First Quarter 2024
Operating & Financial Results Conference Call / Webinar

May 9th, 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 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.

Contents

Speakers

Panna Sharma
CEO and President

David Margrave
CFO

2024 1st Quarter Highlights

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Lantern Pharma®

NASDAQ: LTRN

- ✓ Active clinical trials across three AI-guided drug candidates with initial data and clinical readouts for LP-184 expected and on-track for the second half of 2024.
- ✓ Obtained regulatory allowance to begin Phase 2 Harmonic™ clinical trial enrollment in Japan and Taiwan where approximately 30-35+% of all lung cancer cases occur in never-smokers with NSCLC; Harmonic™ continues patient enrollment in the US.
- ✓ Phase 1 clinical trials for both synthetic lethal drug candidates, LP-184 and LP-284, continue to advance with no dose-limiting toxicities observed in any of the patient cohorts enrolled and dosed to date.
- ✓ The combined annual global sales market potential for LP-184 and LP-284 across multiple cancer indications is estimated to be over $12 billion USD.

2024 1st Quarter Highlights

2 of 2

Lantern Pharma®

NASDAQ: LTRN

- ✓ Starlight Therapeutics, a wholly owned subsidiary of Lantern Pharma focused on CNS and brain cancers with STAR-001, advanced with the filing of a clinical trial protocol for the Phase 1b dose optimization and expansion cohort in recurrent IDH wild-type high grade gliomas.
- ✓ Advanced AI-powered module for streamlining and guiding differentiated ADC development, which will be instrumental in the next-generation of ADC drug candidates for Lantern Pharma and its collaborators.
- ✓ Established an AI driven collaboration with Oregon Therapeutics where the RADR® platform will be leveraged to sharpen, expand and derisk future clinical development strategies for a novel, first-in-class inhibitor of cancer metabolism.
- ✓ Approximately $38.4 million in cash, cash equivalents, and marketable securities as of March 31, 2024.

Lantern's diverse & unique AI-driven pipeline of 11 drug programs including RADR® collaborations and Starlight Therapeutics

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

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

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

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						

Financial updates Q1 2024

Solid financial position & capital efficiency fuel continued growth & give Lantern cash runway into at least Q3 2025

Summary Results of Operations

	Three Months Ended March 31, (unaudited) 2024	2023
Operating expenses:		
General and administrative	$ 1,481,215	$ 1,733,321
Research and development	4,250,786	2,552,947
Total operating expenses	5,732,001	4,286,268
Loss from operations	(5,732,001)	(4,286,268)
Interest + Other income, net	291,191	418,503
NET LOSS	**$** (5,440,810)	**$** (3,867,765)
Net loss per common share, basic and diluted	$ (0.51)	$ (0.36)
Weighted Avg. Common Shares Outstanding - Basic and Diluted	10,742,797	10,857,040

Balance Sheet Highlights & Summary

	03/31/2024 (unaudited)	12/31/2023
Cash, Cash Equivalents & Marketable Securities	38,357,854	41,302,672
Prepaid Expenses & Other Current Assets	1,113,007	2,038,653
Total Assets	39,734,224	43,647,616
Total Liabilities	3,969,007	2,739,682
Total Stockholders' Equity	35,765,217	40,907,934

"We believe our solid financial position will fuel continued growth and evolution of our AI platform, accelerate the development of our portfolio of targeted oncology drug candidates and allow us to introduce additional targeted product and collaboration opportunities efficiently and effectively."

Advancing Starlight Therapeutics with hiring of Chief Medical Officer (CMO) Marc Chamberlain, MD

Dr. Marc Chamberlain, CMO of Starlight

Leading medical oncologist with an extensive and distinct background in therapeutic development, clinical practice, and academic research with a focus in adult and pediatric neurology and neuro-oncology with more than 300 neurology-focused papers in peer-reviewed journals.

Prior: **Co-director** of the neuro-oncology programs at 4 NCI designated cancer centers

UC San Diego Moores Cancer Center · USC Norris Comprehensive Cancer Center, Keck Medicine of USC · Moffitt Cancer Center · Fred Hutch Cancer Center

Medical Director of

Cascadian Therapeutics · SeattleGenetics · Systimmune · Angiochem · Pionyr Immunotherapeutics

Upcoming Webinar Wednesdays:

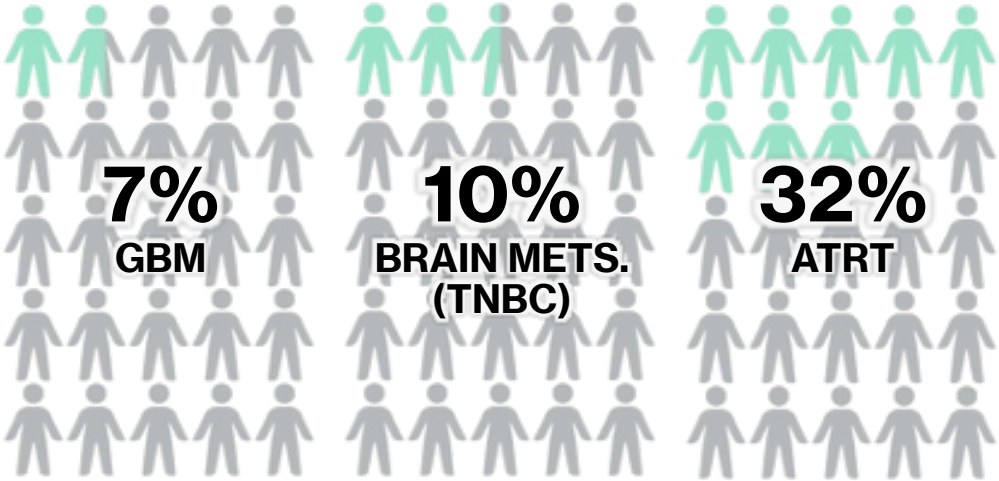
STAR-001 in Brain and CNS cancers with Dr. Marc Chamberlain, CMO of Starlight Therapeutics
June 26th, Wednesday 1PM Eastern Time

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 adult 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



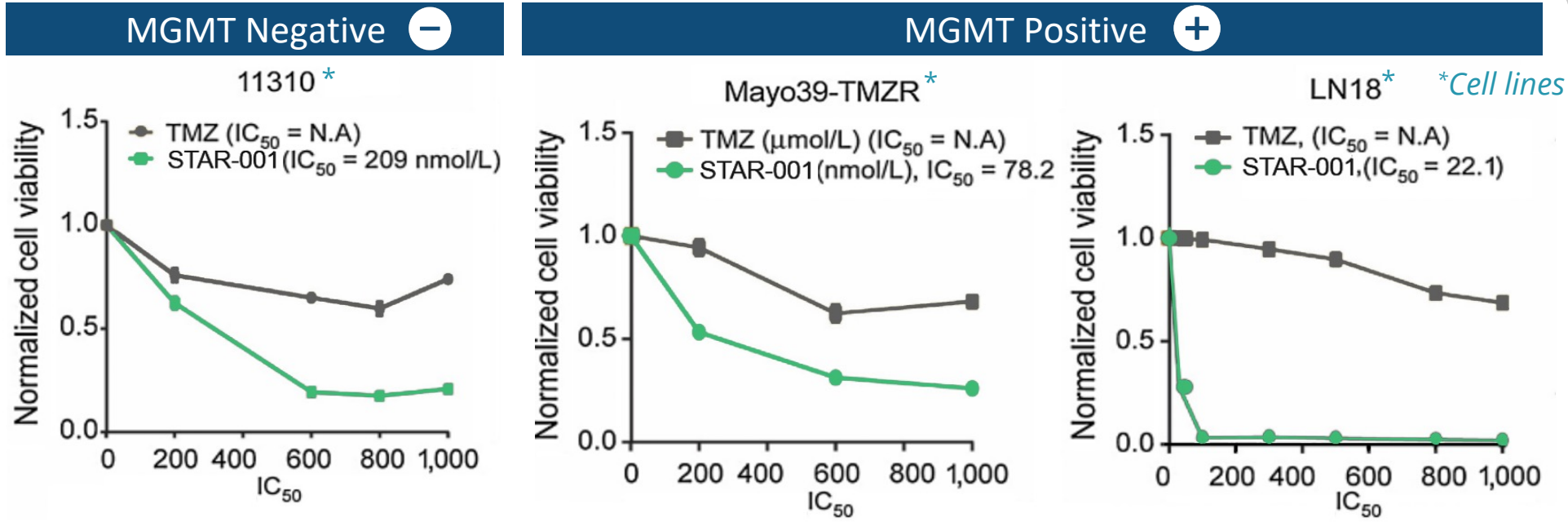
- **500,000+ Potential CNS Patients** Globally*
- **Multiple Clinical-stage** CNS Cancer Indications
- STAR-001 has been Granted **FDA Orphan Drug Designation for GBM & ATRT and Rare Pediatric Disease Designation for ATRT**
- **World Class Collaborators** from Johns Hopkins, UT Health San Antonio, and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

Estimated Annual Global Numbers

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

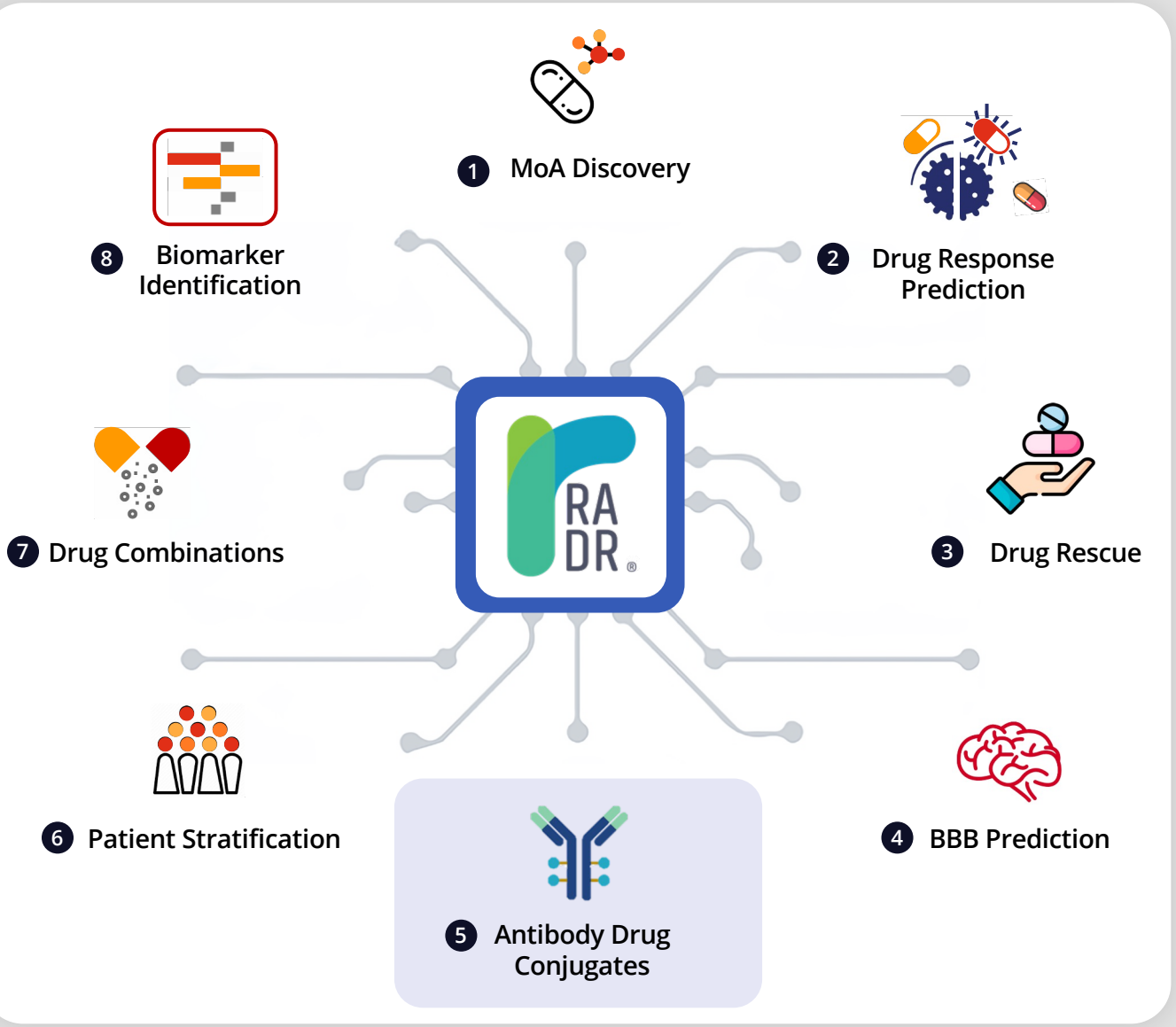
- No effective single-agent therapy has been approved for adult GBM in over 18 years
- STAR-001 was granted an FDA Orphan Drug Designation to treat malignant gliomas including GBM
- STAR-001 has shown effectiveness in both MGMT(+,-) forms of GBM cell lines
- Planning for launch of Phase 1b/2 in second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

Unique position of STAR-001 compared to current therapeutic options

		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*

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

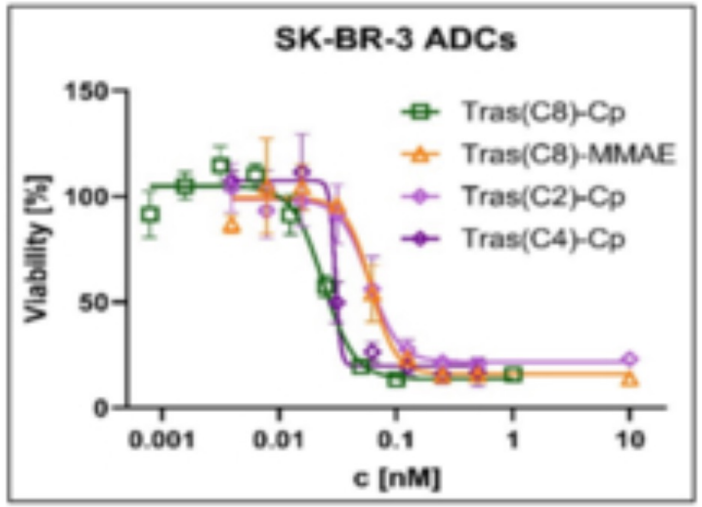
Advanced the development, synthesis, and preclinical proof-of-concept of a novel, highly potent, cryptophycin-based ADC (Cp-ADC)

ADC Collaboration Update

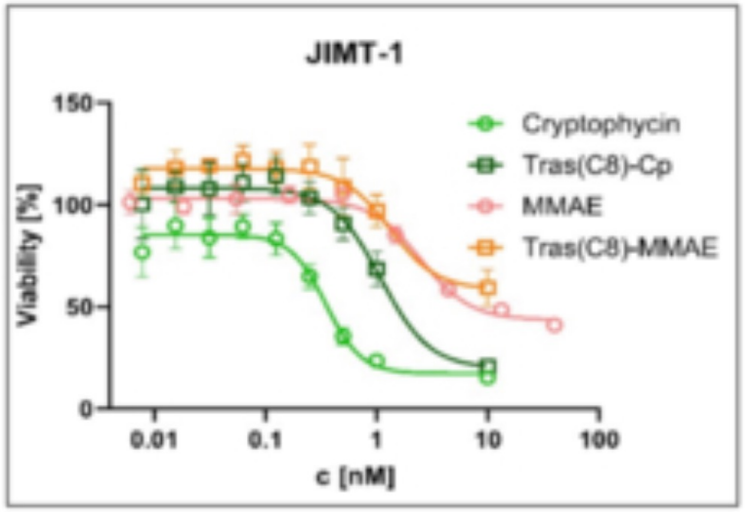
UNIVERSITÄT BIELEFELD

MAGIC BULLET :: Reloaded

High HER2 Expression



Moderate HER2 Expression



Key Highlights

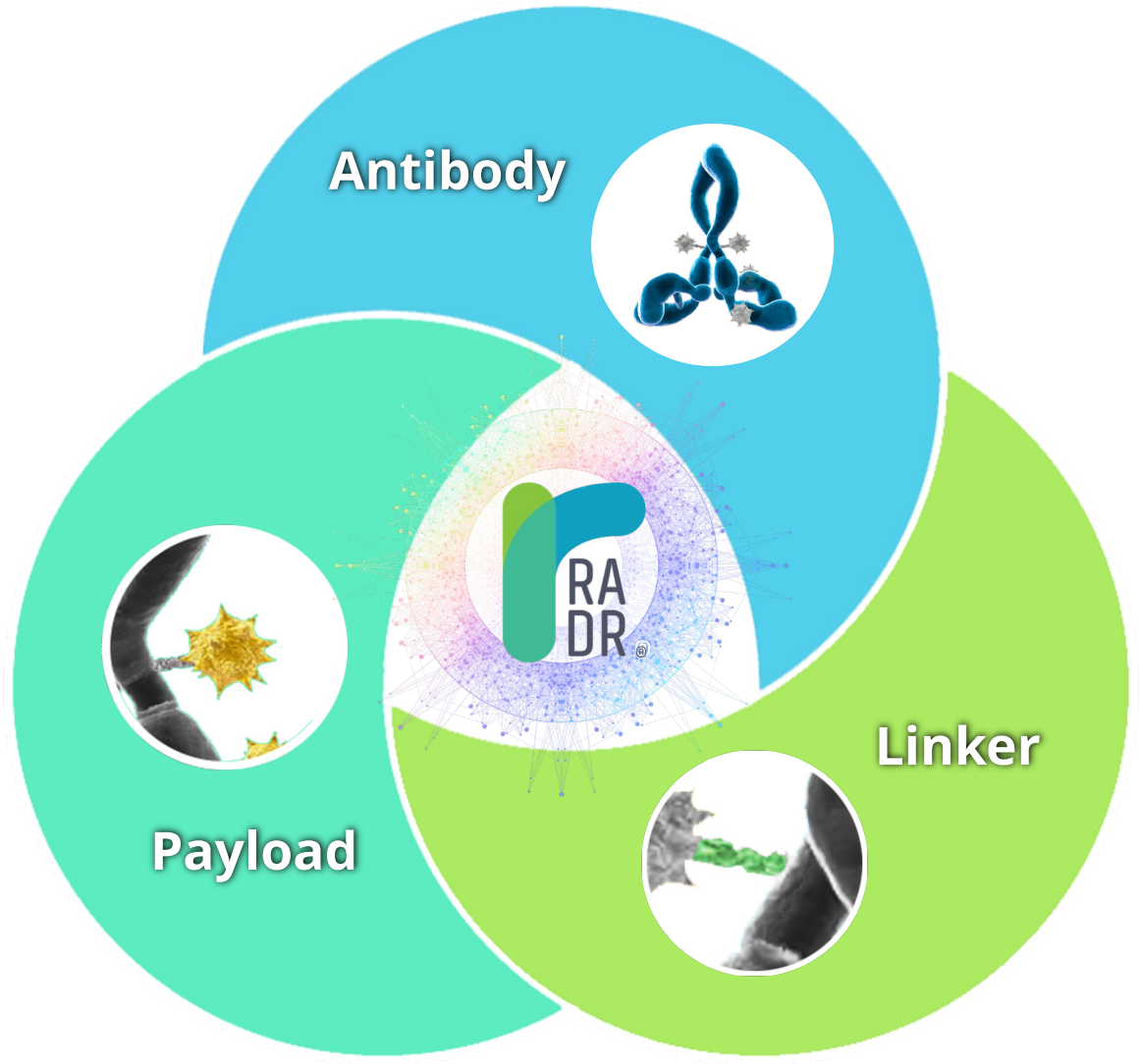
- The cryptophycin(Cp) drug-payload and Cp-ADC averaged an **80% cancer cell kill rate**
- In a moderate Her2 expression model, the Cp-ADC with a DAR* of 8 *(Tras(C8)-Cp)* was about **10x more potent** than a DAR 8 MMAE**-ADC *(Tras (C8)-MMAE)*
- Cp-ADC showed highly efficient anti-tumor activity in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

AI-powered module has potential to deliver differentiated and derisked ADCs faster & with significantly reduced costs



Leveraging AI to deliver novel, differentiated ADCs

Ability to select and characterize among potent and super potent payloads with specific and optimized molecular and biochemical characteristics

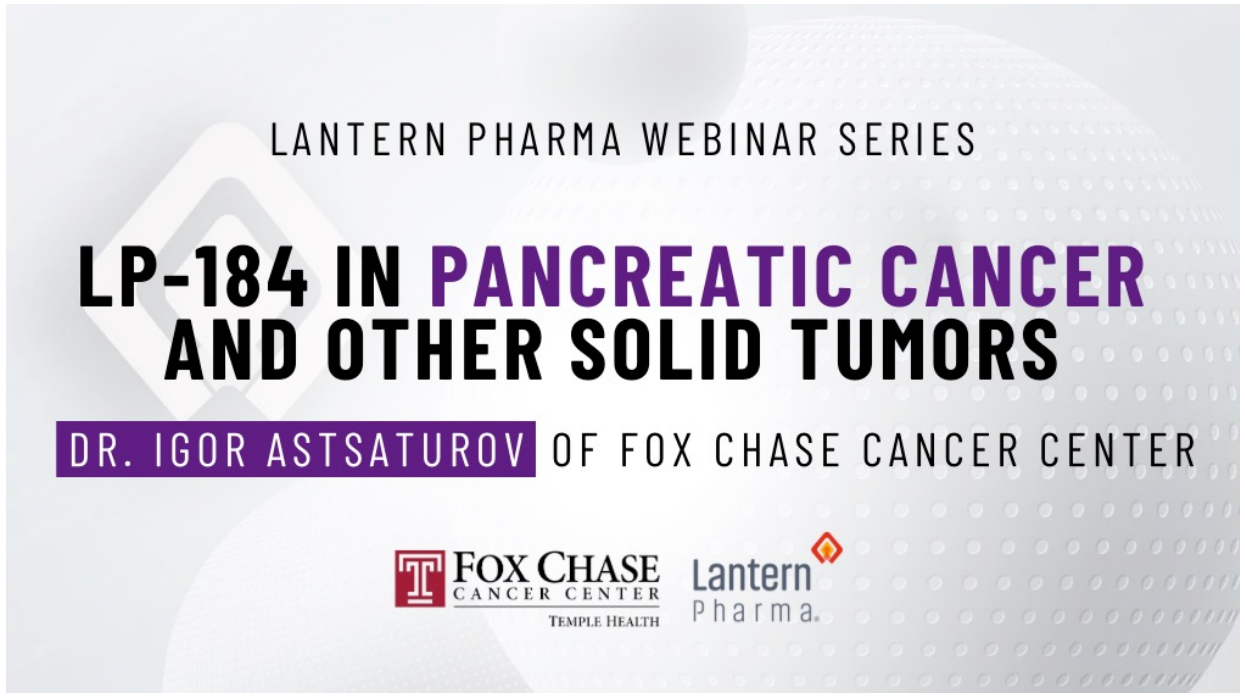
The ADC module will continue to grow by ingesting and learning from billions of data points each quarter based on both experimental and real-world data

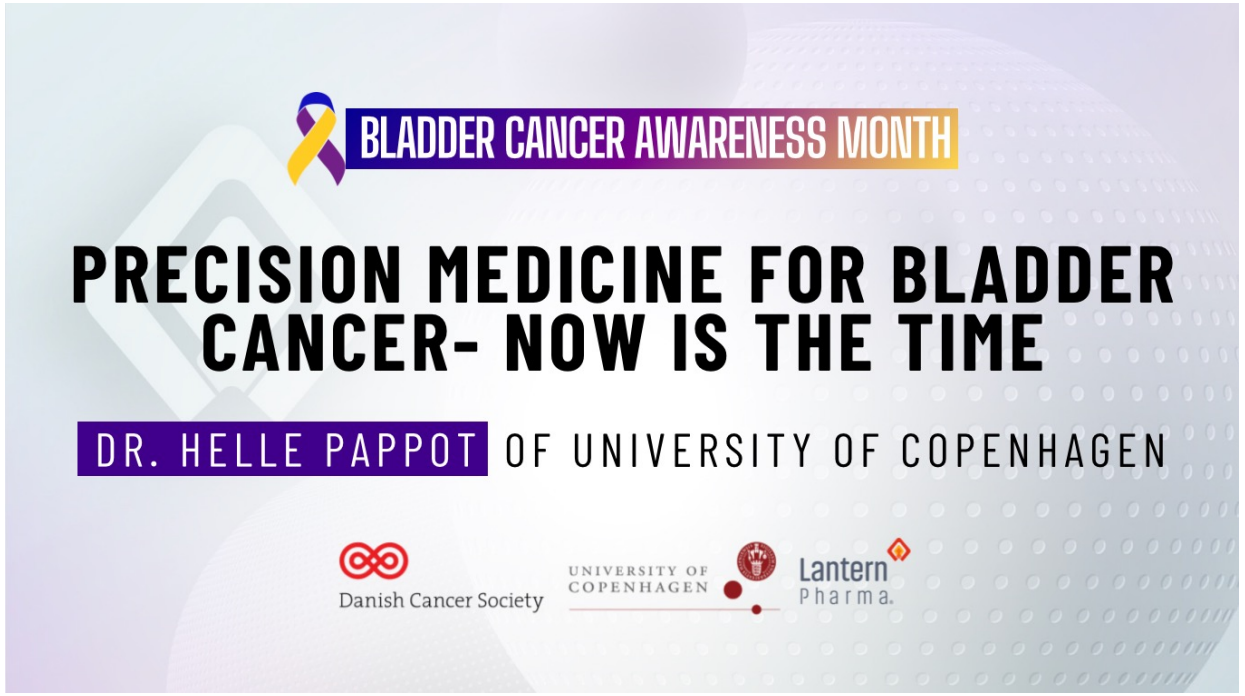
Ability to predict synergy of payloads and antibodies in certain tumors based on both the tumor environment and biological impact

RADR® insights generated by understanding the impact of mutations on heterogeneous target expression patterns in cancers can help improve treatment response, enabling personalized targeting of ADCs

ADC
Antibody Drug Conjugate

Lantern pharma 2024 webinar series – *Webinar Wednesdays* – featuring world-class collaborators and researchers





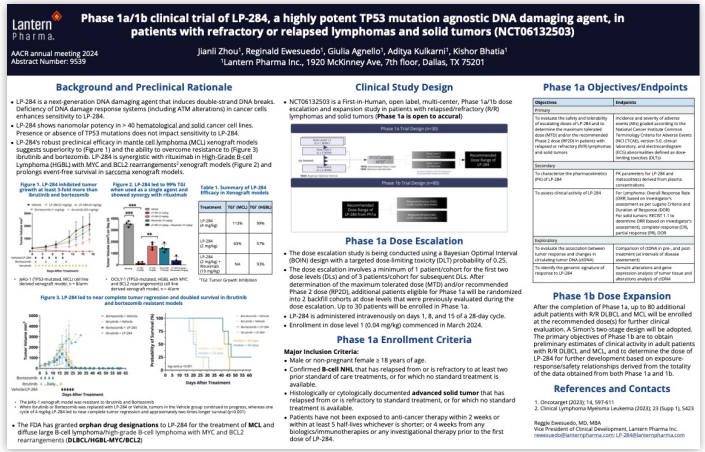
Future Webinar Wednesdays

MAY 29th **LP-184** in Pancreatic Cancer and Other Solid Tumors with Dr. Igor Astsaturov of Fox Chase Cancer Center

MAY 31st **Bladder Cancer Awareness Month** – Precision Medicine for Bladder Cancer with Dr. Helle Pappot of University of Copenhagen

JUNE 26th **STAR-001** in Brain and CNS cancers with Dr. Marc Chamberlain, CMO of Starlight Therapeutics

Publications highlighting the clinical value of RADR® insights & de-risking the development of Lantern's drug candidates


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)

Jianli Zhou[1], Reginald Ewesuedo[1], Giulia Agnello[1], Aditya Kulkarni[1], Kishor Bhatia[1]
[1]Lantern Pharma Inc., 1920 McKinney Ave, 7th floor, Dallas, TX 75201

Background and Preclinical Rationale

Clinical Study Design

Phase 1a Objectives/Endpoints

Phase 1a Dose Escalation

Phase 1b Dose Expansion

Phase 1a Enrollment Criteria

References and Contacts

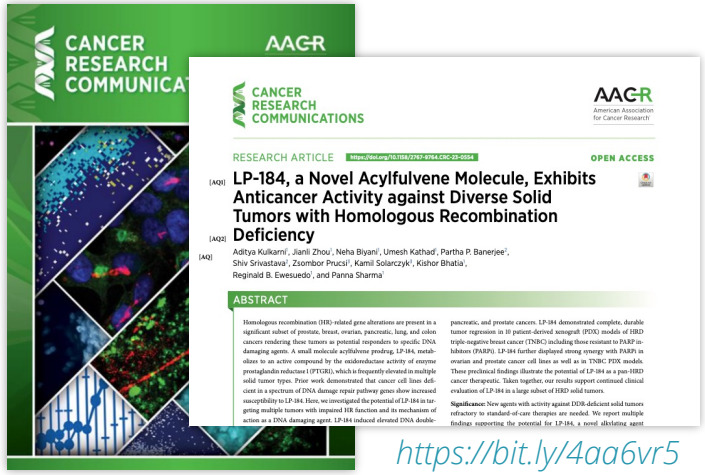
https://bit.ly/3v115QT

POSTER | AACR ANNUAL MEETING 2024

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 2024

American Association for Cancer Research


CANCER RESEARCH COMMUNICATIONS

RESEARCH ARTICLE

LP-184, a Novel Acylfulvene Molecule, Exhibits Anticancer Activity against Diverse Solid Tumors with Homologous Recombination Deficiency

Aditya Kulkarni, Jianli Zhou, Neha Biyani, Umesh Kathad, Partha P. Banerjee, Shiv Srivastava, Zsombor Prucsi, Kamil Solarczyk, Kishor Bhatia, Reginald B. Ewesuedo, and Panna Sharma

ABSTRACT

https://bit.ly/4aa6vr5

PUBLICATION | CANCER RESEARCH COMMUNICATIONS

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

May 2024

American Association for Cancer Research

2024 Objectives

A Breakthrough Year for Lantern

TOP TEN

- 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
- Explore licensing and partnership opportunities with biopharma companies
- 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

Lantern Pharma®

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