Fourth Quarter 2022
Operating & Financial Results Conference Call / Webinar

March 20th, 2023
4:30 PM Eastern Time

Forward Looking Statements

This presentation contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements include, among other things, statements relating to: future events or our future financial performance; the potential advantages of our RADR® platform in identifying drug candidates and patient populations that are likely to respond to a drug candidate; our strategic plans to advance the development of our drug candidates and antibody drug conjugate (ADC) development program; estimates regarding the development timing for our drug candidates and ADC development program; expectations and estimates regarding clinical trial timing and patient enrollment; our research and development efforts of our internal drug discovery programs and the utilization of our RADR® platform to streamline the drug development process; our intention to leverage artificial intelligence, machine learning and genomic data to streamline and transform the pace, risk and cost of oncology drug discovery and development and to identify patient populations that would likely respond to a drug candidate; estimates regarding patient populations, potential markets and potential market sizes; sales estimates for our drug candidates and our plans to discover and develop drug candidates and to maximize their commercial potential by advancing such drug candidates ourselves or in collaboration with others. Any statements that are not statements of historical fact (including, without limitation, statements that use words such as "anticipate," "believe," "contemplate," "could," "estimate," "expect," "intend," "seek," "may," "might," "plan," "potential," "predict," "project," "target," “model,” "objective," "aim," "upcoming," "should," "will," "would," or the negative of these words or other similar expressions) should be considered forward-looking statements. There are a number of important factors that could cause our actual results to differ materially from those indicated by the forward-looking statements, such as (i) the 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 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, (iv) 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 (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, 2022, filed with the Securities and Exchange Commission on March 20, 2022. You may access our Annual Report on Form 10-K for the year ended December 31, 2022 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

Panna Sharma

Chief Executive Officer,
President and Director

David Margrave

Chief Financial Officer

Kishor Bhatia

Chief Science Officer

Host

Nicole Leber

Investor Relations

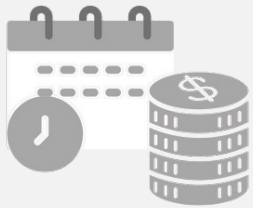
Using AI, Lantern is Transforming Drug Discovery Timelines and Cost

Lantern has launched **9 programs** in two years, and is anticipating launching Multiple Phase 1 trials in 2023

Lantern's Drug Development Model

Large Scale/Multi-omics Oncology Data

Proprietary AI platform RADR®



Accelerated timeline and reduced cost

Transforming Early Stage Discovery & Development

Traditional Model	Lantern's Model
3 – 5 + Years	**2** Years
$10 – 50 + Million	**$1-5** Million

Reduces **Significant** Time & Cost

*"In around **two years**, Lantern has progressed its GBM program from initial RADR® insights, to wet lab validation, to late stage IND enabling studies - significantly cutting typical drug development timelines and cost"*

(Biopharmatrend, 2022)

Sharpening Later Stage Clinical Trials

Traditional Model	Lantern's Model
6 – 12 + Years	**3-5** Years
$100 – 500 + Million	**$25-100** Million

Reduces **Significant** Time & Cost

*"**AI-driven patient stratification** helps to focus clinical trials with potentially fewer and more select patients, which are more likely to respond, ultimately saving time and money"*

(Panna Sharma)

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

Lantern has 12 disclosed drug programs including an ADC program and the Phase 2 Harmonic™ trial

Program	Indication		Discovery	Optimization	Preclinical	Pre IND	Phase I	Phase II
LP-300	Non-Small Cell Lung Cancer (NSCLC)							harmonic
LP-100	Homologous Repair Deficient Cancers (In combination with PARPi therapy)							
LP-184	**Solid Tumors**	Pancreatic Cancer						
		Bladder Cancer						
		TNBC						
LP-284	**Non-Hodgkin's Lymphomas**	Mantle Cell						
		Double Hit						
ADC	Select Solid Tumors							

Rescued Drug Candidates — Newly Developed Molecules — Antibody Drug Conjugate

starlight therapeutics	**STAR-001** (LP-184 for CNS and Brain indications only)	Glioblastoma (GBM)	
		Brain Mets (Lung, Breast, Skin)	
		ATRT	
		Pediatric Brain Cancers	

Fourth Quarter 2022 Highlights

LP-300 and Harmonic™ Trial

- Activated five clinical trial sites, across twelve locations (NY, CA, IL, OH, TX)
- First patients anticipated in early Q2 2023
- Launched first of its kind app focused on driving education & awareness for the NSCLC community

Starlight Therapeutics

- Lantern subsidiary formed to accelerate and focus the development of therapies for adult and pediatric central nervous system (CNS) cancers
- Clinical trials for the lead drug candidate, STAR-001, in CNS cancers are anticipated for late 2023/early 2024

Collaborations

- New RADR®-driven collaboration with TTC Oncology to advance Phase 2 ready candidate TTC-352
- Hosting a KOL webinar on Synthetic Lethality with leading expert Zoltan Szallasi M.D. on March 21st, at 12PM ET (Register: https://bit.ly/3J84Zui)

LP-184 for Solid Tumors

- IND enabling studies completed
- Filing of IND application anticipated in Q2 2023
- Phase 1 first in human clinical trial anticipated to launch in mid 2023
- TNBC indication/new data for LP-184 presented at SABCS

LP-284 for Non-Hodgkin's Lymphomas

- Completion of IND enabling studies and filing of IND application anticipated in Q2 2023
- Phase 1 first-in-human clinical trial expected launch in mid 2023
- Granted FDA Orphan Drug Designation for MCL
- Poster presented at ASH annual conference

RADR® Expansion

- RADR® continues rapid data growth & advances in functionality
- New product development roadmap announced for the development of Antibody Drug Conjugates

Financial Updates

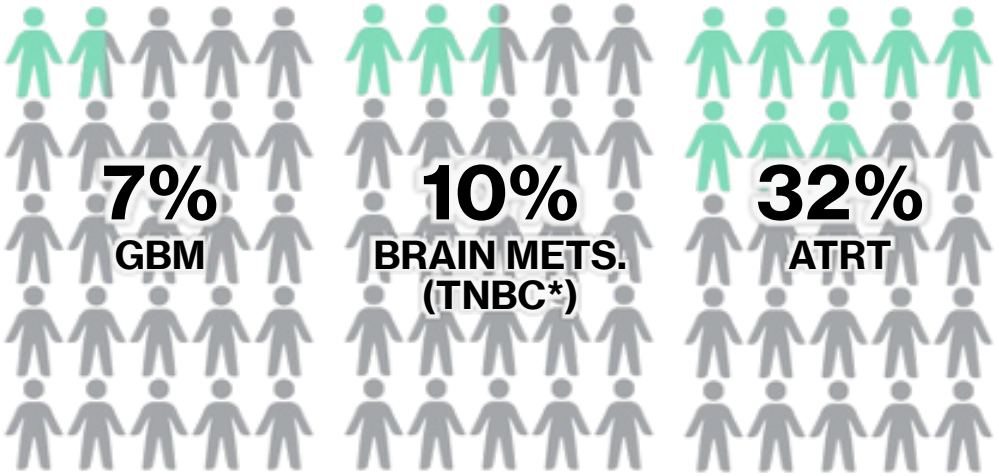
- $55.2 million of cash, cash equivalents, and marketable securities as of December 31, 2022
- Lantern has operating capital into 2025

Starlight Therapeutics' CNS and Brain Cancer Programs were Born from Billions of Datapoints and AI

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 17 years
- Effective therapies are needed to improve outcomes for brain mets. patients
- There are no approved therapies for atypical teratoid rhabdoid tumors (ATRT)
- Multiple CNS indications were developed – *in parallel* - by leveraging AI in less than 2 years time

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

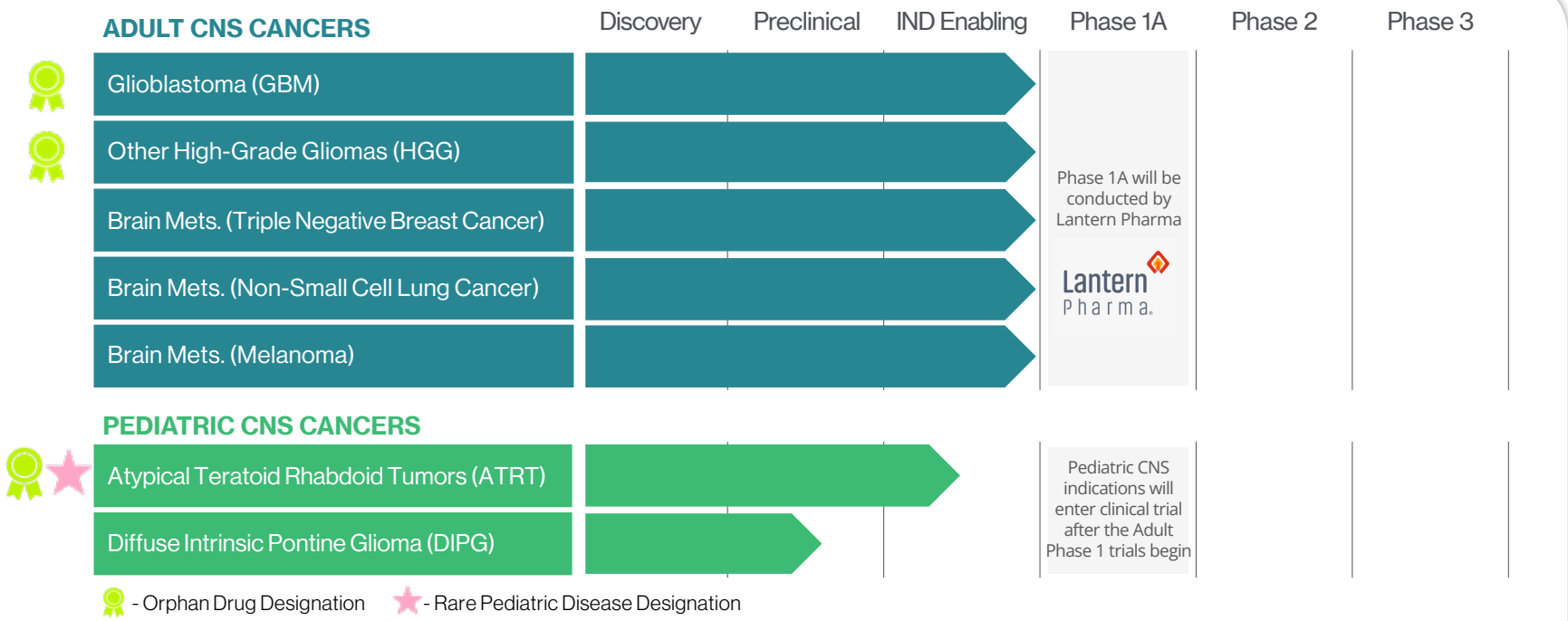


*Triple Negative Breast Cancer

- **Multiple Clinical-stage** CNS Cancer Indications
- **$5-6 Billion** Annual Market Potential for Targeted Indications*
- **500,000+ Potential CNS Patients** Globally*
- STAR-001 has been Granted **FDA Orphan Drug and Rare Pediatric Disease Designations**
- **World Class Collaborators** from Johns Hopkins and UT Health San Antonio
- **4** US Patents & Patent Applications and **10+** Foreign Pending Patent Applications

*Estimated Annual Global Numbers

Multiple Clinical Trials are Planned for STAR-001



- **Nanomolar potency** gives multiple shots on goal in CNS cancers
- Excellent **blood brain barrier permeability**
- **Improved bioavailability** over current SOC Agents
- Target CNS indications **have limited or no effective therapies**
- Upcoming **Phase 1/2 trials** for adult CNS cancers
- Upcoming **Phase 1 trial** for pediatric CNS cancers

STAR-001 has Multi-billion Market Potential In CNS Cancers

$5-6 billion (USD)

Global Annual Estimated Market Potential

Glioblastoma

$1.5-2 billion

Annual US Cases 13K

Other HGGs

$1.2 billion

Annual US Cases 22K

Brain Mets. (Lung, Breast)

$3 billion

Annual US Cases 100K

ATRT & Pediatric CNS

$0.1 billion

ATRT Annual US Cases 600+

The Harmonic™ Trial for Never Smoker Patients with NSCLC

harmonic

Phase 2

Non-Small Cell Lung Cancer

Never Smokers

90 Patients

Two arm, Open-label, Randomized Trial

Multi-Site

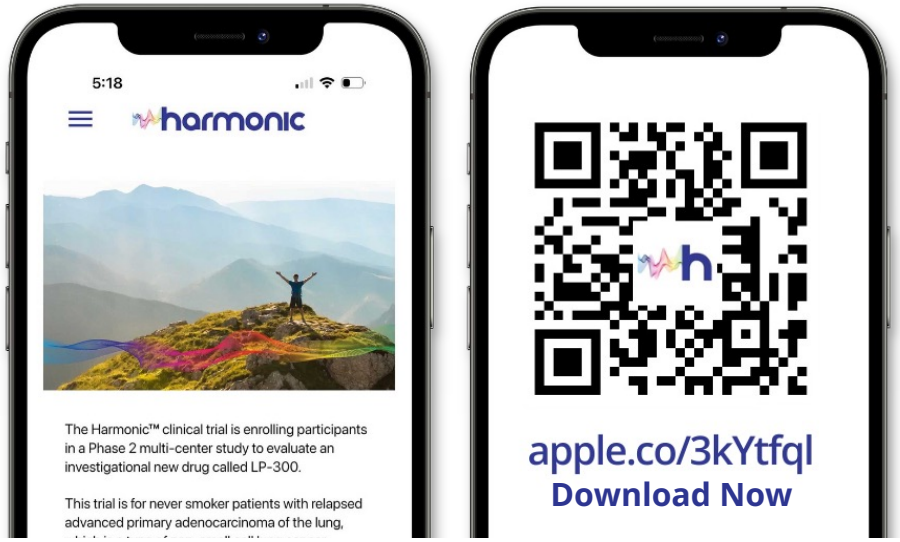
Major Updates

- Activated **5 sites** across **12 different locations** in the US
  - Gabrail Cancer Center
  - Northwest Oncology
  - New York Cancer and Blood Specialists
  - Texas Oncology
  - Cancer and Blood Specialty Clinic

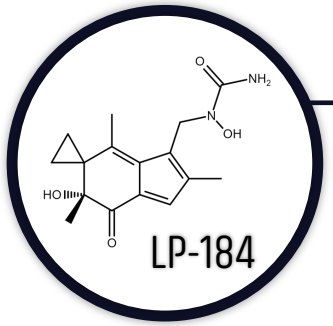
- Multiple additional sites across the US to be enrolled during 2023

Additional Value Drivers

- First of its kind **iPhone app launched** for the Harmonic™ trial
- The new Harmonic™ trial app provides patients, caregivers, and the cancer community with mobile access to up-to date information on:
  - How NSCLC is different in never-smokers versus in tobacco users
  - What taking part in the Harmonic™ trial involves
  - Ability to contact the Harmonic™ clinical trial team
  - Information on the investigational new drug, LP-300
  - Locations of all currently active clinical trial sites
  - Education & awareness for the NSCLC community



LP-184 has Potent Efficacy Across Multiple Solid Tumors



Solid Tumors

DDR Deficient Tumors Including:

- Pancreatic Cancer
- Bladder Cancer
- Breast Cancer
- Lung Cancer

$6-7 billion
Global annual market potential

Phase 1 trial in 2023

Q4 2022	Q2 2023	2023
Complete IND enabling studies and file IND		Phase 1 Trial Launch

World-class collaborators

Danish Cancer Society

Fox Chase Cancer Center
Temple Health

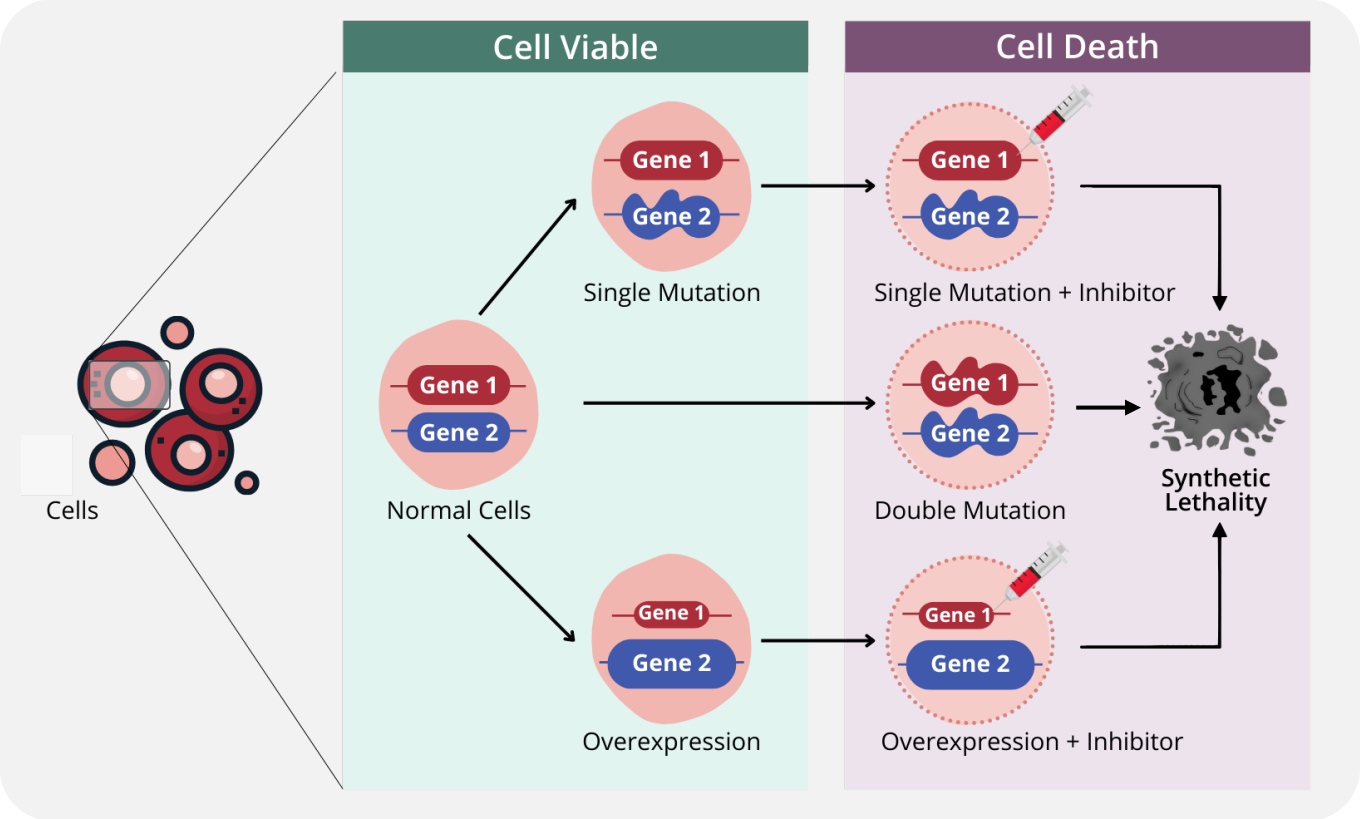
Program Highlights

- **Unique Mechanism of Action:**
  - Synthetic lethality
    - Overexpression of PTGR1
    - Deficiencies in **D**NA **D**amage **R**epair (DDR) pathway
- **Nanomolar Potency:**
  - Low nanomolar anti-cancer potency, healthy cells largely unaffected at these concentrations
- **Strong Growing IP Estate:**
  - 10+ issued or pending patents & patent applications
  - Extensive portfolio filings in major global markets
  - Includes applications expiring in 2041 or later, if granted
- **FDA Orphan Drug Designation**
  - Pancreatic cancer
  - **Increases commercial protection and value**

LP-184 has a Unique Mechanism of Action Leveraging Synthetic Lethality

Genetic factors contributing to LP-184's Synthetic Lethality

Synthetic Lethality for LP-184



- PTGR1 activates LP-184 into its highly potent and cytotoxic form
- Cancers with deficiencies in DNA damage repair (DDR) pathways have increased sensitivity to LP-184

KOL Webinar on Synthetic Lethality

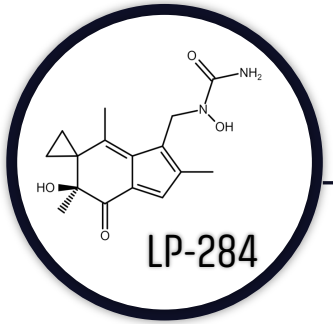
Dr. Zoltan Szallasi, M.D. Register: https://bit.ly/3J84Zui

Principal investigator at Danish Cancer Society Research Center
Assistant Professor of Pediatrics at Boston Children's Hospital affiliated with Harvard Medical School

Danish Cancer Society

Boston Children's Hospital
Until every child is well™

LP-284 was Developed from RADR® Insights to Late-Stage IND Enabling Studies in Less Than 2 Years for Non-Hodgkin's Lymphomas



LP-284 for non-Hodgkin's B-cell lymphomas

- Mantle Cell Lymphoma
- Double Hit Lymphoma

$1.2 billion
U.S. & Europe
annual market potential

Program Highlights

- LP-284 has nanomolar potency against several aggressive non-Hodgkin's lymphomas (NHL) including mantle cell and double hit
- In-vivo LP-284 can rescue tumors resistant to MCL standard-of-care agents Ibrutinib and Bortezomib
- Enhanced potency when used in combination with other approved agents like Spironolactone
- FDA granted Orphan Drug Designation for mantle cell lymphoma
- Results from preclinical studies have been published at ASH 2021, ASH 2022, and SOHO 2022

Phase 1 Trial Launch in 2023*

Q4 2022	Q2 2023	2023
Complete IND enabling studies and file IND		Phase 1 Trial Launch

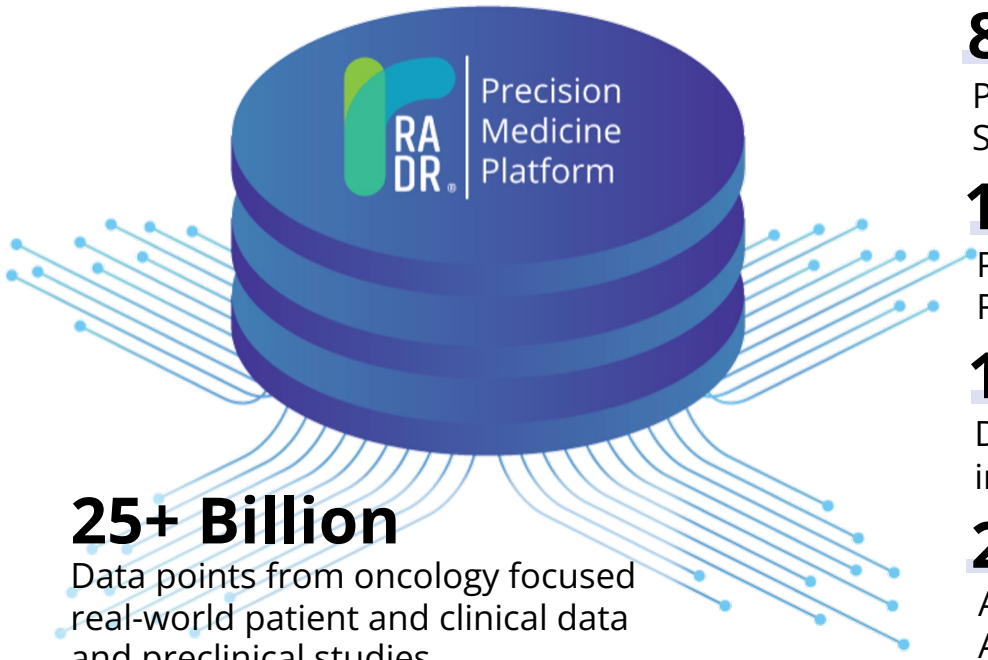
**Anticipated Timeline*

RADR® is Lantern's AI and Machine-Learning Platform that Powers Oncology Drug Discovery and Development

Precision Medicine Platform

Response **A**lgorithm for **D**rug Positioning & **R**escue

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



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

80%+
Prediction Success

130K+
Patient Records

154+
Drug-tumor interactions

200+
Advanced ML Algorithms

4 Multi-Faceted modules of RADR®

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

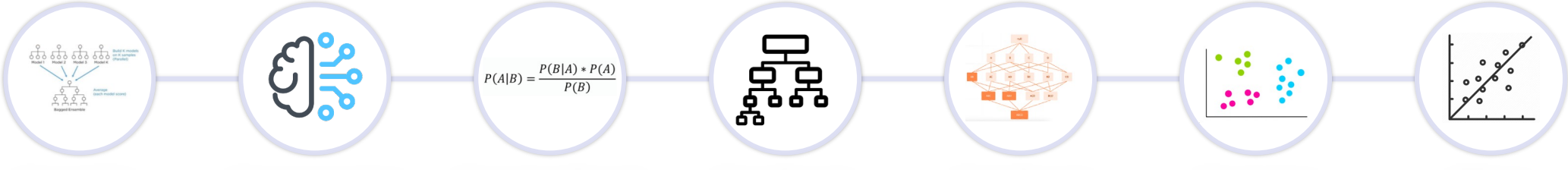
Identify New Disease Indications
Identify and prioritize type/subtype of cancer for your compound with use of RADR®

Determine Optimal Drug Combinations
Use different algorithms and methods from RADR® to find **potential Drug combinations**

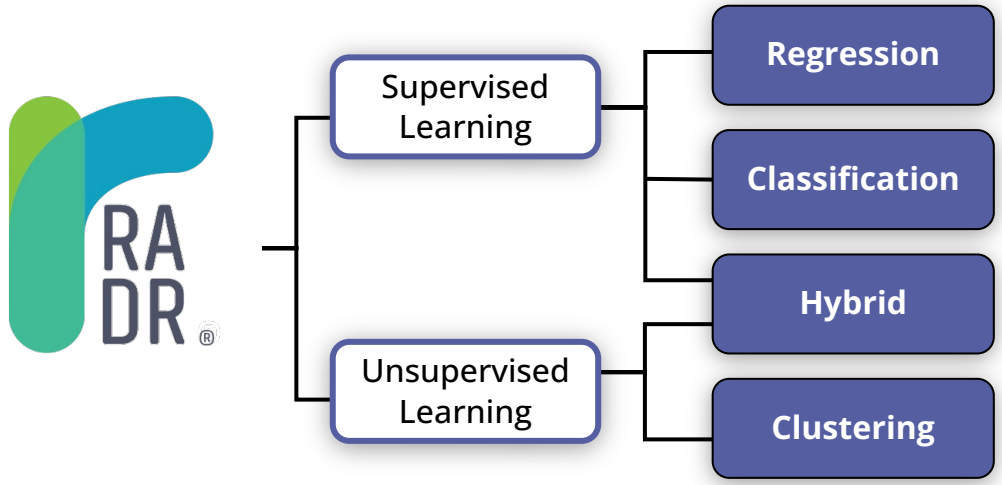
Generate ML-Driven Biomarker Signatures for Patient Selection
RADR® can derive Machine Learning based **gene signatures,** which can guide biomarker strategies and CDx (Companion Diagnostics)

RADR®'s Library of Over 200+ Advanced Algorithms Powers its Multi-Faceted Modules

Example RADR® Algorithms



Ensemble | Deep Learning | Bayesian Based | Tree Based | Rule Based | Clustering | Others



Examples

- Predicting drug sensitivity values, e.g. IC50
- Predicting blood brain barrier (BBB) permeability of a compound
- Predicting synergy values by combining compounds
- Identifying patient populations that can be targeted through a MoA
- Stratifying patients as responder, partial-responder, or non-responder
- Biomarker pattern-based patient clustering
- Predicting outcomes for companion diagnostic usage in a clinical trial

- Diversity of algorithms allow us to handle various input data types and solve different biological problems
- Lantern has filed patents for ensemble algorithms in cancer drug development

RADR®'s Capabilities Enhanced with Increased Focus on the Development of Antibody Drug Conjugates

What are Antibody Drug Conjugates (ADCs)?

Antibody Drug Conjugates (ADCs) are highly specific cancer-targeted antibodies linked to potent anti-tumor small molecules and designed for the treatment of cancer

Highlights of RADR®'s ADC Development Roadmap

- Development of additional algorithms that can boost prediction of optimal combinations of ADC components including antibodies, antibody linkers, payloads, and ADC combinations with other anticancer small molecules
- Generation of additional ML-based ADC biomarker signatures that can predict a cancer's sensitivity to an ADC and guide future patient selection for clinical trials
- Use of RADR® guided selection of new molecule payloads with features of synergy or properties to overcome resistance from existing ADC payloads
- Creation of AI modules to predict the immunogenicity of ADC antibodies to cancer cell surface antigens
- Expansion of RADR®'s 25+ billion oncology-focused data points with the addition of immuno-oncology (IO) datasets

Lantern's Collaborators are Leveraging RADR® to Accelerate the Development of their Drug Candidates

Actuate Therapeutics, Inc. is a private clinical stage biopharmaceutical company focused on the development of compounds for use in the treatment of cancer, and inflammatory diseases leading to fibrosis.

TTC Oncology is an emerging biotechnology company founded in 2015. TTC Oncology's mission is to develop and bring to market a novel, small-molecule therapy, TTC-352, to address the unmet needs of breast cancer patients. TTC has a license from the University of Illinois at Chicago covering the therapy.

Key RADR® AI insights for elraglusib (9-ING-41)*

- Developed a model of patient sensitivity to identify potential responders and non-responders
- Discovered actionable genetic biomarkers
- Insights and biomarkers are informing design of an upcoming Phase 2 clinical trial

Future directions of collaboration

- Highlights from the ongoing success of this collaboration are planned to be shared in an upcoming webinar
- Development and application of novel RADR® algorithms and computational methods
- Incorporation of new elraglusib patient data including: RNA, ctDNA, and protein biomarkers
- Lantern received equity in Actuate as part of the collaboration

**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)*

Collaboration details

- RADR® driven collaboration to uncover efficacy-associated biological signatures and biomarkers to advance the clinical development and positioning of TTC's leading drug candidate, TTC-352

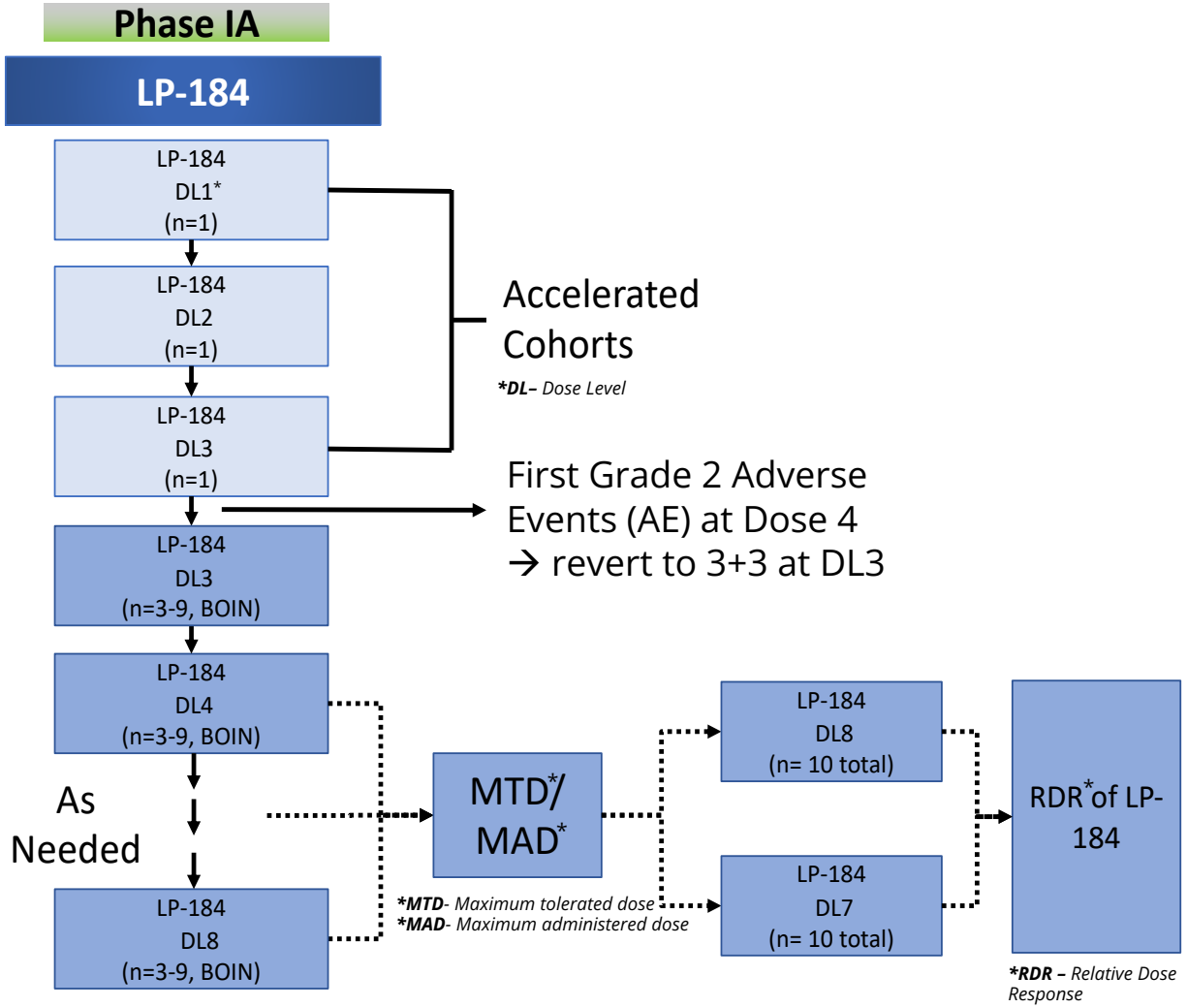
Initial aims of collaboration

- Identify biomarker or gene signatures to power potential patient selection for an upcoming TTC-352 Phase 2 clinical trial
- Further characterize TTC-352's mechanism of action
- Discover additional treatment indications for TTC-352

Terms of collaboration

- Lantern Pharma is receiving an exclusive right to license TTC-352, including any collaboration intellectual property (IP), during an exclusive option period
- Lantern and TTC will each participate in upfront, milestone, and royalty payments in the event a third party licenses IP resulting from the collaboration

LP-184 Clinical Trial Updates and Design of Phase 1A Trial



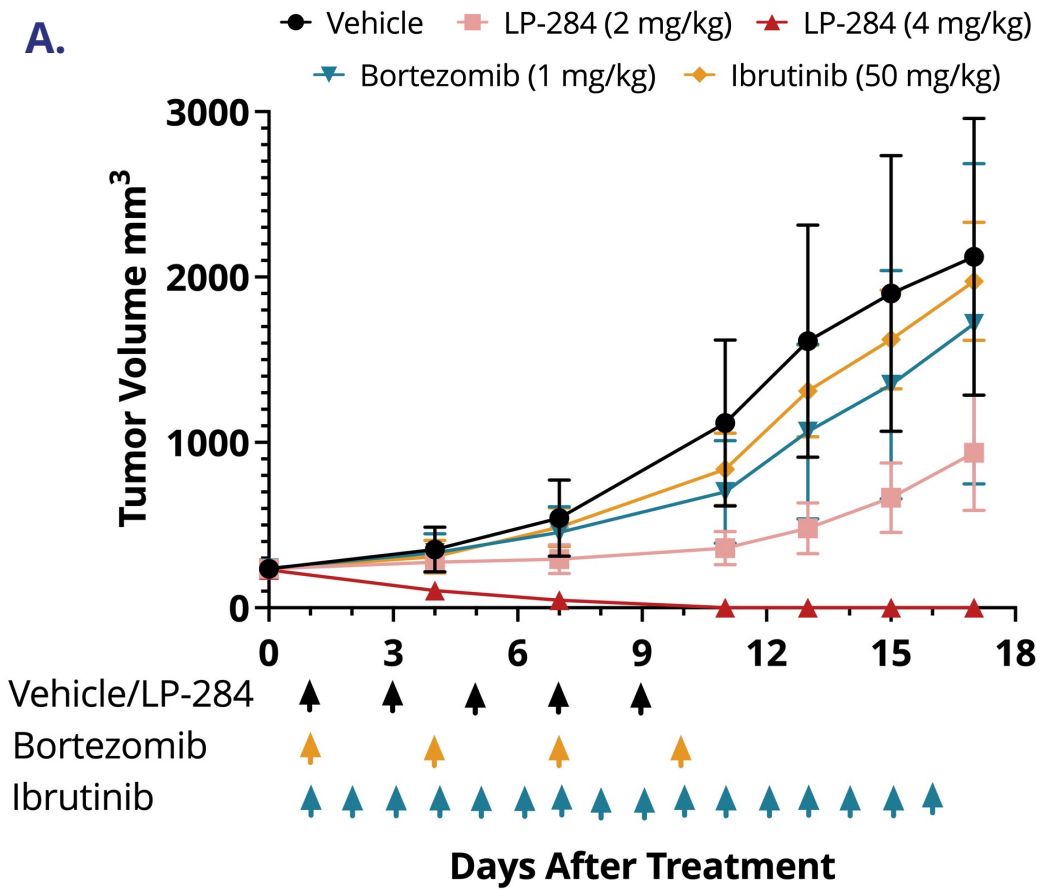
LP-184 Phase 1A Clinical Trial Updates and Design

- **Anticipated Phase 1A Clinical Trial Dates**
  - IND enabling studies completed
  - IND application submission – Early April 2023
  - Study-start up – Q2 2023
  - 1st patient dosed – Summer 2023

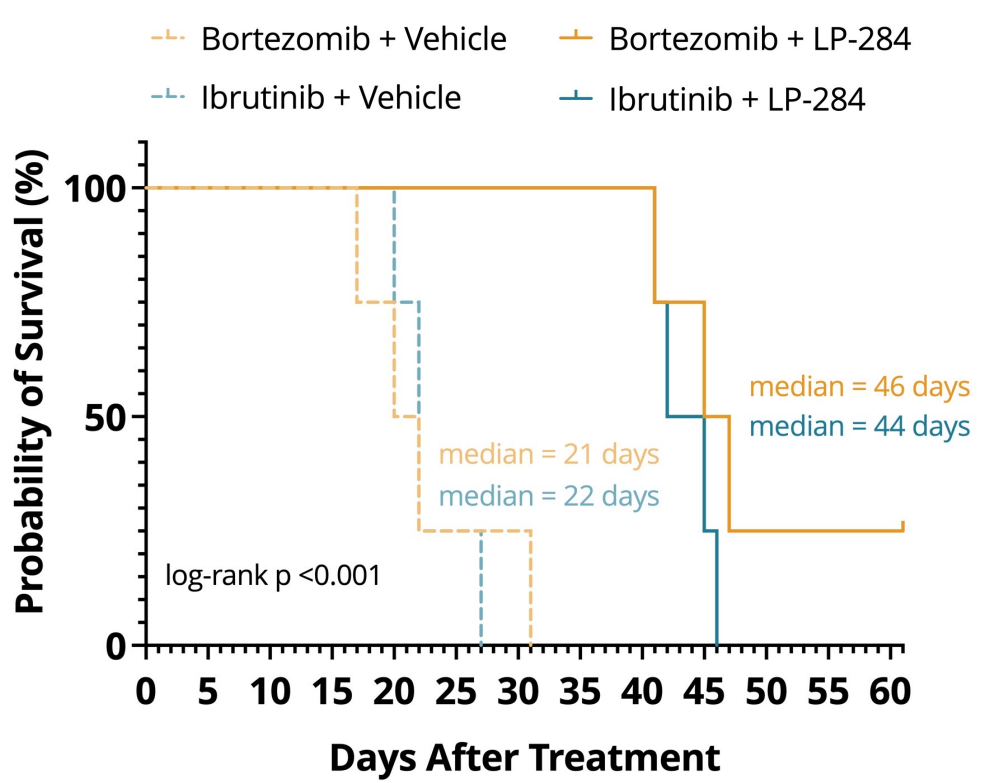
- **Clinical Trial Design**
  - Bayesian optimal interval **(BOIN)** design
  - Anticipated starting dose of 0.015 mg/kg, based off IND enabling studies in dogs.
  - Targeting up to 40 patients
  - Future clinical trial sites anticipated at top comprehensive centers in the US:
    - Fox Chase Cancer Center
    - Johns Hopkins
    - Multiple additional sites

LP-284 Treatment Demonstrates Stronger Anti-Tumor Potential in Mouse Models Compared to Current MCL Therapies

LP-284 Significantly Decreases MCL Tumor Volumes in Mice vs Standard of Care Agents



LP-284 Increases Probability of Survival in Mice vs Standard of Care Agents



Summary Results of Operations

	Three Months Ended December 31, (Unaudited)		Year Ended December 31,	
	2022	**2021**	**2022**	**2021**
Operating expenses:				
General and administrative	$ 1,574,680	$ 1,348,983	$ 5,829,799	$ 5,020,928
Research and development	2,251,598	2,162,260	8,602,954	7,570,580
Total operating expenses	3,826,278	3,511,243	14,432,753	12,591,508
Loss from operations	(3,826,278)	(3,511,243)	(14,432,753)	(12,591,508)
Interest + Other income, net	445,173	(29,031)	172,807	228,479
NET LOSS	**$** (3,381,105)	**$** (3,540,274)	**$** (14,259,946)	**$** (12,363,029)
Net loss per common share, basic and diluted	$ (0.31)	$ (0.31)	$ (1.31)	$ (1.13)

Balance Sheet Highlights & Summary

	December 31, 2022	December 31, 2021
Cash and Marketable Securities	**$55,196,085**	**$70,725,447**
Prepaid Expenses & Other Current Assets	$2,985,472	$1,990,953
Total Assets	**$58,836,321**	**$73,950,477**
Total Liabilities	**$2,798,297**	**$2,379,057**
Total Stockholders' Equity	**$56,038,024**	**$71,571,420**

Shares Outstanding

LANTERN PHARMA INC. (LTRN)	December 31, 2022
Common Shares Outstanding	10,857,040
Warrants	177,998
Options (Employees, Management and Directors)	1,037,591
Fully Diluted Shares Outstanding	**12,072,629**

2023 Objectives

A **Transformational** year for Lantern

- Advance enrollment of **The Harmonic™ Trial** & increase patient/clinician awareness
- Launch clinical trials for LP-184 and LP-284
- Progress LP-184 (STAR-001) towards Ph. 1 / 2 pediatric clinical trial, including ATRT
- Advance ADC preclinical development to support future Phase 1 launch and/or partnership
- Explore combinations for LP-100, LP-184, LP-284, and LP-300 with other existing approved drugs
- Expand RADR® AI platform to 50 billion datapoints
- Establish additional RADR® based collaborations with companies and research partners
- Explore licensing and partnership opportunities with biopharma companies
- Continue disciplined fiscal management

Lantern Pharma

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