Second Quarter 2023
Operating & Financial Results Conference Call / Webinar

August 9th, 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 biomarker 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 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, (iii) 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 (iv) 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, 2023. 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
CEO and President

David Margrave
CFO

Host

Nicole Leber
Investor Relations

Lantern is Transforming Drug Discovery Timelines & Costs with AI

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

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%**

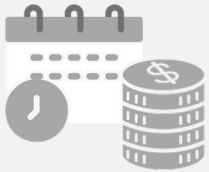
Lantern has launched **10 new programs in 2 years**, and has active ongoing ph.1 and ph.2 clinical trials

*https://onlinelibrary.wiley.com/doi/full/10.1002/cam4.3732

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 diverse & unique AI-driven pipeline of 14 drug programs includes the Phase 2 Harmonic™ trial and RADR® collaborations

Lantern Pharma (NASDAQ: LTRN)

Program	Indication	Discovery	Preclinical	Phase I	Phase II	Orphan Designation	Rare Pediatric Disease
LP-300	Non-Small Cell Lung Cancer for Never Smokers				harmonic		
LP-100	Homologous Repair Deficient Cancers						
LP-184	Recurrent Advanced Solid Tumors (*Pancreatic, TNBC, Bladder, Lung Cancers*)					● ** for Pancreatic*	
LP-284	Recurrent Non-Hodgkin's Lymphomas (*Mantle cell, Double-hit lymphomas*)					● **for Mantle Cell*	
ADC	Select Solid Tumors						

Starlight Therapeutics (Wholly Owned Subsidiary)

STAR-001 *(LP-184 for CNS and Brain Cancers Only)*	Glioblastoma *(GBM)*					●	
	Brain Mets *(Lung, Breast, Skin)*						
	Atypical Teratoid Rhabdoid Tumor *(ATRT)*					●	●
	Pediatric Brain Cancers						

RADR® Collaborations

Elraglusib *owned by – Actuate Therapeutics*	Multiple Solid Tumors					Collaboration partner	ACTUATE THERAPEUTICS
TTC-352 *owned by– TTC Oncology*	ER+ Breast Cancers					Collaboration partner	ttc oncology
ADC	Cryptophycin Conjugate for Solid Tumors					Collaboration partner	UNIVERSITÄT BIELEFELD

2023 2nd Quarter Highlights

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Lantern Pharma®

NASDAQ: LTRN

- **Obtained FDA clearance of the IND application for LP-184** and activated initial clinical sites for the Phase 1 basket trial in relapsed/refractory advanced solid tumors and brain cancers – a patient population with unmet clinical needs.

- **Completed IND-enabling studies for LP-284** and anticipate IND submission in August; first-in-human Phase 1 clinical trial targeted for Q4 '23 for advanced non-Hodgkin's lymphomas.

- **Dosed initial patients in the Phase 2 Harmonic™ clinical trial** for never smokers with NSCLC, who make up 15-20% of all lung cancer cases; continued expansion of additional clinical trial sites in the US and increased patient recruitment activity.

2023 2nd Quarter Highlights

2 of 2

Lantern Pharma®

NASDAQ: LTRN

- **Initiated RADR® collaboration with Bielefeld Univ.** to design and develop breakthrough **antibody drug conjugates (ADCs)** with greater precision and efficacy.
- Received US Patent & Trademark Office notice of allowance for **composition of matter patent for LP-284**, extending commercial protection into early **2039**.
- **$48.0 million** in cash, cash equivalents, and marketable securities as of June 30, 2023, providing a cash runway into 2025.

Financial Updates Q2 2023

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

Summary Results of Operations

	Three Months Ended June 30, (unaudited) 2023	2022
Operating expenses:		
General and administrative	$ 1,632,080	$ 1,405,998
Research and development	3,558,217	2,988,823
Total operating expenses	5,190,297	4,394,821
Loss from operations	(5,190,297)	(4,394,821)
Interest + Other income, net	443,899	(97,565)
NET LOSS	**$** (4,746,398)	**$** (4,492,386)
Net loss per common share, basic and diluted	$ (0.44)	$ (0.41)
Weighted Avg. Common Shares Outstanding - Basic and Diluted	10,857,040	10,830,947

Balance Sheet Highlights & Summary

	06/30/2023 (unaudited)	12/31/2022
Cash, Cash Equivalents & Marketable Securities	$47,948,968	$55,196,085
Prepaid Expenses & Other Current Assets	$2,551,802	$2,985,472
Total Assets	$51,426,024	$58,836,321
Total Liabilities	$3,166,694	$2,798,297
Total Stockholders' Equity	$48,259,330	$56,038,024

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

LP-184: 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**

Phase 1A

Solid Tumors

Brain & CNS Cancers

30-35

Patients expected to be enrolled

June 2023 — IND application cleared by FDA

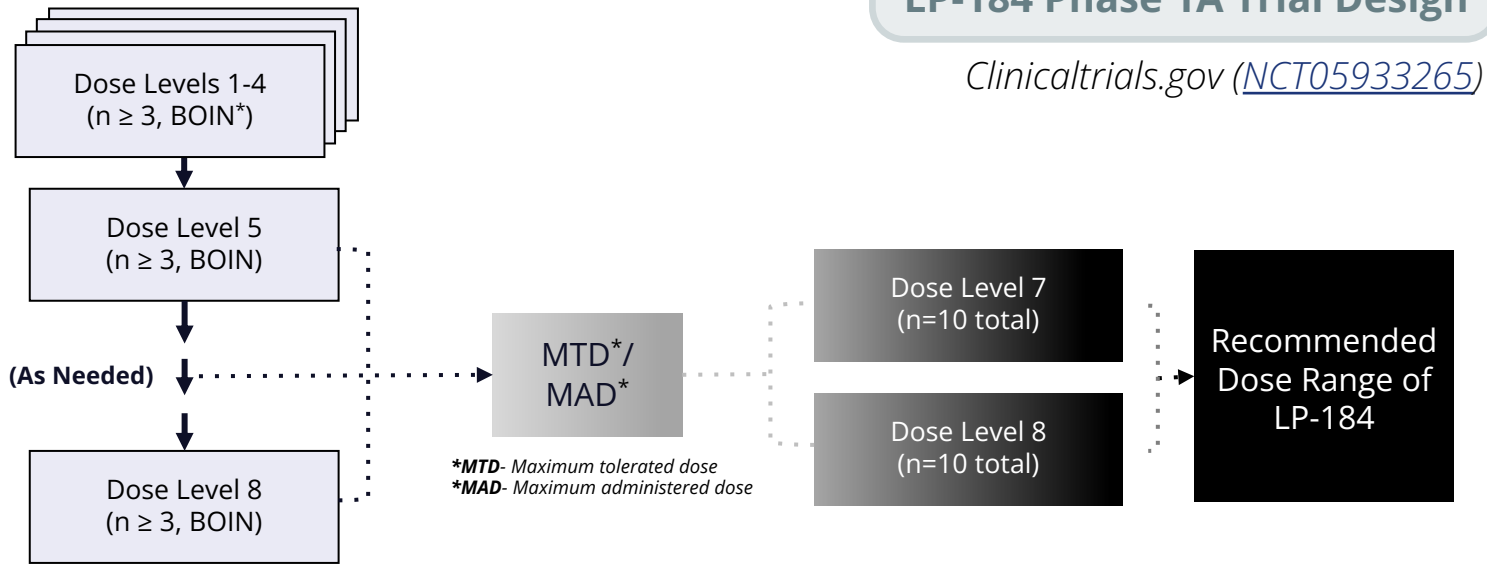
July 2023 — Trial launch and initial sites activated

Q3 2023* — First patient dosed

** anticipated*

LP-184 Phase 1A Trial Design

Clinicaltrials.gov (NCT05933265)



LP-284: Ph. 1 trial anticipated to launch in Q4 for recurrent NHLs with scarce therapeutic options & market potential of $1+ billion in annual sales

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

Phase 1

Non-Hodgkin's Lymphomas

$1.2 Bn

U.S. & Europe annual market potential in MCL & DHL

9,000+

U.S. & Europe annual patients in MCL & DHL

Q2 2023 — Completed IND enabling studies

August 2023 — File IND application with the FDA

Q4 2023* — Phase 1 Trial Launch

** anticipated*

Recent Highlights

- Received notice of allowance from the USPTO for the composition of matter patent, no. 17/192,838, covering the molecule LP-284, extending commercial protection into early **2039**.

Program Highlights

- LP-284 has nanomolar potency against several aggressive non-Hodgkin's lymphomas (NHL) including mantle cell and double hit lymphomas
- FDA granted Orphan Drug Designation for mantle cell lymphoma
- 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

Harmonic™: Accelerating recruitment efforts for a growing indication with limited treatment options and an annual global market potential of $2.5+ bn

harmonic

Phase 2

Non-Small Cell Lung Cancer

Never Smokers

90 Patients

Two arm, Open-label, Randomized Trial

Multi-Site

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

Cancer.gov

Annual Market Potential (global) : $2.5+ Billion

Trial Updates

- **Dr. Joseph Treat, MD of Fox Chase Cancer Center**: appointed lead principal investigator for the Harmonic™ study
- Initial patients dosed in first half of 2023, enrollment anticipated to last 18-24 months
- Multiple additional patients and sites across the US anticipated to be enrolled during second half of 2023
- Exploring potential to expand trial to Asia in countries with a higher incidence of NSCLC in never smokers

ADCs: Initiated RADR® collaboration w/ Bielefeld Univ. to develop breakthrough cryptophycin ADCs - an entirely new treatment modality

Rapidly growing global ADC market

currently valued at **$4+ billion**

projected value by 2027 **$14+ billion**

UNIVERSITÄT BIELEFELD

Collaboration Highlights

- **RADR® ADC module** will be leveraged to develop novel and potent cryptophycin-ADCs
- **Lantern received exclusive worldwide option** to license IP from Bielefeld University related to, or generated from, collaboration

Professor Norbert Sewald, Ph.D.

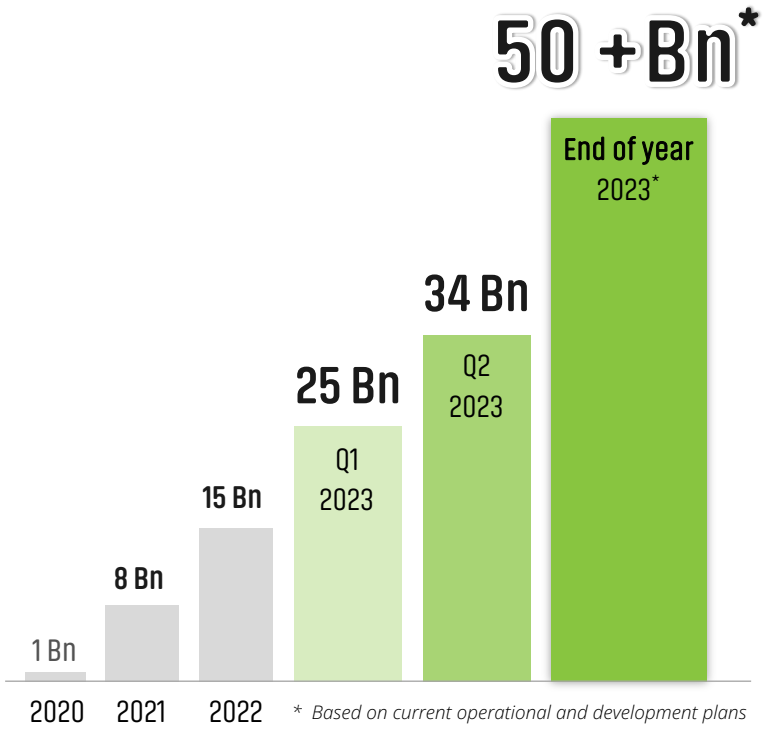
- Professor of Organic and Bioorganic Chemistry at Bielefeld University (Bielefeld, Germany)
- Lead investigator of the European consortium Magicbullet::reloaded
- Research Focus
  - Development of antibody-drug and peptide-drug conjugates
  - Isolation and total synthesis of natural products
  - Chemical modification of bioactive peptides
  - Biocatalytic halogenation of amino acids, peptides, and proteins.

MAGIC BULLET :: Reloaded

RADR®'s expansion of size, scope, and capabilities continues to push the boundary of AI for oncology drug discovery and development

SIZE

50 billion oncology-focused datapoints by end of 2023



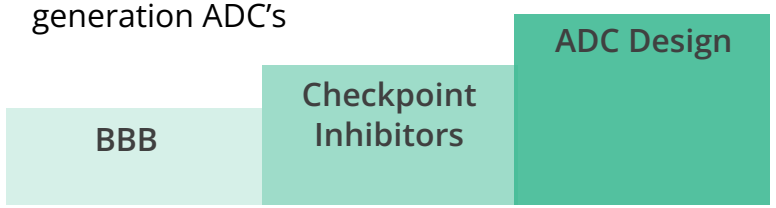
SCOPE

- Additional classes of compounds including antibodies, checkpoint inhibitors, DNA damaging agents, and ADCs

IO drugs | ADCs | DNA damaging agents

CAPABILITIES

- Predicting the BBB permeability of any compound
- Prediction of patient response and combination usage for any Immune checkpoint inhibitor
- Developing and designing templates for next generation ADC's



2023-24 Objectives

A Transformational Year for Lantern

TOP TEN

- Accelerate enrollment of **The Harmonic™ Trial** & increase patient/clinician awareness
- Launch and advance clinical trial(s) for LP-184, including in combination programs
- Advance first-in-human clinical trial for LP-284
- Progress Starlight Therapeutics towards Ph. 1 / 2 adult & pediatric clinical trials
- Initiate ADC preclinical development to support future Phase 1 launch and/or partnership
- Develop combination programs for 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 corporate and research partners
- Explore licensing and partnership opportunities with biopharma companies
- Continue disciplined fiscal management

Lantern Pharma

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