Fourth quarter 2021 Operating & Financial Results Conference Call / Webinar

March 10th, 2022
4:30 PM Eastern Time

TODAY'S SPEAKERS

Panna Sharma

Chief Executive Officer,
President and Director

David Margrave

Chief Financial Officer
and Secretary

Dr. Kishor Bhatia

Chief Scientific Officer

Nicole Leber

Investor Relations

Forward Looking Statements

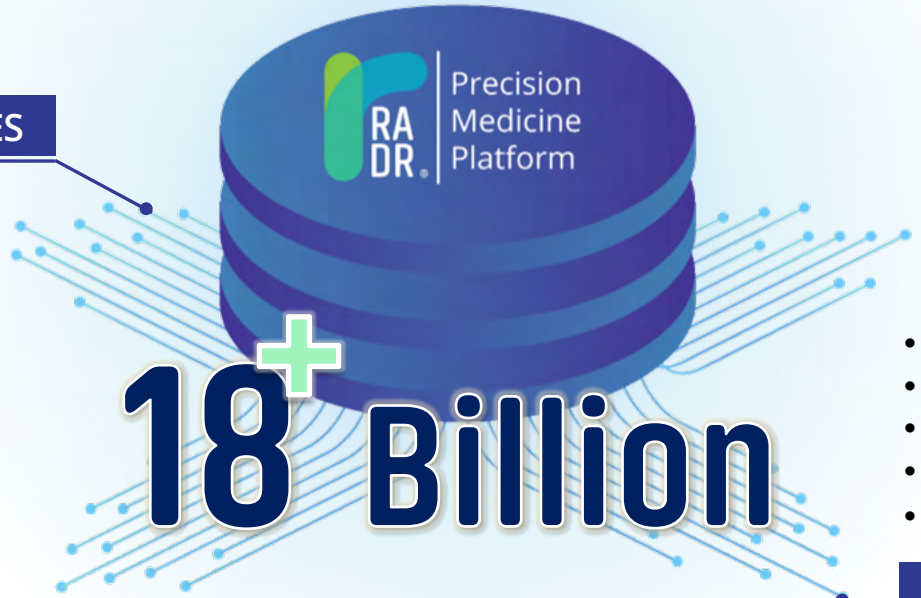
This presentation contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements include, among other things, statements relating to: future events or 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; 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 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," “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 impact of the COVID-19 pandemic, (ii) the risk that our research and the research of our collaborators may not be successful, (iii) the risk that we may not be able to successfully initiate, conduct, or conclude clinical testing for or obtain marketing approval for our product candidates; (iv) the risk that no drug product based on our proprietary RADR A.I. platform has received FDA marketing approval or otherwise been incorporated into a commercial product, and (v) those other factors set forth in the Risk Factors section in our Annual Report on Form 10-K for the year ended December 31, 2021, filed with the Securities and Exchange Commission on March 10, 2022. You may access our Annual Report on Form 10-K for the year ended December 31, 2021 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

RADR® Surpassed 18 billion datapoints this past month

NEW CANCER CATEGORIES

- Rare Solid Tumors
- Ultra Rare Cancers
- Pediatric Cancers
- Bladder Cancer
- CNS & Brain Cancers



- Immune Data
- Protein Data
- Hotspot Mutation Panels
- Methylome Data
- Epigenetic Data

NEW DATA TYPES

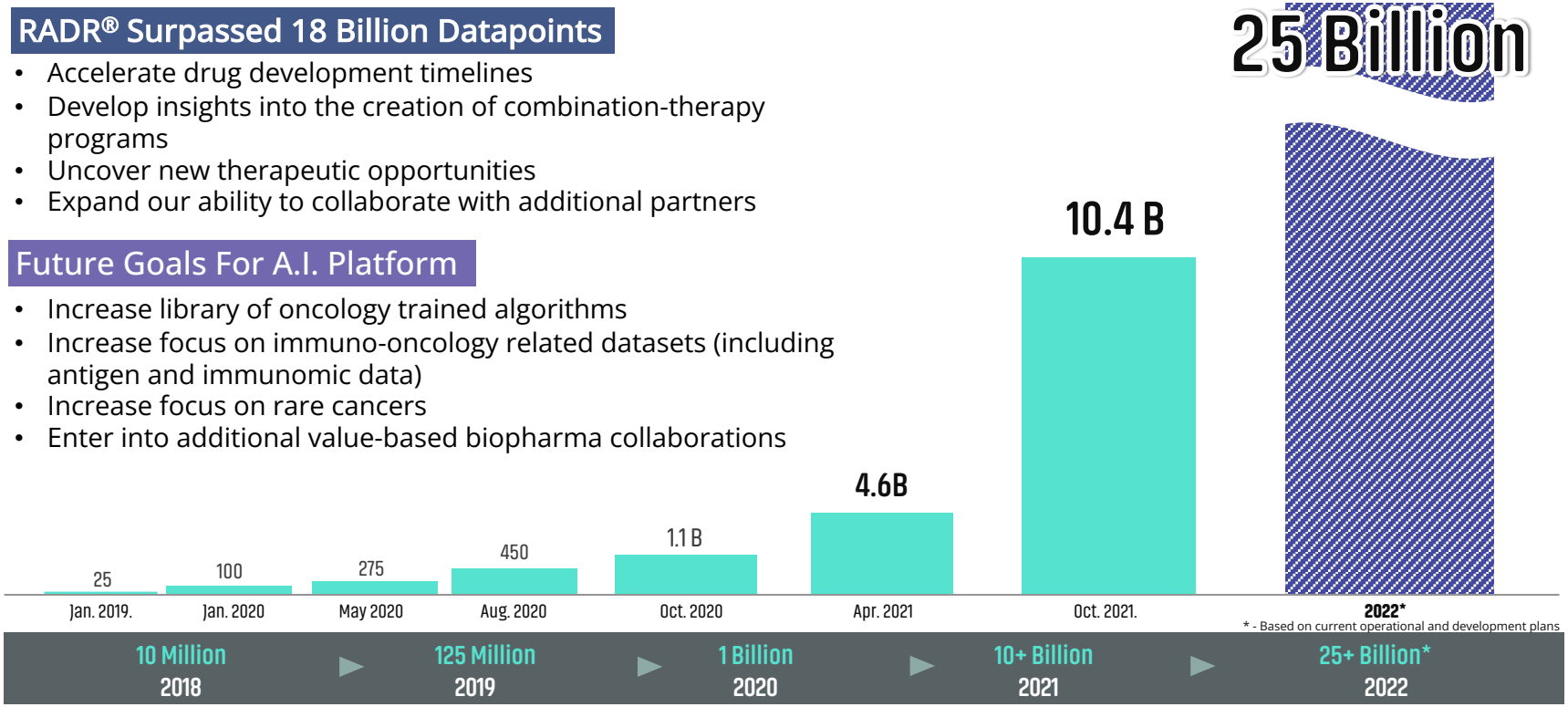
Expanding RADR® drives growth in our portfolio of therapies and potential collaborations with other biopharma companies

RADR® Surpassed 18 Billion Datapoints

- Accelerate drug development timelines
- Develop insights into the creation of combination-therapy programs
- Uncover new therapeutic opportunities
- Expand our ability to collaborate with additional partners

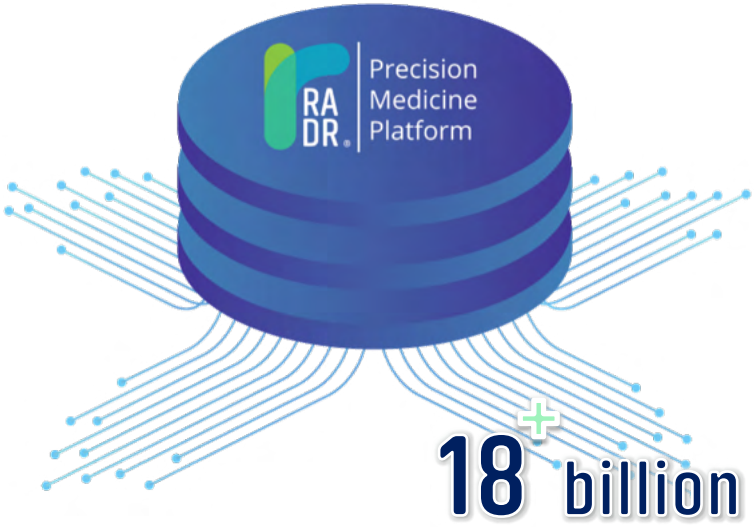
Future Goals For A.I. Platform

- Increase library of oncology trained algorithms
- Increase focus on immuno-oncology related datasets (including antigen and immunomic data)
- Increase focus on rare cancers
- Enter into additional value-based biopharma collaborations



What is RADR®

Response **A**lgorithm for
Drug Positioning & **R**escue

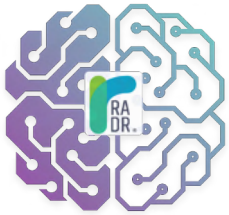


- A proprietary integrated data analytics, experimental biology, oncology-focused, machine-learning-based platform focused on drug development
- Leverages cutting edge machine-learning approaches and techniques to generate powerful data-driven insights
- Enables rapid informatics based hypothesis generation which can be validated in wet-lab
- Uses biology driven machine-learning algorithms to achieve higher prediction accuracy in real world settings
- A scalable, robust, expanding and replicable platform to support a range of drug development needs

Lantern leverages A.I. to reduce oncology drug development costs and improve the likelihood of success

Abandoned Drug Assets & New Drug Development

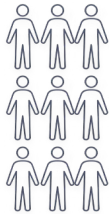
- Drugs that fell short of statistical significance *or* abandoned by pharma / biotech companies in late stage trials despite tens to hundreds of millions spent on development, PK analysis, safety and efficacy studies
- Development of new compounds in drug classes that leverage our AI platform



RADR®

- Big data (genomic, clinical, response) assembled and analyzed
- Patient subgroups identified through machine learning and artificial intelligence
- Mechanisms of action clarified
- Potpotential combinations identified
- Potential for faster and more efficient path to relaunching in the clinical trial setting

Responders



Non-Responders

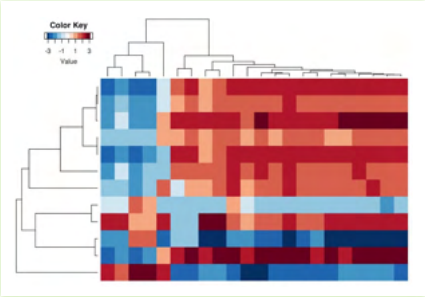
- Patient stratification based on A.I. enabled genomic biomarker discovery
- New patient populations for failed or abandoned drugs based on validated biomarker signatures
- Aimed to shorten time to market
- Designed to reduce risk in development
- Potential for orphan or fast track status
- New Chemical Entities designed and filed

Potential to **shorten clinical development** by years,
save tens to hundreds of millions of dollars in cost and
substantially **de-risk drug development** versus the traditional model

How RADR® is used by Lantern & our collaborators

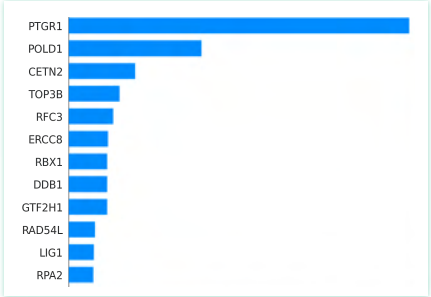
Find Mechanism of Action

Use RADR to find **potential Mechanism of Action (MoA)** of the Compound / Drug



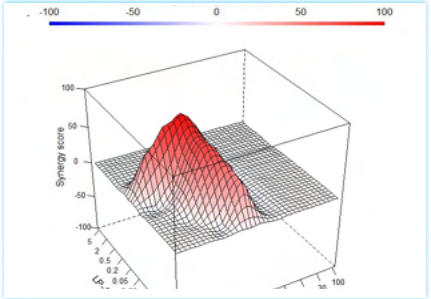
Derive ML-based signatures

RADR can derive Machine Learning based **gene signatures,** which can guide biomarker strategies & CDx (Companion Diagnostics)



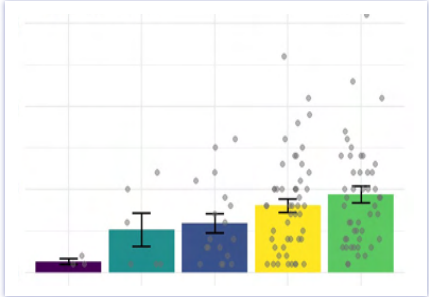
Identify Drug Combinations

Use different algorithms and methods from RADR to find **potential Drug combinations**

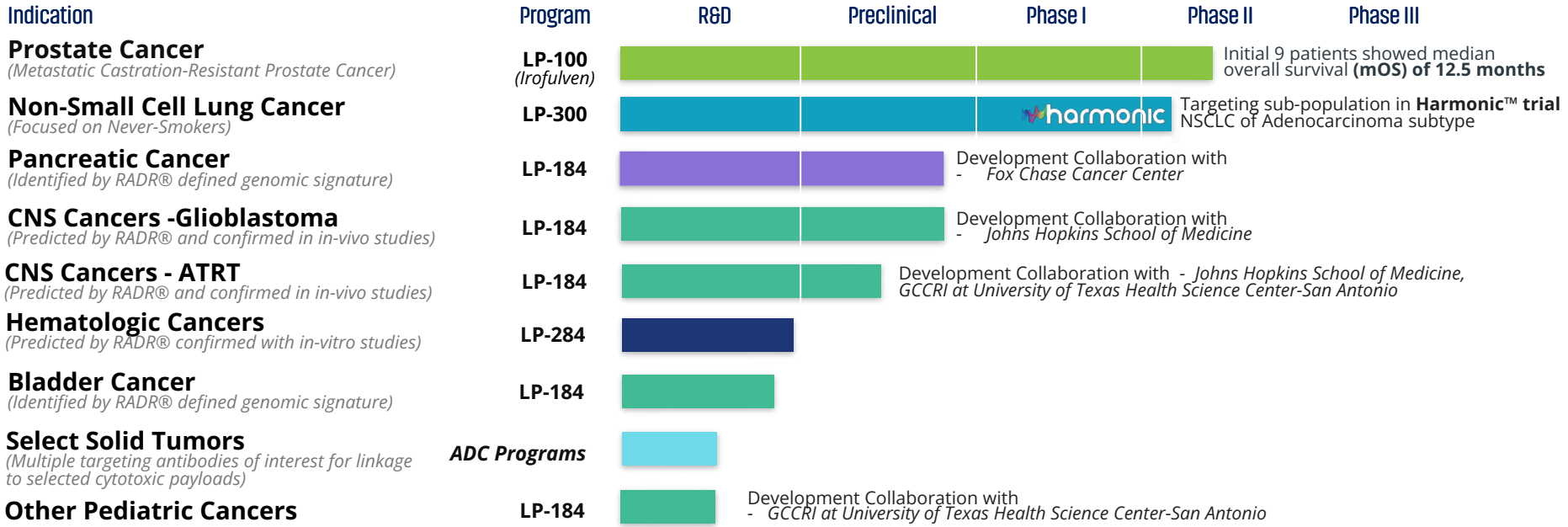


Identify new indications

Identify and prioritize type/subtype of cancer for your compound with use of RADR



Lantern's unique & rapidly developing pipeline

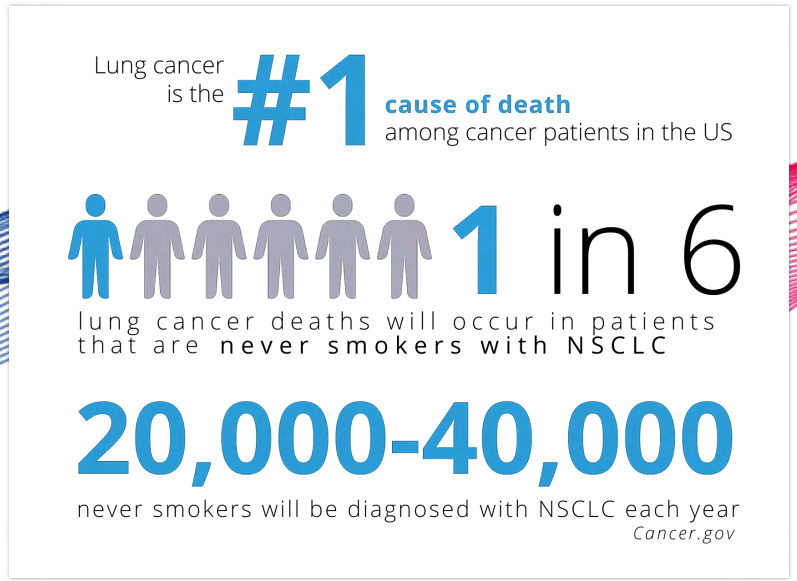


Accelerated Development by Leveraging the RADR® A.I. platform

Over 80+ issued patents and pending applications across 14 patent families

Harmonic™ clinical trial – Phase 2 trial for LP-300

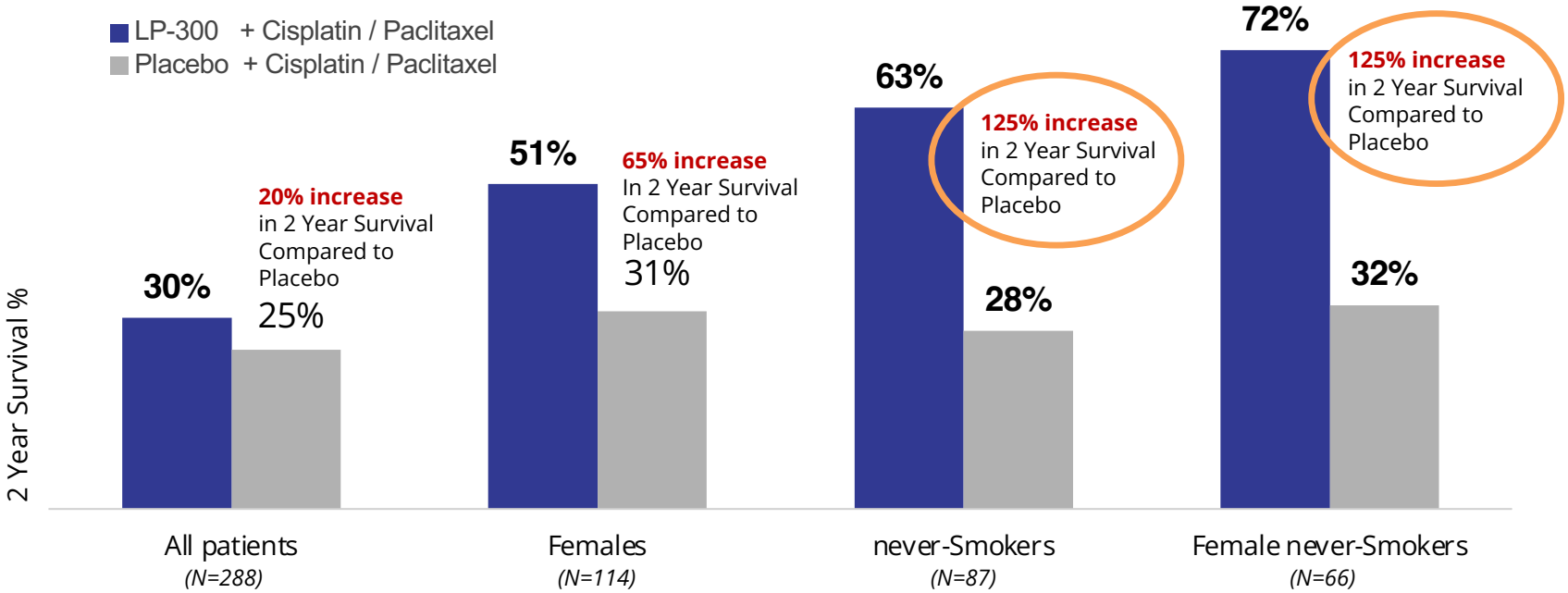
*"If lung cancer in never-smokers were a separate entity, it would be in the **top 10 cancers** in the U.S."*



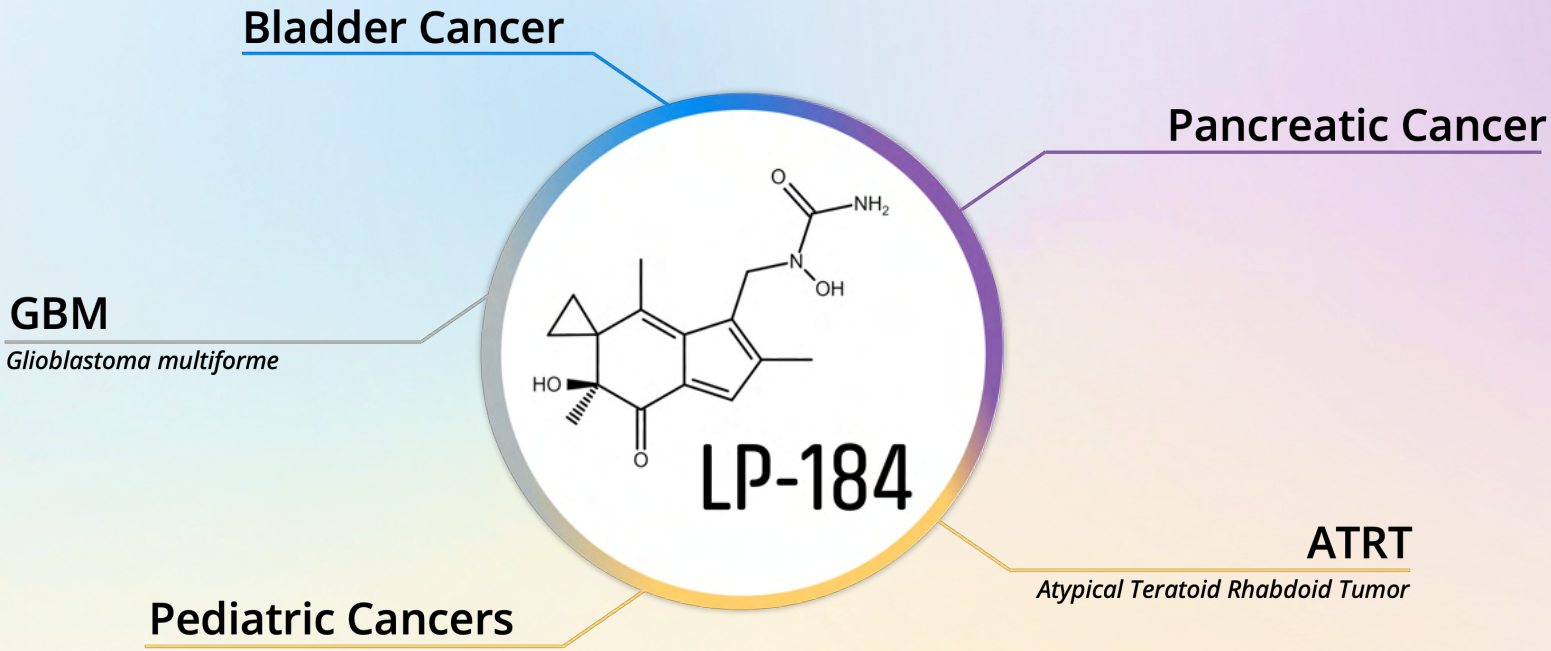
Harmonic™ clinical trial is a Phase 2, multi-center, study to evaluate Lantern's investigational drug LP-300. It is focused on treating **Never Smoker** patients with relapsed advanced primary adenocarcinoma of the lung, which is a type of non-small cell lung cancer (NSCLC).

- 90 patient, two-arm, open label trial
- trial focused on **Never Smoking** patients with relapsed primary adenocarcinoma of the lung, a type of NSCLC.
- In a subset of Never Smoker patients from a larger NSCLC trial, patients who received LP-300 with chemotherapy showed **increased overall and 2-year patient survival by 91% and 125%**, respectively.

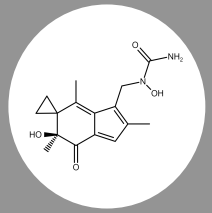
Lantern's precision oncology approach in the LP-300 Phase II trial builds on a prior Phase III trial that did not meet clinical efficacy endpoints but demonstrated survival benefit in a patient subgroup



Source: Phase 3 clinical trial, study ID DMS32212R, conducted by BioNumerik Pharmaceuticals - subpopulations receiving paclitaxel/cisplatin



- Granted **Orphan Drug Designation** for the treatment of Pancreatic Cancer, GBM and ATRT
- Granted **Rare Pediatric Disease Designation** for the treatment of ATRT
- Positive preclinical data for LP-184 in pancreatic cancer and GBM
- Currently conducting IND enabling studies to support IND submission in 2022



LP-184

Glioblastoma Multiforme (GBM)

12,914

Estimated new cases in the US in 2022

250,000

Estimated Global incidence in 2022

Recent Highlights

- In orthotopic GBM xenografts showed **significant tumor reduction and survival benefit** with LP-184 treatment
- **Combination** of spironolactone with LP-184 led to 3-6x enhancements in GBM sensitivity *in vitro*

Upcoming Milestones

- Evaluation of *in vivo* anti-tumor efficacy of **LP-184 + Spironolactone combination** in a subcutaneous xenograft tumor model of GBM
- **Protocol development** for a phase 0/2 clinical trial testing LP-184 in recurrent GBM/ MGMT unmethylated newly diagnosed GBM
- A publication showing LP-184 efficacy in GBM is being prepared for submission in collaboration with Dr. John Laterra

Publication/ Presentation

SNO Society for NeuroOncology

"LP-184, a novel alkylating agent, is effective in glioblastoma"

Journal of Clinical Oncology®
An American Society of Clinical Oncology Journal

"Glioblastoma Response to Blood-Brain-Barrier Permeable, MGMT-Agnostic Therapeutic LP-184 and Sensitization by Nucleotide-Excision Repair Deficiency." (submitted)

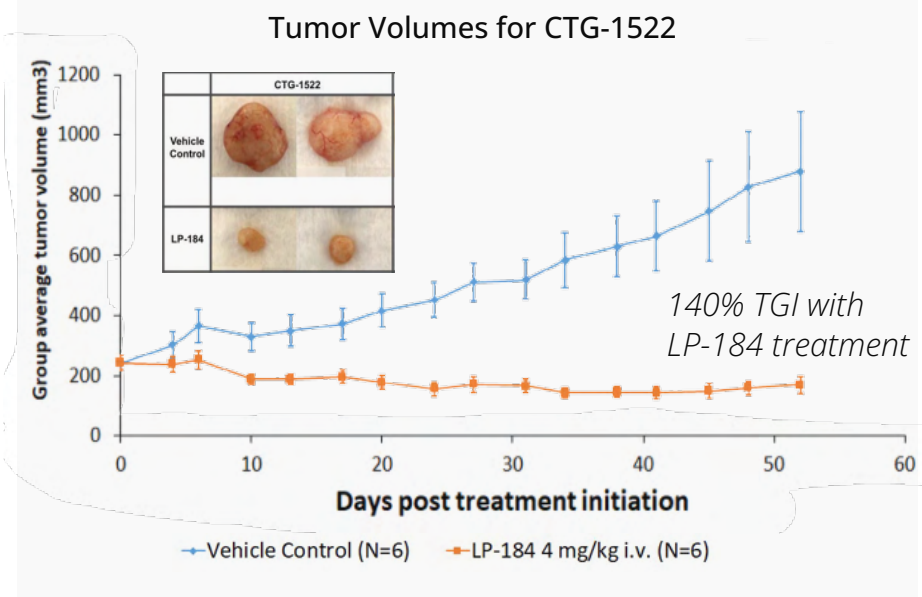
Collaboration

Kennedy Krieger Institute

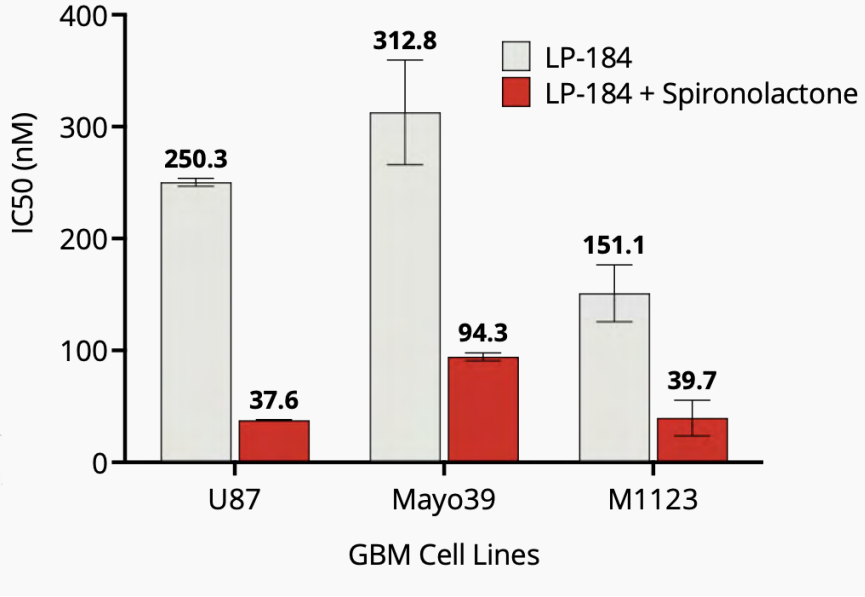
JOHNS HOPKINS MEDICINE

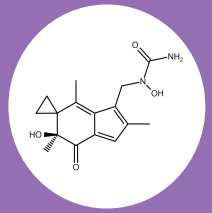
Positive preclinical data in GBM

In-vitro Blood Brain Permeability of LP-184



Combination Therapy of LP-184 with Spironolactone





LP-184

Pancreatic Cancer

37,700

Estimated new cases in the US in 2021

460,000

Estimated Global incidence in 2021

Recent Highlights

- In HR deficient pancreatic cancer cell line, LP-184 combined with gemcitabine, irinotecan and oxaliplatin (part of the standard of care for pancreatic cancer) is **synergistic** over selected concentration ranges.
- Lantern hosted a **virtual KOL event** on the potential treatment of Pancreatic Cancer with LP-184, on World pancreatic cancer day

Upcoming Milestones

- Evaluation of *in vivo* anti-tumor efficacy of LP-184 in combination with (i) selected SOC chemotherapeutic agents (ii) radiation in xenograft models
- Complete **IND enabling studies** in first half of 2022
- Plan on **Phase 1 clinical trial** in second half of 2022

Publication/ Presentation

AACR American Association for Cancer Research

"LP-184, a novel alkylating agent, is highly effective in pancreatic cancers with DNA damage repair defects"

Journal of Clinical Oncology®
An American Society of Clinical Oncology Journal

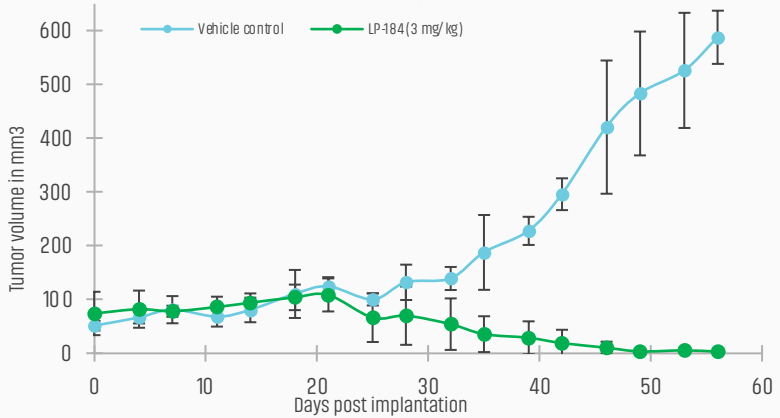
"Synthetic lethality of LP-184, a next generation acylfulvene, in ex vivo PDX models with homologous recombination defects"

Collaboration

Fox Chase Cancer Center
Temple Health

Positive preclinical data in pancreatic cancer

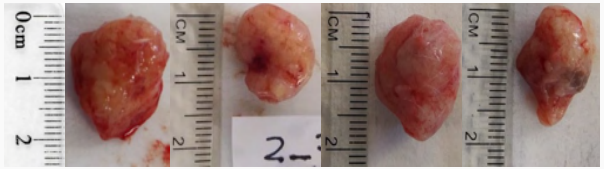
LP-184 in vivo response in a Capan-1 pancreatic cancer xenograft mouse model



Tumor growth inhibition of **109%** was observed with LP-184 treatment relative to control with dosing occurring weekly over an 8 week period

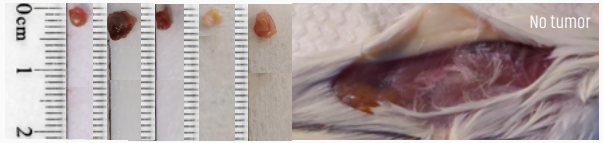
LP-184 demonstrated significant tumor shrinkage (146x) in in-vivo mice PDX models

Tumors From Vehicle Control Mice at the End of Study Period



Average tumor volume = 587 mm^3

Tumors from LP-184 (3mg/kg) Treated Mice at the End of Study Period



Average tumor volume = 4 mm^3

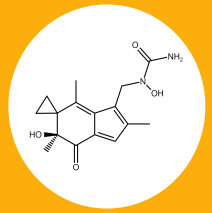
Preclinical data demonstrated that LP-184 demonstrated significant & rapid pancreatic tumor shrinkage, by **over 90%,** in *in-vivo* mouse models in 8 weeks.

In August 2021, the U.S. **FDA granted LP-184 Orphan Drug Designation (ODD)** for the treatment of Pancreatic Cancer

LP-184 synergistic combinations in pancreatic cancer cell lines

Cell line	NERD	HRD	LP-184 + combination agent	Bliss Synergy Score
Capan1	No	Yes	**Gemcitabine**	13.76
			5-Fluorouracil	10.53
			Irinotecan	16.50
			Oxaliplatin	15.42
Panc03.27	No	No	**Irinotecan**	12.00
			Oxaliplatin	12.09

Note: Bliss synergy score ranges from -100 to 100. A synergy score >10 generally indicates synergism.



LP-184

Atypical Teratoid Rhabdoid Tumor (ATRT)

60

Estimated new cases in the US annually

600

Total existing cases of ATRT in the US

Recent Highlights

- LP-184 for ATRT granted **Orphan Drug Designation** and **Rare Pediatric Disease Designation** by FDA
- ATRT is exceptionally sensitive to LP-184, with response positively correlated to loss of SWI/SNF proteins that cause rhabdoid tumors and are altered in 20% of all cancers

Upcoming Milestones

- Publications showing **enhanced LP-184 response** with spironolactone combination and the effectiveness of LP-184 in ATRT and other rhabdoid tumors are expected mid 2022
- Numerous Rhabdoid Tumors are believed to share ATRT sensitivity to LP-184 and **over 20 models** are being tested at UT Health, with Dr. Peter Houghton
- Protocol development for a **Phase 1 trial** in pediatric CNS cancers

Collaboration

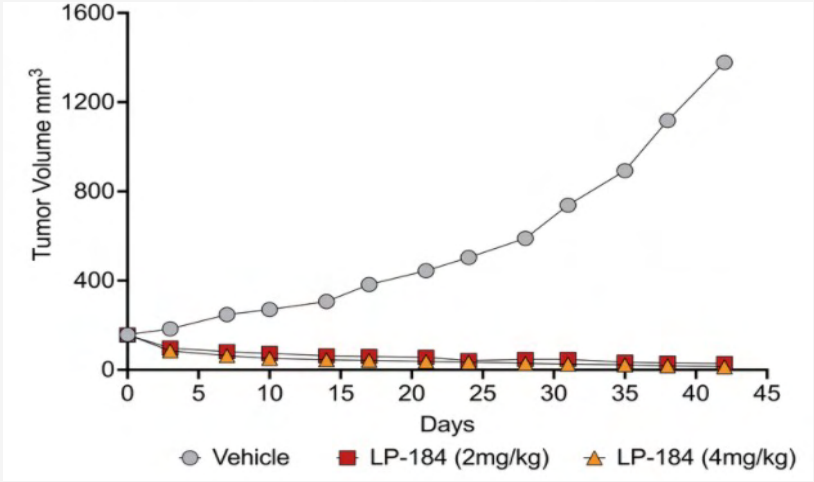
JOHNS HOPKINS MEDICINE

UT Health San Antonio
Greehey Children's Cancer Research Institute

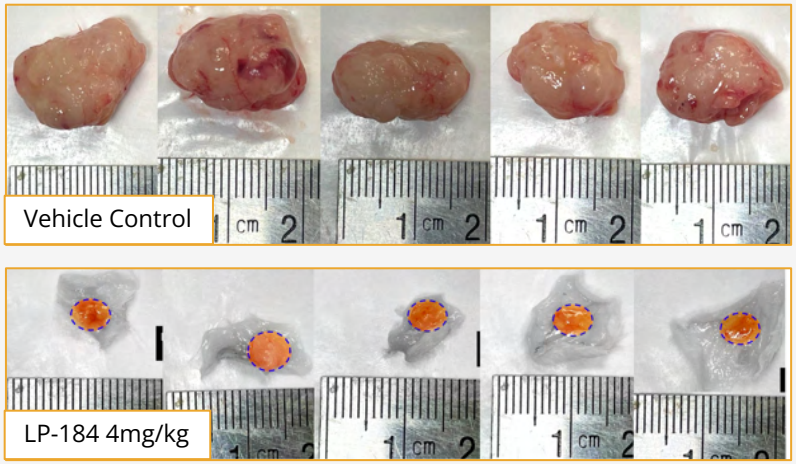
LP-184 is effective in a xenograft model of Atypical Teratoid / Rhabdoid Tumor (ATRT)

CHLA06 subcutaneous cell line derived xenograft model (SMARCB1 deletion, MYC elevation)

Tumor Volumes for CHLA-06



Representative terminal tumors



Orphan Drug Designation (ODD) and Rare Pediatric Disease Designation (RPDD) were granted by FDA for the use of LP-184 in ATRT treatment

ADC Program

Antibody Drug Conjugate (ADC) Program for Select Solid Tumors

Characteristics

High Specificity

ADCs take advantage of the high potency of cytotoxic payloads and the superior specificity of antibodies. The drug antibody conjugate thus maximizes efficacy and minimizes systemic toxicity

Growing

2 of the 4 largest oncology licensing deals in 2020 were for **ADC assets**
AstraZeneca licensed a Ph 1 ADC from Daiichi Sanko for *$6.0 billion*
Merck licensed a Ph2 ADC from Seagen for *$3.2 billion*

Highlights and Milestones

- Designing a library of ADC molecules for feasibility and preclinical studies
  - Library will be developed with both cleavable and non-cleavable linkers
  - Three potent payloads being considered
- Initial studies will focus on three potential antibodies to target **epithelial** and **lymphoid** tumors
- Lead candidates will be chosen based upon efficacy, toxicity, bystander effects and flexibility of payloads to achieve an acceptable range of DAR (Drug Antibody Ratio)

Academic and research collaborations

NIH National Cancer Institute	LP-184 LP-284	Gene signature development and drug sensitivity prediction
Johns Hopkins Medicine	LP-184	Evaluation of efficacy of LP-184 in glioblastoma (GBM)
Fox Chase Cancer Center, Temple Health	LP-184	Determination of drug efficacy in pancreatic PDX tumor models
Georgetown University	LP-184	Evaluation of drug efficacy and sensitivity in prostate and pancreatic cancer organoid models and engineered pancreatic cancer cell lines
Danish Cancer Society | Research Center	LP-100 LP-184	Examine efficacy of Lantern's drug portfolio in common solid tumors that harbor DNA damage repair deficiency
UT Health San Antonio	LP-184 LP-284	Evaluation of drug efficacy in pediatric tumor models

Technology collaborations with Deep Lens and Code Ocean

Strategic collaboration to accelerate patient enrollment for the Harmonic™ Clinical Trial for never-smokers with non-small cell lung cancer (NSCLC), utilizing LP-300 in combination with chemotherapy

Strategic collaboration to to facilitate the accelerated development of RADR® while reducing development complexity and cost and increasing security and reproducibility

Precision Medicine Platform

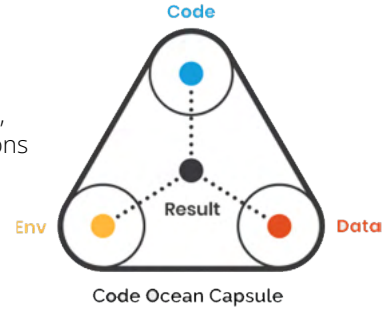
predict outcomes and response in specific patient subsets

VIPER

accelerate the patient enrollment

Leveraging Code Ocean's *Compute Capsule* technology

- further power RADR® platform for faster, more collaborative discoveries from billions of RADR data points, as well as data and insights from collaborators.
- manage our external data and code collaborators with ease



*Help Patients to have access to the **right medicine** at the **right time***

*Further enhances our already established RADR® platform and provides **additional efficiencies** in terms of development time and cost.*

*We believe our **solid financial position** will fuel continued growth and evolution of our RADR® A.I. 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.***

Contents

Summary results of operations

	Three Months Ended December 31, (Unaudited)		Year Ended December 31,	
	2021	**2020**	**2021**	**2020**
Operating expenses:				
General and administrative	1,348,983	1,547,675	5,020,928	3,664,965
Research and development	2,162,260	1,348,329	7,570,580	2,243,225
Total operating expenses	3,511,243	2,896,004	12,591,508	5,908,190
Loss from operations	**(3,511,243)**	**(2,896,004)**	**(12,591,508)**	**(5,908,190)**
Interest + Other income, net	(29,031)	-	228,479	-
NET LOSS	**$ (3,540,274)**	**$ (2,896,004)**	**$ (12,363,029)**	**$ (5,908,190)**
Net loss per common share, basic and diluted	$ (0.31)	$ (0.47)	$ (1.13)	$ (1.37)
Weighted avg. common shares outstanding - basic and diluted	11,403,339	6,219,871	10,904,927	4,304,918

Balance sheet highlights & summary

	12/31/2021	12/31/2020
Cash and Marketable Securities	**$ 70,725,447**	**$ 19,229,232**
Prepaid Expenses & Other Current Assets	$ 1,990,953	$ 1,007,690
Total Assets	**$ 73,950,477**	**$ 20,359,634**
Total Liabilities	**$ 2,379,057**	**$ 660,839**
Total Stockholders' Equity	**$ 71,571,420**	**$ 19,698,795**

Shares Outstanding

	December 31, 2021
LANTERN PHARMA INC. (LTRN)	
Common Shares Outstanding	11,088,835
Warrants	273,777
Options (Employees, Management and Directors)	890,826
Fully Diluted Shares Outstanding	**12,253,438**

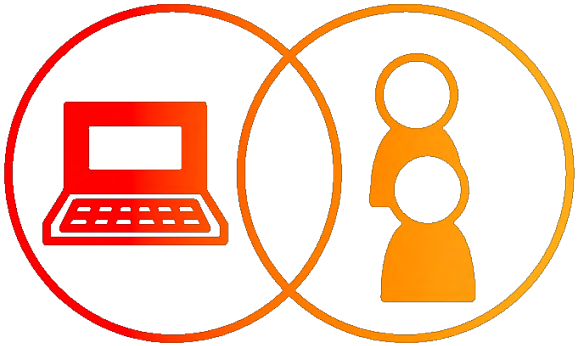
Share repurchase program

$7,000,000 is authorized for share repurchase under the Company's share repurchase program implemented in 2021

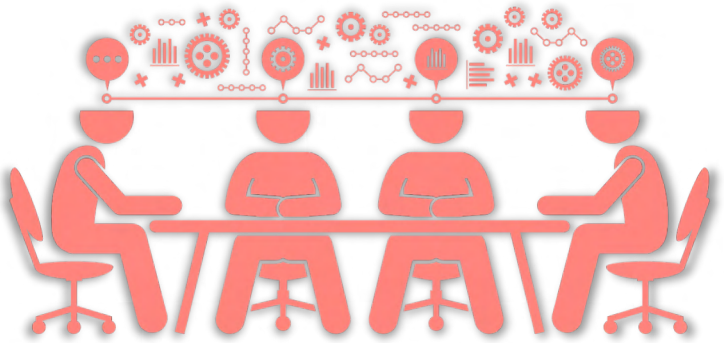
Date	Shares Repurchased	Average Price	Total Paid *including Commissions*
FY 2021	121,490	$7.71	$939,666
January 1, 2022 – March 1, 2022	308,345	$6.97	$2,199,964
Total	**429,835**	**$7.18**	**$3,139,630**

Migrating to a hybrid work environment

HYBRID WORK ENVIRONMENT



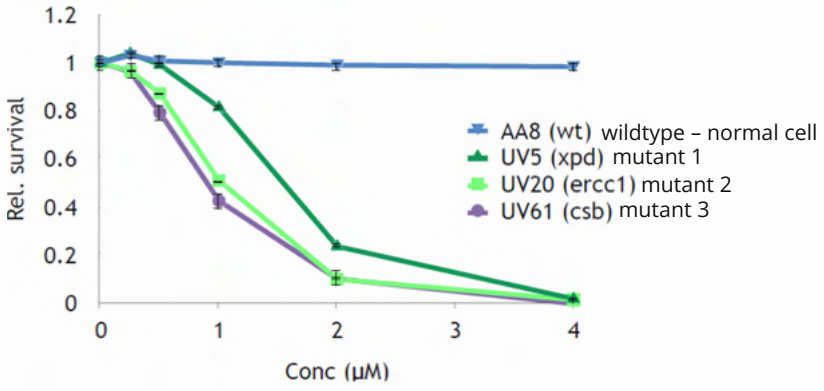
GROWING TEAM



Contents

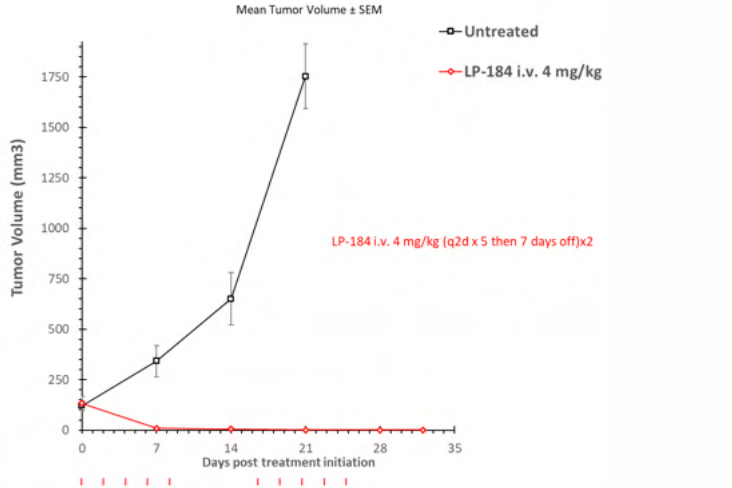
LP-184 shows exquisite sensitivity in NERD as well as HRD cancers !

LP-184 in NERD cancers

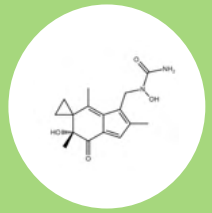


Mutant cell lines deficient in the Nucleotide Excision Repair (NER) pathway were **more sensitive to LP-184** than the parent cell line

LP-184 in HRD cancers



LP-184 treatment resulted in **complete tumor regression** in a PDX model of TNBC that is HR deficient and resistant to PARP inhibitors and doxorubicin/ cyclophosphamide



LP-284

Mantle Cell Lymphoma

4,200

2014 Estimated
new cases in the US

14,000

2017 estimated Global
incidence number

Recent Highlights

- Showed **nanomolar potency** in a variety of hematological cancer cells including in mantle cell lymphoma, double-hit lymphoma, Burkitt's lymphoma, multiple myeloma, chronic myeloid leukemia, and acute lymphocytic leukemia
- Presented at the 63rd **ASH meeting and Exposition**: chemical biology and experimental therapeutics

Upcoming Milestones

- Investigate LP-284's potency in ***in vivo*** **Mantle Cell Lymphoma** models
- Validate **molecular biomarkers** (unpublished data) that predict LP-284 sensitivity
- Examine LP-284's toxicity in animals

Publication/ Presentation

American Society of Hematology

"The Positive Enantiomer of a Novel Chiral DNA Alkylating Agent Exhibits Nanomolar Potency in Hematologic Cancers"

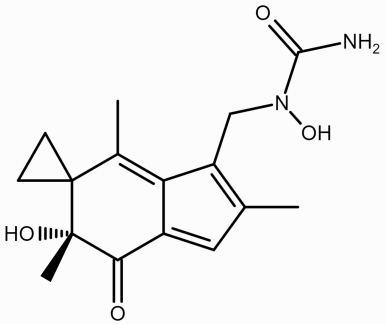
Jianli Zhou, Ph.D., Lantern Pharma

Collaboration

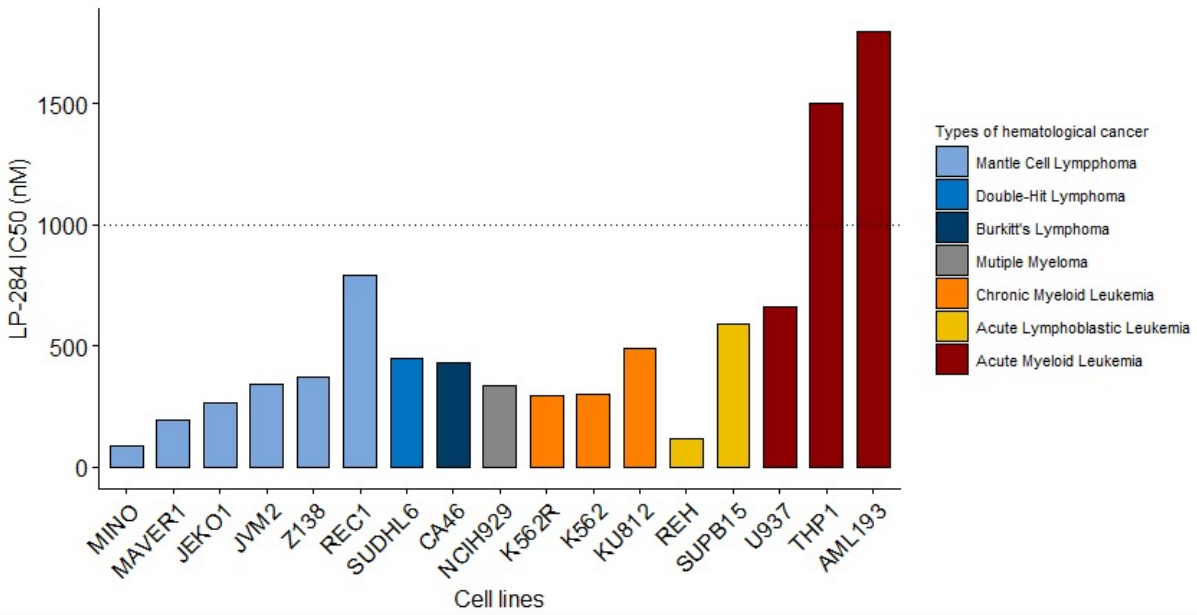
NIH NATIONAL CANCER INSTITUTE

LP-284 demonstrated distinct anti-tumor activity in hematologic cancer cells

LP - 284



- LP-284 is a synthetic molecule belonging to the new generation of acylfulvenes, a family of naturally derived anti-cancer drug candidates.
- LP-284 is the stereoisomer (enantiomer) of LP-184.



LP-284 exhibited **nanomolar potency** in mantle cell lymphoma, double-hit lymphoma, Burkitt's lymphoma, multiple myeloma, chronic myeloid leukemia, and acute lymphocytic leukemia

2022 Objectives

A **Transformational** year for Lantern

- Launch of **The Harmonic™ Trial** - Ph. 2 clinical trial for LP-300 in NSCLC
- Advance LP-100 clinical trial
- Launch Ph. 1 clinical trial for LP-184 in genomically-defined solid tumors
- Launch Ph. 1/2 clinical trial for LP-184 in GBM
- Progress LP-184 in ATRT towards Ph. 1/2 clinical trial
- Advance pediatric cancer drug development program
- Advance ADC preclinical studies to support future Phase 1 launch
- Explore potential combinations for LP-184, LP-284 & LP-300 with other existing approved drugs
- Strategically grow RADR® A.I. platform to 25 billion datapoints
- Explore licensing and partnership opportunities

Contents

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