Fourth Quarter & Year-end 2023
Operating & Financial Results Conference Call / Webinar

March 18th, 2024
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 risk that our research and the research of our collaborators may not be successful, (ii) the risk that promising observations in preclinical studies do not ensure that later studies and development will be successful, (iii) the risk that we may not be successful in licensing potential ADC 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.

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Speakers

Panna Sharma
CEO and President

David Margrave
CFO

2023 was a transformational year for Lantern Pharma

- ✓ Launched multiple **clinical trials** for our AI guided drug candidates
- ✓ Multiple peer-reviewed **publications and posters**
- ✓ AI platform advancements with RADR® reaching over **60 billion datapoints**
- ✓ Efficient expansion of **clinical infrastructure and operations**
- ✓ Ongoing advancement of **CNS cancer focused subsidiary Starlight Therapeutics**
- ✓ Filed **11 new patent** applications
- ✓ Strong, focused **fiscal discipline**

2023 4th Quarter Highlights

1 of 2

Lantern Pharma®

NASDAQ: LTRN

- ✓ Multiple clinical trials across **three AI-guided drug candidates** are active with first expected data and readouts for LP-184 in the second half of 2024.
- ✓ **Next-generation drug development** programs approaching IND studies.
- ✓ **Dosed initial patients** in both Phase 1 clinical trials for synthetic lethal drug-candidates, LP-184 and LP-284, each of which are first-in-human molecules with the potential for **use across multiple cancer indications.**
- ✓ Expanded Phase 2 LP-300 Harmonic™ clinical trial into 12 sites in the US and advanced towards initial regulatory allowance for **trial commencement in Japan, Taiwan and South Korea** where approximately 30-35+% of all lung cancer cases occur in never-smokers with NSCLC.

2023 4th Quarter Highlights

2 of 2

Lantern Pharma®

NASDAQ: LTRN

- ✓ **Advanced Starlight Therapeutics** with hiring of Chief Medical Officer (CMO) and **preparing for potential Phase 1B/2 clinical trial** in adult CNS tumors beginning in second half of 2024.
- ✓ Demonstrated **significant advancement of our cryptophycin focused antibody-drug-conjugate program (cpADC)** in multiple solid tumor models, with additional preclinical data to be generated during 2024 in advance of IND studies.
- ✓ **Exceeded 2023 goal** of 60 billion datapoints for oncology drug development AI platform, RADR®, and **announced 100 billion datapoint goal** for 2024 to include additional advancements in **integrating generative AI features into platform** functionality.
- ✓ Approximately **$41.3 million** in cash, cash equivalents, and marketable securities as of December 31, 2023.

Lantern's diverse & unique AI-driven pipeline of 11 drug programs including the Phase 2 Harmonic™ trial and RADR® collaborations

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, and Other Solid Tumors*)					● * for Pancreatic& HGG	
LP-284	Recurrent Non-Hodgkin's Lymphomas (*Mantle cell, Double-hit lymphomas, and HGBL*)					● *for MCL & HGBL	
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

Summary Results of Operations

	Three Months Ended December 31,		Year Ended December 31,	
	2023	**2022**	**2023**	**2022**
Operating expenses:				
General and administrative	$ 1,304,127	$ 1,574,680	$ 5,983,255	$ 5,829,799
Research and development	3,573,257	2,251,598	11,894,315	8,602,954
Total operating expenses	4,877,384	3,826,278	17,877,570	14,432,753
Loss from operations	(4,877,384)	(3,826,278)	(17,877,570)	(14,432,753)
Interest + Other income, net	691,463	445,173	1,916,036	172,807
NET LOSS	**$ (4,185,921)**	**$ (3,381,105)**	**$ (15,961,534)**	**$ (14,259,946)**
Net loss per common share, basic and diluted	$ (0.39)	$ (0.31)	$ (1.47)	$ (1.31)

Balance Sheet Highlights & Summary

	December 31, 2023	December 31, 2022
Cash and Marketable Securities	$41,302,672	$55,196,085
Prepaid Expenses & Other Current Assets	$2,038,653	$2,985,472
Total Assets	$43,647,616	$58,836,321
Total Liabilities	$2,739,682	$2,798,297
Total Stockholders' Equity	$40,907,934	$56,038,024

Shares Outstanding

LANTERN PHARMA INC. (LTRN)	December 31, 2023
Common Shares Outstanding*	10,721,192
Warrants	177,998
Options (Employees, Management and Directors)	1,091,196
Fully Diluted Shares Outstanding*	**11,990,386**

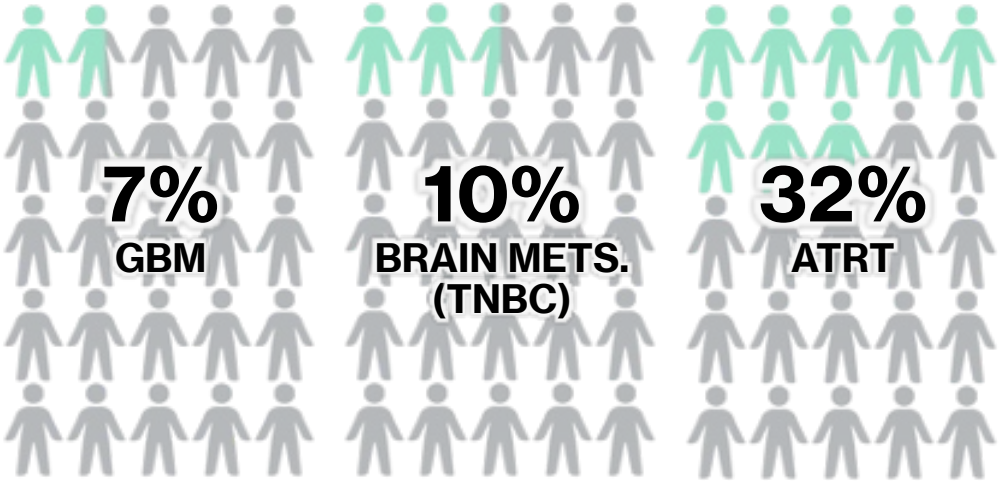
**This includes a share repurchase of 145,348 shares of LTRN common stock at a purchase price of $3.44 per share in November 2023*

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

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)

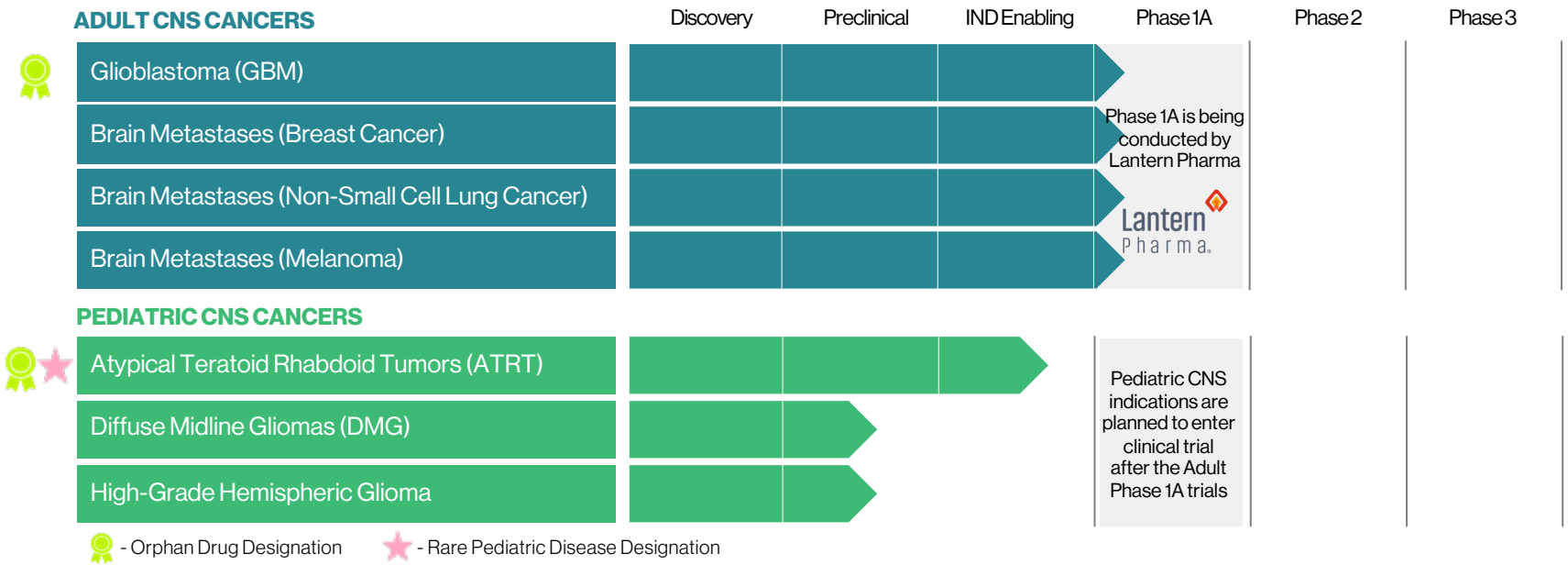
5 Year Survival Rates of CNS And Brain Cancers Remain Low Despite Advances in Cancer Therapies



- **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

Multiple Clinical Trials are Planned for STAR-001



- **Nanomolar potency** gives multiple shots on goal in CNS cancers
- Excellent **blood brain barrier permeability** as predicted by top-performing AI algorithms and confirmed in multiple in vivo studies
- **Improved bioavailability** over current SOC agents
- Target CNS indications **have limited or no effective therapies**
- Upcoming **Phase 1B/2 trial** for adult CNS cancers planned for 2nd half 2024
- Upcoming **Phase 1 trial** planned 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+

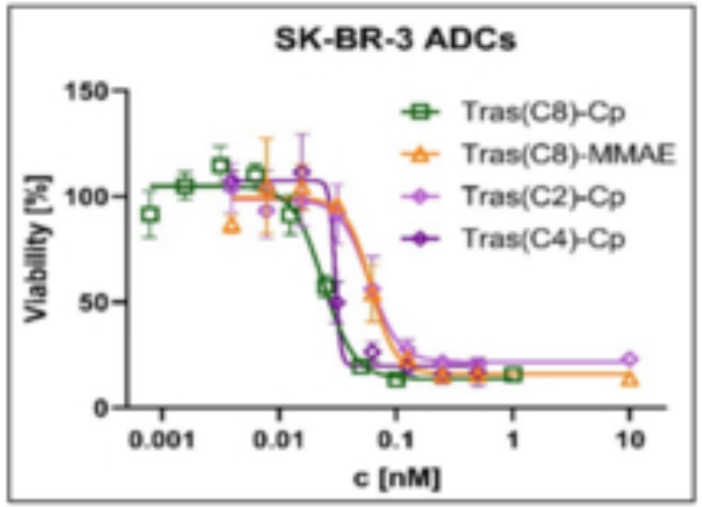
Advanced the development, synthesis, and preclinical proof-of-concept of a novel, highly potent, cryptophycin-based ADC

ADC Collaboration Update

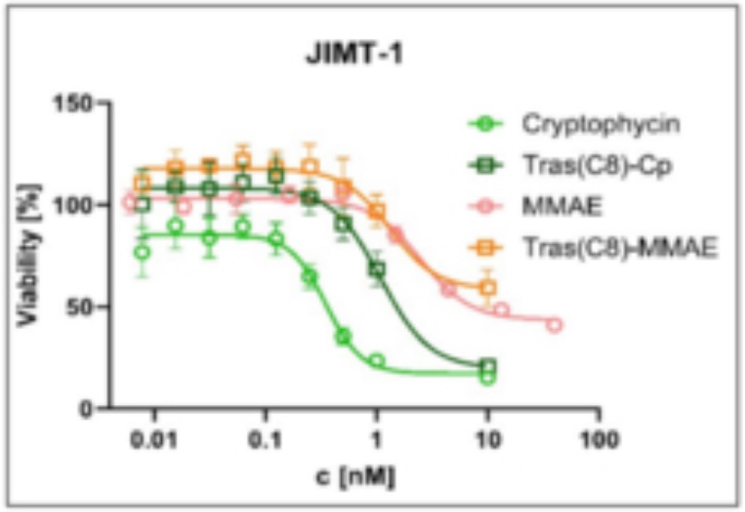
UNIVERSITÄT BIELEFELD

MAGIC BULLET :: Reloaded

High HER2 Expression



Moderate HER2 Expression



Key Highlights

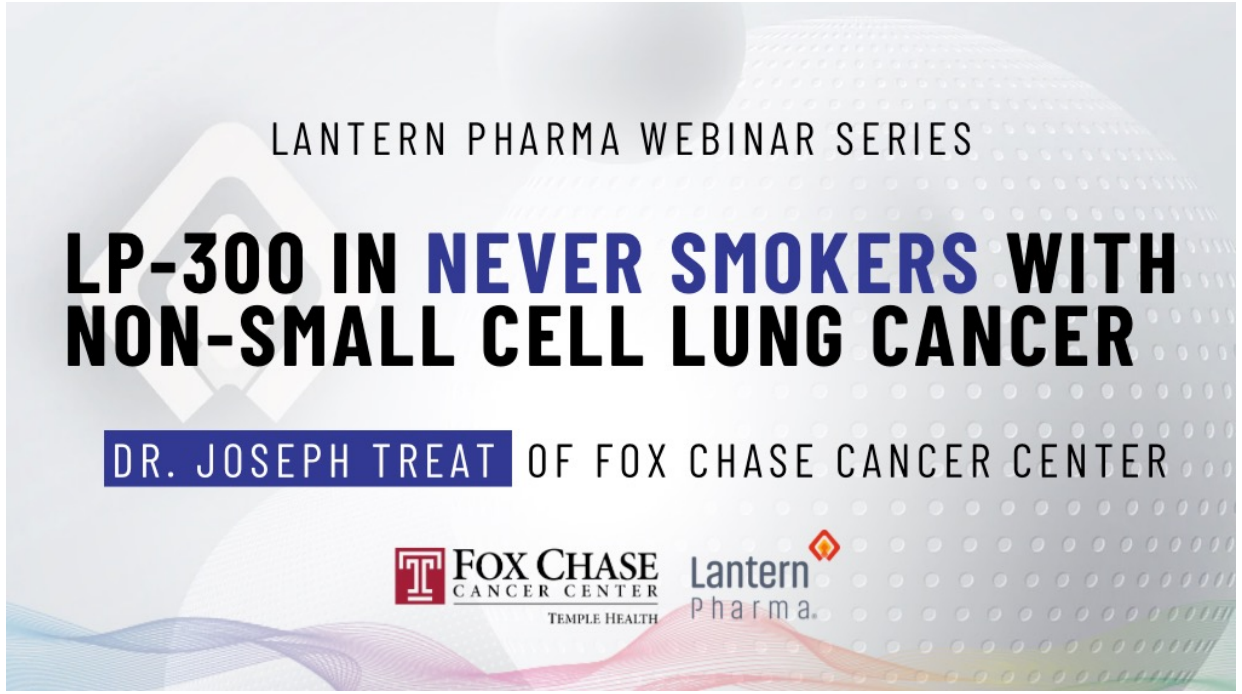
- The cryptophycin(Cp) drug-payload and Cp-ADC averaged an **80% cancer cell kill rate**
- In a moderate Her2 expression model, the Cp-ADC with a DAR* of 8 *(Tras(C8)-Cp)* was about **10x more potent** than a DAR 8 MMAE**-ADC *(Tras (C8)-MMAE)*
- Cp-ADC showed highly efficient anti-tumor activity in 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

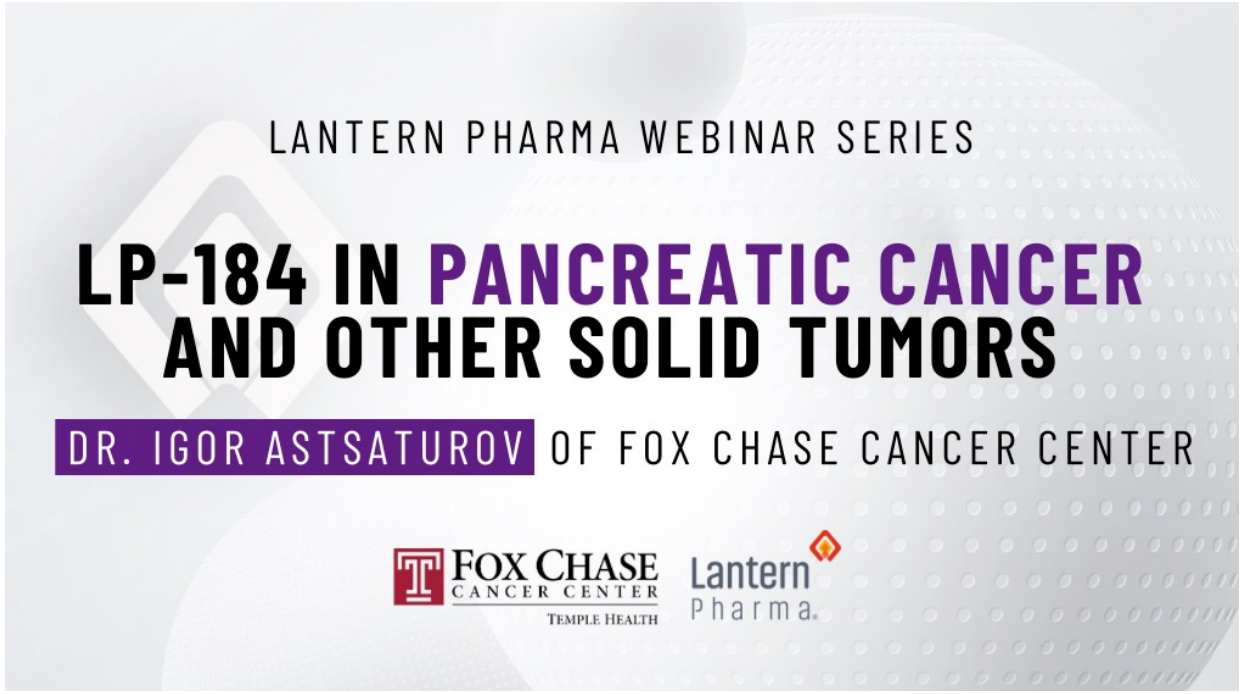
*drug to antibody ratio

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

Collaboration Led by **Professor Norbert Sewald, Ph.D.**

Lantern Pharma 2024 Webinar Series – *Webinar Wednesdays* – Featuring World-class Collaborators And Researchers

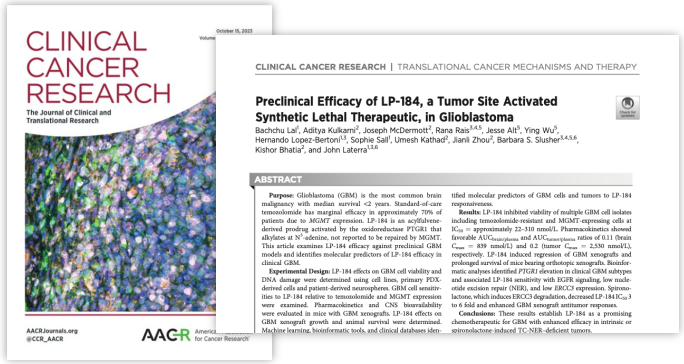




Webinars scheduled for coming quarters

1. **LP-300** in Never Smokers with Non-Small Cell Lung Cancer with Dr. Joseph Treat of Fox Chase Cancer Center
2. **STAR-001** in Brain and CNS cancers with Dr. Marc Chamberlain, CMO of Starlight Therapeutics
3. **LP-184** in Pancreatic Cancer and Other Solid Tumors with Dr. Igor Astsaturov of Fox Chase Cancer Center

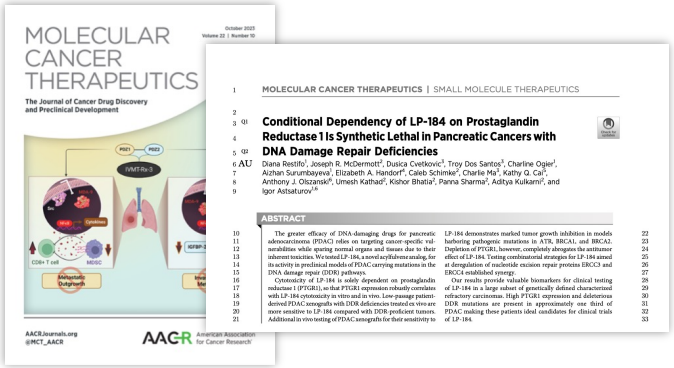
Publications Highlighting the Clinical Value of RADR® Insights & De-risking the Development of Lantern's Drug Candidates



CLINICAL CANCER RESEARCH | TRANSLATIONAL CANCER MECHANISMS AND THERAPY

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

October 2023



MOLECULAR CANCER THERAPEUTICS | SMALL MOLECULE THERAPEUTICS

Conditional Dependency of LP-184 on Prostaglandin Reductase 1 Is Synthetic Lethal in Pancreatic Cancers with DNA Damage Repair Deficiencies

October 2023

Upcoming poster:

AACR American Association for Cancer Research

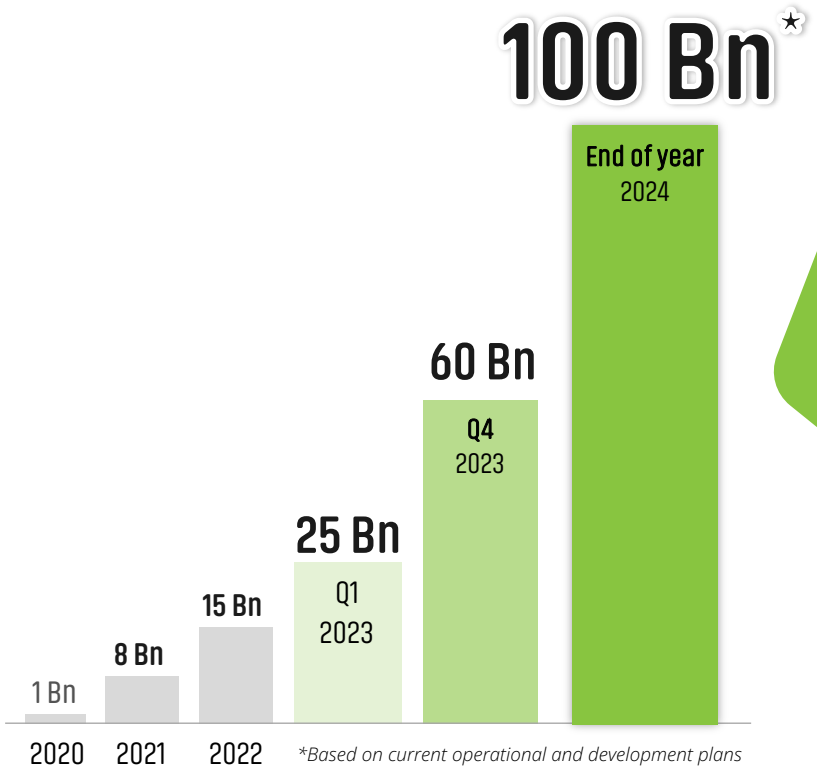
Phase 1a/1b clinical trial of LP-284, a highly potent TP53 mutation agnostic DNA damaging agent, in patients with refractory or relapsed lymphomas and solid tumors

April 8th, 2024

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

SCALE

100 billion oncology-focused datapoints by end of 2024



SCOPE

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

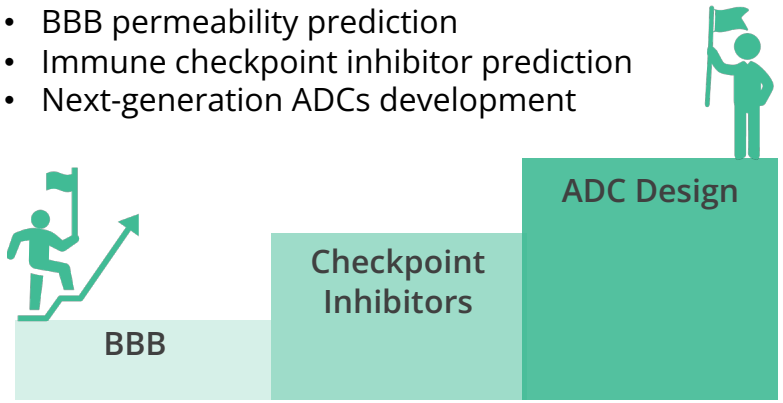
IO drugs

ADCs

DNA damaging agents

CAPABILITIES

- BBB permeability prediction
- Immune checkpoint inhibitor prediction
- Next-generation ADCs development



Current RADR® Modules - Focused on Key Oncology Issues

1. **MoA Discovery -** Integration of knowledge from biological networks and machine learning to better understand the drugs' Mechanism of Action
2. **Drug Response Prediction -** Machine learning pipelines to predict drug response with multiomics data
3. **Drug Rescue -** Leverage AI-guided insights and 60B+ RADR® datapoints to find new indications / patient populations for shelved / abandoned drugs
4. **BBB Prediction -** Predict a drug's ability to penetrate the Blood Brain Barrier
5. **Antibody Drug Conjugates -** Identify best target and indications for clinically valuable and de-risked generation of ADCs
6. **Patient Stratification -** Use trained models to predict patient response ahead of the treatment
7. **Drug Combinations -** Identify synergistic drugs to enhance the success rates of drug repositioning/ rescue by modeling drug combinations useful in therapy
8. **Biomarker Identification -** Combination of algorithms and bioinformatics tools to identify biomarkers that can be used for diagnosis, prognosis, and patient stratification

2024 Objectives

A Breakthrough Year for Lantern

TOP TEN

- Advance and expand phase 1 clinical trial for LP-184
- Accelerate enrollment in first-in-human clinical trial for LP-284 in NHL + other cancers
- Expand enrollment of **The Harmonic™ Trial** to targeted sites in Asia
- Explore licensing and partnership opportunities with biopharma companies
- Expand RADR® AI platform to 100+ billion datapoints and develop additional collaborations
- Progress Starlight Therapeutics towards Ph. 1 / 2 adult & pediatric clinical trials
- 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
- Grow and mature efficient internal clinical operations capabilities
- Continue disciplined fiscal management

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