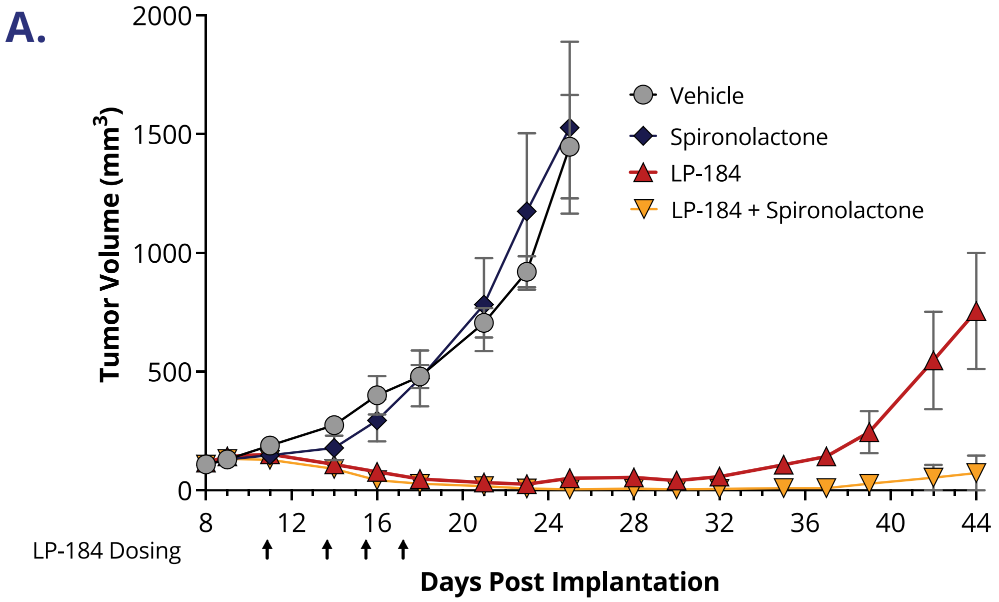


*BOIN- Bayesian Optimal Interval

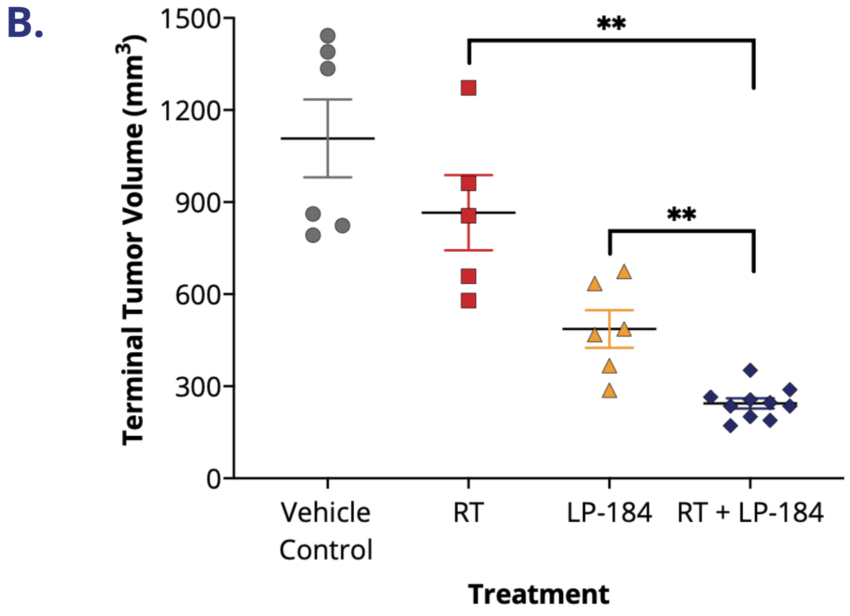
Preclinical Data on Combination Therapy – LP-184

In-vivo LP-184 has synergy with several SOC agents including spironolactone, radiation therapy, and others

LP-184 + Spironolactone in GBM in vivo mouse model



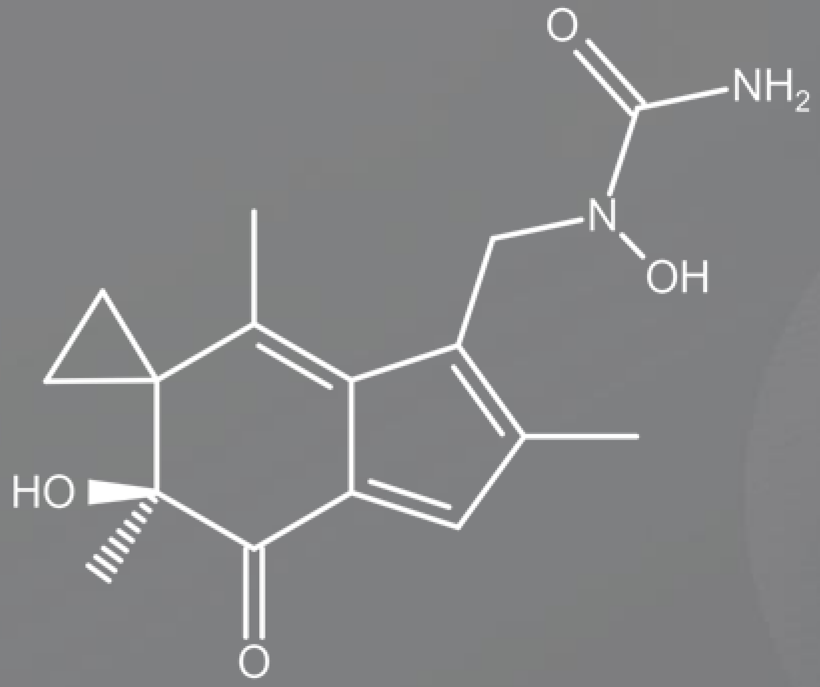
LP-184 + Radiation in the Panc03.27 CDX Model



- **Spironolactone** is an FDA approved agent that can impair DNA damage repair pathways in tumor cells
- **Combination** of LP-184 or LP-284 with Spironolactone:
  1) Enhances potency
  2) Decreases expected dose needed for treatment
  3) Exploits MoA of both drugs

- Terminal tumor volumes from the RT + LP-184 treatment group are significantly (**p < 0.01) smaller than treated with RT or LP-184 alone
- Mean tumor volumes of RT + LP184 were **~1.8 fold lower** than tumors treated with LP-184 alone

LP-284 for the Treatment of B-cell Non-Hodgkin's Lymphomas (NHL)



Lead Indications	Mantle Cell, Double Hit Lymphomas, DDR Deficient Non-Hodgkin's Lymphomas
Clinical Status	Phase 1 (multiple patients dosed with no dose-limited toxicity observed)
Market Potential*	$3.75 - 4 Billion
Indication Size*	375,000+
Target/ MOA	Synthetic Lethality
Molecule Type	Acylfulvene Class
Designations	Orphan Drug - Mantle Cell Lymphoma
Combination Potential	Rituximab and Spironolactone
IP Estate	Claims extending into 2039

**Estimated Annual Global*

Disease Overview – B-cell Non-Hodgkin's Lymphomas

Superior responses to LP-284 are observed in several B-cell lymphomas

Annual Global Market Potential: $ 4 Billion
(NHL)

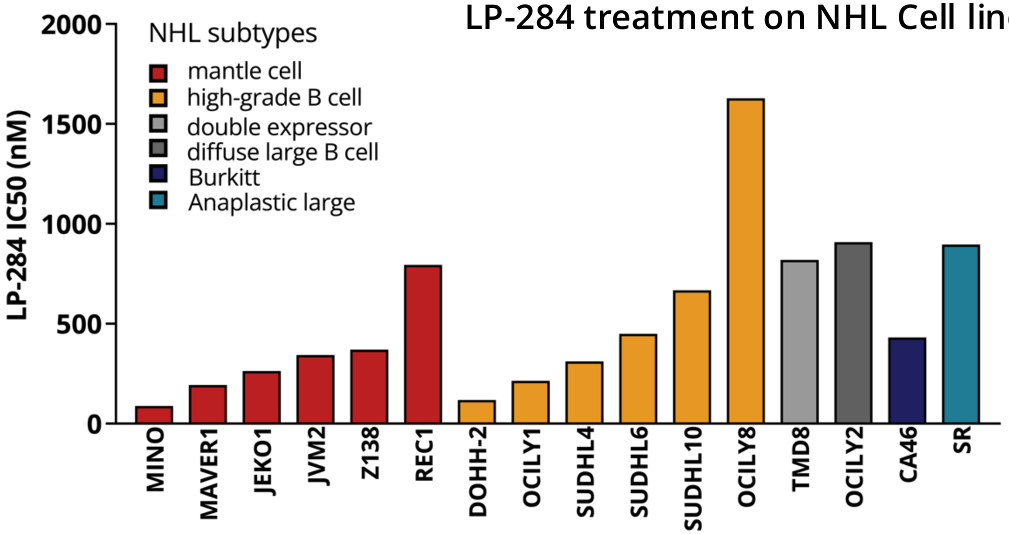
B-cell Non-Hodgkin's Lymphomas

- NHL is a cancer of the lymphatic system and occurs when normal B-cells, T-cells, or Natural Killer (NK)-cells grow out of control
- There are over 30 subtypes of NHL including mantle cell lymphoma (MCL), high-grade b-cell lymphoma(HGBL), and diffuse large B-cell lymphoma

7th leading cause of cancer in the US

4% of all cancers are NHL in the US

LP-284 treatment on NHL Cell lines



Mantle Cell Lymphoma
(MCL)

- A rare, aggressive type of B-cell NHL distinguished by overexpression of CCND1
- Small-medium size cancer cells in the lymph nodes, spleen, bone marrow, blood, and gastrointestinal system
- Rarely curable with current standard-of-care treatments and poor prognosis

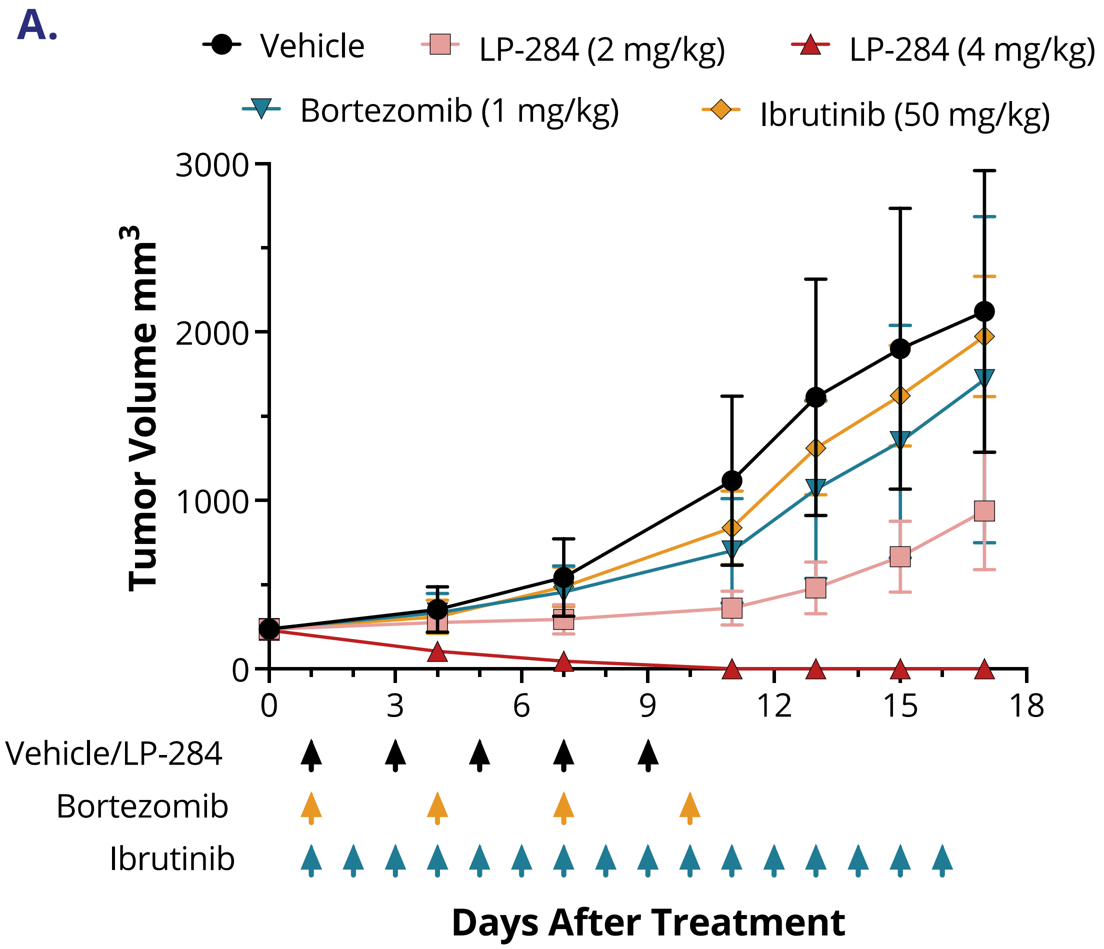
High-Grade B-Cell Lymphoma
(HGBL)

- A rare, aggressive type of B-cell NHL characterized by rearrangements of MYC and BCL2 and/or BCL6 genes
- Often occurs in neck, armpit, groins and can spread to central nervous system
- No standard treatment approach and poor prognosis.

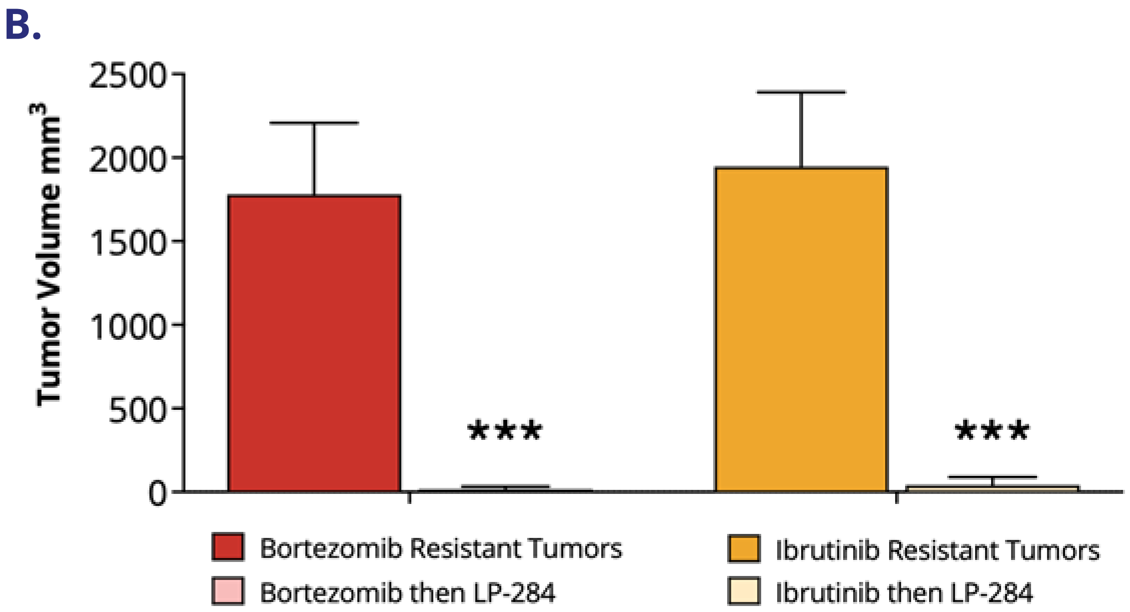
Preclinical Results – LP-284

Superior responses to LP-284 are observed in several NHLs including those resistant to SOC agents

LP-284 has drastically reduced MCL Tumor Volumes in Mice compared to FDA Approved Agents



LP-284 reduced the volume of tumors resistant to Ibrutinib and Bortezomib



Nearly all MCL Patients Relapse from SOC Therapies

In cell-derived xenograft MCL models, LP-284 can completely reduce tumors that are resistant to Ibrutinib and Bortezomib

Clinical Trial – LP-284 Phase 1 Trial

Ph. 1 trial launched in Q4 2023 for recurrent NHLs with scarce therapeutic options

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

Phase 1a

Non-Hodgkin's Lymphomas

30-35
Patients expected to be enrolled

$4.0Bn
Estimated global annual market potential in NHL

Multi-Site

Sep 2023 — IND application cleared by FDA

Q4 2023 — Launched phase 1 trial

First Half 2024 — Multiple patients dosed

Recent Highlights

- Trial launched and multiple sites activated in the US
- Additional US sites to be opened in second half of 2024

Program Highlights

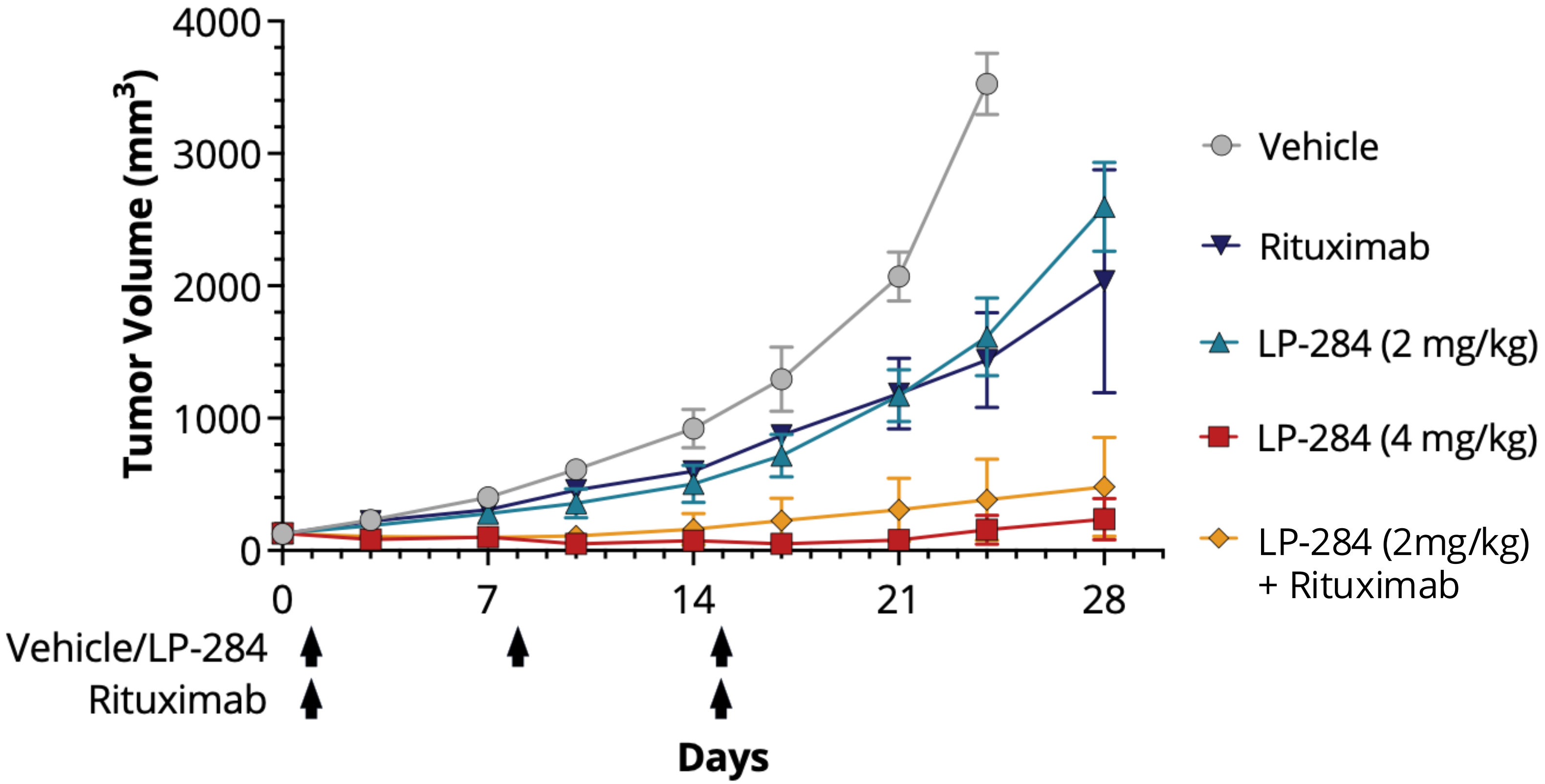
- LP-284 has nanomolar potency against several aggressive non-Hodgkin's lymphomas (NHL) including mantle cell lymphoma (MCL) and high-grade b-cell lymphoma (HGBL)
- **FDA granted Orphan Drug Designation for MCL and HGBL**
- In-vivo LP-284 can rescue MCL xenograft tumors resistant to Ibrutinib and Bortezomib
- Enhanced potency when used in combination with rituximab in HGBL xenograft models

Preclinical Data on Combination Therapy – LP-284

LP-284 was highly synergistic when used in combination with rituximab in HGBL xenograft models

High Grade B-cell Lymphoma (HGBL) Tumor Volumes in Mice LP-284 – in combination with rituximab

HGBL have universally poor prognosis after chemotherapy, such as EPOCH, Hyper CVAD, and CODOX-M/IVAC - all are given with Rituximab. Novel agents are critically needed for more effective treatments in HGBL



LP-284 treatment led to **near complete tumor growth** inhibition and showed synergistic effects with the FDA-approved agent rituximab

At half of the optimal dose (2mg/kg v. 4mg/kg) **LP-284 when combined with rituximab led to a 63% improvement** in anti-cancer activity (as measured by tumor volumes) versus rituximab alone

- Rituximab alone = 57% TGI
- LP-284+ Rituximab = 93% TGI

Results presented at: soho2023 ELEVENTH ANNUAL MEETING

Advanced the development, synthesis, and preclinical proof-of-concept of a novel, highly potent, cryptophycin-based ADC

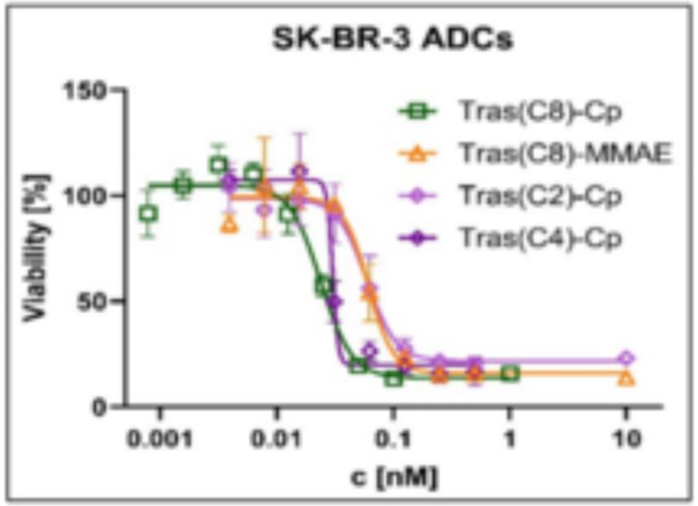
ADC Collaboration Update

UNIVERSITÄT BIELEFELD

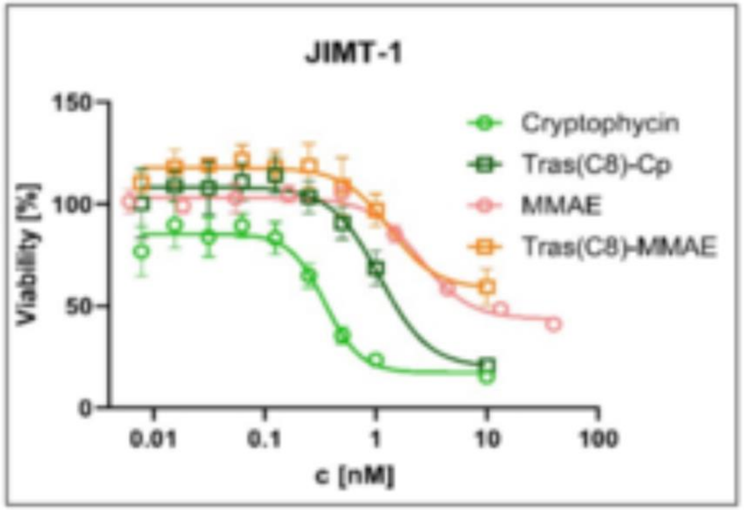
MAGIC BULLET Reloaded

Collaboration Led by Professor Norbert Sewald, Ph.D.

High HER2 Expression



Moderate HER2 Expression



Key Highlights

- The cryptophycin(Cp) drug-payload and Cp-ADC averaged an **80% cancer cell kill rate**
- In a moderate Her2 expression model, the Cp-ADC with a DAR* of 8 *(Tras(C8)-Cp)* was about **10x more potent** than a DAR 8 MMAE**-ADC *(Tras (C8)-MMAE)*
- Cp-ADC showed highly efficient anti-tumor activity in all six cancer cell lines (breast, bladder, colorectal, gastric, pancreatic, and ovarian cancer) with EC-50 values in the picomolar to single-digit nanomolar range
- Additional studies are now being developed to further validate and expand these findings to obtain a deeper understanding of the genomic and biomarker correlates of payload efficacy

**drug to antibody ratio*

***Monomethyl auristatin E - potent tubulin inhibitor that is used as the payload for four FDA-approved ADCs*

starlight
therapeutics

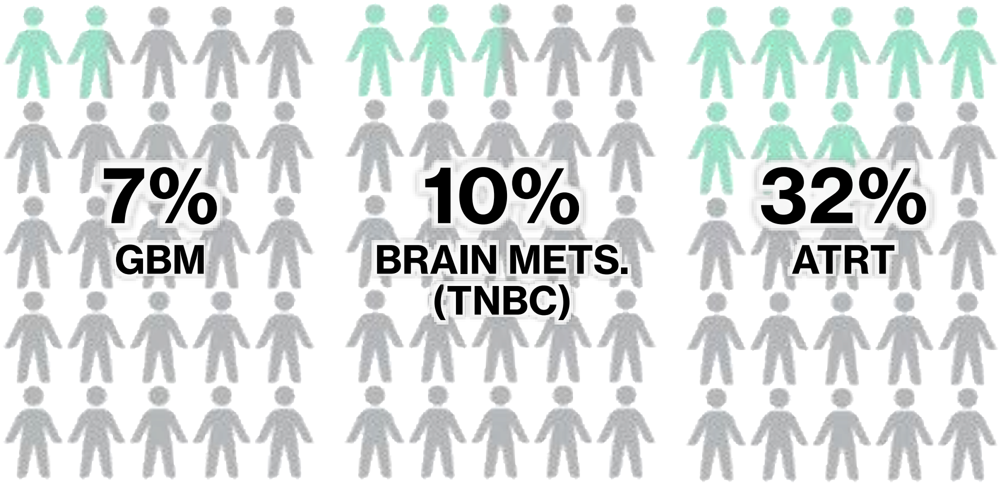
Born from Billions of Datapoints & AI, Starlight has Blockbuster Potential to Provide New Treatment Options for 500,000+ Patients

starlight therapeutics

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 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



starlight therapeutics

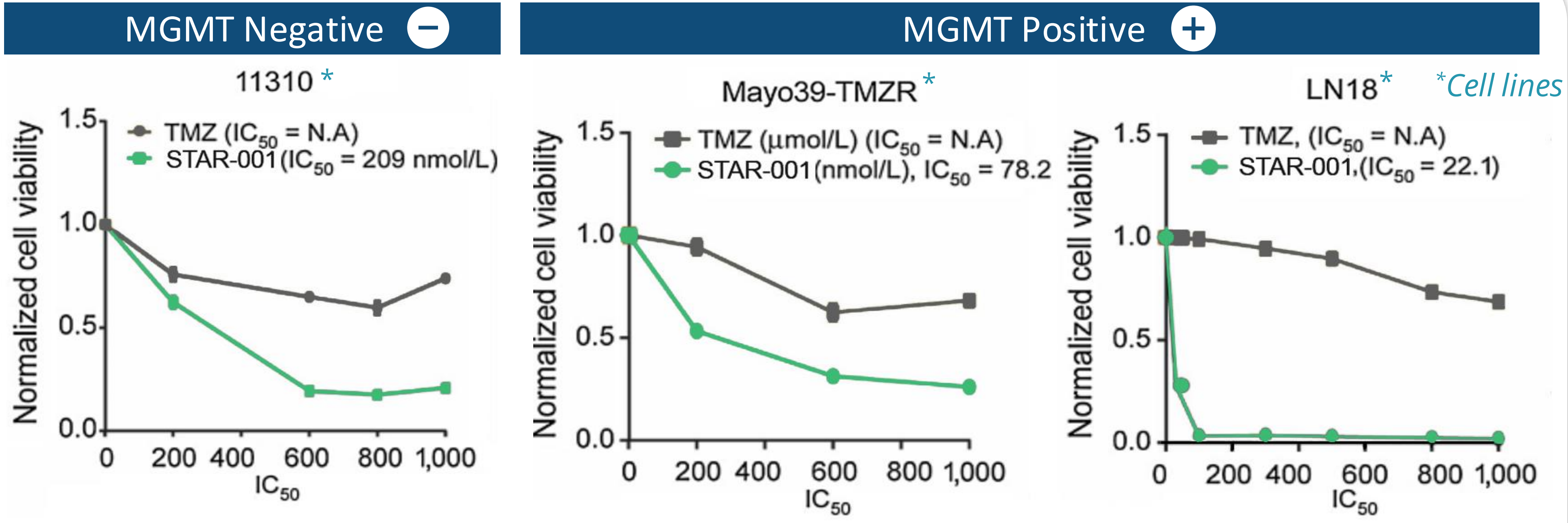
- **500,000+ Potential CNS Patients** Globally*
- **Multiple Clinical-stage** CNS Cancer Indications
- STAR-001 has been Granted **FDA Orphan Drug Designation for GBM & ATRT and Rare Pediatric Disease Designation for ATRT**
- **World Class Collaborators** from Johns Hopkins, UT Health San Antonio, and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

**Estimated Annual Global Numbers*

STAR-001 has potent anti-tumor efficacy in methylated and unmethylated GBM mouse models

STAR-001 demonstrates **3,000X** higher *in vitro* potency **compared to temozolomide -** independent of MGMT status

STAR-001 potency in MGMT negative and MGMT positive (temozolomide-resistant) GBM cell lines



STAR-001 KEY TAKEAWAYS

- No effective single-agent therapy has been approved for adult GBM in over 18 years
- STAR-001 was granted an FDA Orphan Drug Designation to treat malignant gliomas including GBM
- STAR-001 has shown effectiveness in both MGMT(+,-) forms of GBM cell lines
- Planning for launch of Phase 1b/2 in second half of 2024

Unique position of STAR-001 compared to current therapeutic options

starlight therapeutics

CURRENTLY APPROVED MAINSTAY GBM THERAPIES

	STAR-001	Temozolomide (TMZ)	Nitrosourea (CCNU)
Molecular weight	304 kD	194 kD	233 kD
Derivation	Mushroom *Omphalotus illudens**	Synthetic	Synthetic *Nitrogen Mustards*
Chemistry	Acylfulvene	Imidazotetrazine	Cyclohexylamine + 1-chloro-2-isocyanatoethane
Drug schedule	Intravenous D1, 8 q21d	Oral daily or D1-5 q28d	Oral D1 q6 weeks
Mechanism of action	dsDNA breaks @ N^3 adenosine	ssDNA breaks @ O^6 & N^7 guanine (methyl)	ss & dsDNA breaks @ O^6 guanine (chloroethyl)
DNA repair system	TC-NER & HR	MGMT	HR
Tumor/blood concentration ratio	0.2	0.2	0.9
IC_{50} *(varies by cell line)*	100~ 800 **nM**	500 µM	50 µM
Bioactivation	Prodrug, conversion by intracellular PTGR1	Prodrug, spontaneous conversion by hydrolysis to MTIC	Prodrug, spontaneous conversion by hydrolysis
Elimination, half life	Kidney, <30 minutes	Kidney, 2 hours	Kidney, <5 minutes

**Synthetic manufacturing route*

IP Portfolio

Intellectual property portfolio builds expanding protections with additional barriers to competition

100+ Issued Patents & Pending Applications

5 Families
Drug Sensitivity & Response Signatures using Biomarkers

11 Families
Methods of Use

2 Families
Composition of Matter

RADR

2041*
Identifying suitable cancer types and subtypes for a drug candidate

2043*
Applying ensemble methods in machine learning and deep learning for drug discovery

2044*
Predicting blood-brain barrier permeability

LP-300

2041*
Determining sensitivity to LP-300 based on biomarkers

2041*
Treating female (non-smoker) patients with non-small cell lung cancer

Increasing cancer patient survival time using LP-300

LP-184

2041
Treating rhabdoid tumors with LP-184

2039*
Treating solid tumor cancers using LP-184 and biomarker

2041*
Treating pancreatic cancer using LP-184

2042*
Treating cancers with spironolactone and LP-184

LP-284

2040
Composition of Matter

2041*
Treating blood cancers with LP-284

Patent Highlights

*Pending patent application. Date referenced indicates estimated year of expiration if the patent is granted.

Recent Posters/ Publications

Highlighting the strong validation of RADR® insights, de-risking the development of Lantern's drug candidates

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

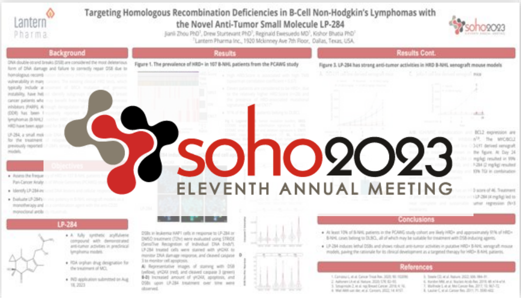
August 2024

Preclinical Efficacy of LP-184, a Tumor Site Activated Synthetic Lethal Therapeutic, in Glioblastoma

Oct 2023

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

May 2024



Targeting homologous recombination deficiencies in B-cell non-Hodgkin's lymphomas with the novel anti-tumor small molecule LP-284

Sep 2023

Phase 1a/1b clinical trial of LP-284, a highly potent TP53 mutation agnostic DNA damaging agent, in patients with refractory or relapsed lymphomas and solid tumors (NCT06132503)

April 2024

Artificial intelligence platform, RADR®, aids in the discovery of DNA damaging agent for the ultra-rare cancer Atypical Teratoid Rhabdoid Tumors

Oct 2022

Financial Highlights And Cap Table

Solid financial position and capital efficiency fuel continued growth anticipated to provide a cash runway into at least Q3 2025

- **Approx. $33.3 M of cash, cash equivalents and marketable securities as of June 30th, 2024**
- Committed to creating enduring growth and value for LTRN shareholders

LANTERN PHARMA INC. (LTRN)	
Exchange	Nasdaq
52 Week Per Share Price Range (through 8/9/24)	$2.38 - $11.99
Common Shares Outstanding (6/30/24)	10.76M
Warrants (6/30/24)	81.5K
Options (Employees, Management and Directors) (6/30/24)	1.06M
Fully Diluted Shares Outstanding (6/30/24)	11.90M

Lantern's Board of Directors

Donald "Jeff" Keyser, J.D., MPH, Ph.D.
Non-executive Chairman

David Silberstein, Ph.D.

Vijay Chandru, Ph.D.

Maria Maccecchini, Ph.D.

Panna Sharma
CEO and President

Leadership

PANNA SHARMA

Chief Executive Officer
& President

PRIOR:

- President & CEO, Cancer Genetics (CGIX)
- CEO & Managing Partner, TSG Partners
- Managing Member, Oncospire Genomics (Joint Venture with Mayo Clinic)
- CSO, iXL Services

DAVID MARGRAVE

Chief Financial Officer

PRIOR:

- 20+ years of oncology focused management experience
- Chairman, Texas Healthcare & Bioscience Institute (current)
- President & CAO, BioNumerik Pharmaceuticals

KISHOR BHATIA, Ph.D.

Chief Scientific Officer

PRIOR:

- 40+ years experience in cancer research
- Director, Children's cancer Center Riyadh
- Director Office of AIDS Malignancy Program, NCI

REGINALD EWESUEDO, M.D., M.S.c., MBA

VP of Clinical Development

PRIOR:

- VP, Kymera Theraputics
- VP, Tesaro/GSK
- VP, Pfizer

MARC CHAMBERLAIN M.D.

Chief Medical Officer

PRIOR:

- Co-director of Neuro-oncology program, UC San Diego; USC; Moffitt Cancer Center; Fred Hutchinson Cancer Center
- Medical Director, Cascadian Therapeutics; SeaGen; SystImmune; Pionyr Immunotherapeutics

PETER CARR

Principal Software Architect

PRIOR:

- Sr. Software Engineer, Broad Institute Cancer Program
- Sr. Programmer/Analyst, Boston Univ Science & Math Education Center

Investment Highlights

Lantern Pharma (NASDAQ: LTRN)

Proven drug rescue and drug development process and in the clinic with 3 compounds and accelerating additional compounds and combinations to clinical trials...potentially saving tens of millions of dollars and years of development

Growing AI based platform with clear roadmap to 100+ Bn. datapoints focused exquisitely on cancer therapeutic development and companion Dx in a high growth, high demand $12+ Bn. market

Focused on cancer drug market segments with clear clinical need, understood mechanisms, targeted patient populations that exceed 1 million , and multi-billion USD in annual sales potential

A novel AI-powered ADC platform with the potential to develop and out-license or partner ADC assets in early phases

Several compounds in place with multiple targeted indications, including LP-184 and LP-284 (received Orphan Disease Designations in pancreatic and GBM & Rare Pediatric Disease Designation for ATRT), which can help accelerate development

Proven and growing library of AI & machine-learning methodologies published at ASCO, AACR, and SNO used to generate novel IP & patents and accelerate discovery by potentially years

Experienced and innovative management team w/ 70+ years experience in cancer and a passion to change the cost and outcome for cancer patients by using AI and genomics – *paradigm changing technologies*

Industry leading collaborations with Johns Hopkins, UT Health San Antonio, Fox Chase Cancer Center, and University of Bielefeld

2024 Investment Highlights

Recent Milestones

- Dosed initial patients in the Harmonic™ clinical trial
- Launched Phase 1A basket trial for LP-184 and multiple patients dosed
- Launched Phase 1A trial for LP-284 and initial patients dosed
- Advanced collaboration with Bielefeld University to develop breakthrough ADCs using AI
- Developed industry leading AI algorithms to predict any compound's ability to cross the BBB
- Expanded RADR® AI platform to 60+ billion datapoints
- Received orphan drug designation for LP-284 in High-Grade B-cell Lymphoma

Upcoming Milestones

- 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
- Develop combination programs for LP-184, LP-284, and LP-300 with existing approved drugs

Lantern Pharma®

NASDAQ: LTRN

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