

**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549**

**FORM 8-K**

**CURRENT REPORT**

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): March 20, 2023

**Lantern Pharma Inc.**

(Exact name of registrant as specified in its charter)

<b>Delaware</b> (State or Other Jurisdiction of Incorporation)	<b>001-39318</b> (Commission File Number)	<b>46-3973463</b> (IRS Employer Identification No.)
<b>1920 McKinney Avenue, 7th Floor Dallas, Texas</b> (Address of Principal Executive Offices)		<b>75201</b> (Zip Code)
	(972) 277-1136 (Registrant's telephone number, including area code)	

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

- Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)  
 Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)  
 Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))  
 Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act: Common Stock

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, \$0.0001 par value	LTRN	The Nasdaq Stock Market

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

**Item 2.02 Results of Operations and Financial Condition.**

On March 20, 2023, Lantern Pharma Inc. (the "Company") will issue a press release announcing its financial results for the fiscal year and fourth quarter ended December 31, 2022. A copy of the press release is furnished as Exhibit 99.1 to this Current Report on Form 8-K and is incorporated herein by reference.

The information in this Item 2.02, including Exhibit 99.1 hereto, shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filings under the Securities Act of 1933, as amended, or the Exchange Act, regardless of any general incorporation language in such filings, unless expressly incorporated by specific reference in such filing.

**Item 7.01 Regulation FD Disclosure.**

On March 20, 2023, the Company will utilize a presentation to assist with the Company's discussions during a conference call and live webinar hosted by the Company to discuss financial and operating results for the fiscal year and fourth quarter ended December 31, 2022. A copy of the presentation is furnished as Exhibit 99.2 to this Current Report on Form 8-K and is incorporated herein by reference.

The information in this Item 7.01, including Exhibit 99.2 hereto, shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filings under the Securities Act of 1933, as amended, or the Exchange Act, regardless of any general incorporation language in such filings, unless expressly incorporated by specific reference in such filing.

**Item 9.01 Financial Statements and Exhibits.**

(d) Exhibits.

**Exhibit No. Exhibit Description**

99.1 Press Release dated March 20, 2023 announcing financial results for fiscal year and quarter ended December 31, 2022.

99.2 [Presentation relating to March 20, 2023 conference call and live webinar to discuss financial and operating results for fiscal year and quarter ended December 31, 2022.](#)  
104 Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

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#### SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Lantern Pharma Inc.,  
A Delaware Corporation

Dated: March 20, 2023

By: /s/ David R. Margrave  
David R. Margrave, Chief Financial Officer

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### Lantern Pharma Reports Fourth Quarter and Fiscal Year 2022 Financial Results and Operational Highlights

- The Harmonic™ clinical trial, a Phase 2 study in never-smoker patients with non-small lung cancer, has activated 5 clinical trial sites, across 12 locations, and anticipates multiple additional sites in the US during the 1<sup>st</sup> half of 2023; first enrolled patients are anticipated for Q2 2023.
- IND-enabling studies for LP-184 are completed, and submission of the IND application to the FDA is anticipated for April 2023.
- Completion of IND-enabling studies for LP-284 and submission of the IND application to the FDA are anticipated in mid-2023.
- First-in-human Phase 1 clinical trials for LP-184, in genomically defined solid tumors, and for LP-284, in multiple non-Hodgkin's lymphomas, are targeted for launch in mid-2023.
- Starlight Therapeutics Inc., a wholly-owned Lantern subsidiary, was formed to focus exclusively on the clinical development of therapies for multiple CNS (central nervous system) and brain cancers; clinical trials for lead drug candidate, STAR-001, in CNS cancers are anticipated for late 2023/early 2024.
- RADR®, Lantern's oncology-focused AI drug development platform, surpassed 25 billion oncology-focused datapoints; future advancements will include AI-driven insights for the development of combination regimens, including immuno-oncology agents, and for the development of antibody drug conjugates (ADCs).
- \$55.2 million in cash, cash equivalents, and marketable securities as of December 31, 2022.
- Lantern has a cash runway into 2025.
- Conference call scheduled for 4:30 p.m. ET / 1:30 p.m. PT today.

DALLAS—(Business Wire)—Lantern Pharma Inc. (NASDAQ: LTRN), a clinical-stage biopharmaceutical company using its proprietary RADR® artificial intelligence (“AI”) and machine learning (“ML”) platform to transform the cost, pace, and timeline of oncology drug discovery and development, today announced operational highlights and financial results for the fourth quarter and fiscal year ended December 31, 2022.

“The Lantern team spent 2022 focused on preparing our unique drug candidates, LP-184 and LP-284, for the clinic, while at the same time advancing the clinical foundation and infrastructure for our Phase 2 Harmonic™ clinical trial for never-smokers with NSCLC. We have been working relentlessly towards the objective of leading the transformation of our industry's approach to the pace, risk, and cost of drug development by leveraging large scale data, machine learning, and leading-edge artificial intelligence technologies. We believe our capabilities in the development of precision oncology medicines and ADCs will establish us as a pioneer in the field of AI-based drug discovery,” commented Panna Sharma, CEO and President of Lantern Pharma.

“During 2022 we also made significant advances in the field of CNS oncology, which resulted in several new indications for our drug candidate LP-184. We have gone from one CNS indication, GBM, to seven indications in less than 18 months and in a highly capital efficient manner. This unique achievement would have only been possible by combining our AI-driven approach along with our collaborative business model, where we engage with top-tier researchers and institutions to both validate and sharpen our development plans for specific cancer subtypes and patient populations. In 2023, we expect to launch multiple first-in-human clinical trials in targeted cancers, where there is an urgent patient need and clear evidence from both our in-silico and in-vivo studies of the potential to improve outcomes for patients. Ultimately, we believe that this will help to create significant value for investors and for the broader community of precision oncology,” continued Sharma.

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#### Portfolio Highlights:

- **LP-184** – The investigational new drug (IND) enabling studies for LP-184 have been completed and the submission of the IND application to the US Food and Drug Administration (FDA) is anticipated during Q2 2023. Lantern is anticipating a Phase 1A basket trial for LP-184 in 2023, for recurrent brain cancers, including glioblastoma (GBM), brain metastases and other central nervous system (CNS) cancers, pancreatic cancer, and additional solid tumors with DNA damage response (DDR) deficiencies. Globally, the aggregate annual market potential of these programs is estimated to be approximately \$11.0-13.0 billion, consisting of \$5.0-6.0 billion for CNS cancers and \$6.0-7.0 billion for solid tumors.

At the 2022 San Antonio Breast Cancer Symposium (SABCS), Lantern scientists presented new research on the anti-tumor potential of LP-184 for Triple Negative Breast Cancer (TNBC), one of the most malignant forms of breast cancer. The presentation highlighted results demonstrating that LP-184 treatment of 10 TNBC patient-derived xenograft (PDX) mouse models, led to complete and durable tumor regression of 107-141%. In addition to primary TNBC tumors, LP-184 may also have added therapeutic potential to treat brain metastases (brain mets.) from TNBCs, which are found in ~14% of TNBC patients at their initial diagnosis. In the US, there are approximately 28,000 newly diagnosed and relapsed TNBC patients per year, representing an estimated annual market potential of up to \$1.7 billion.

- **LP-300** – Harmonic™ is a Phase 2 clinical trial for never-smoker patients with relapsed non-small cell lung cancer (NSCLC) and will assess the effect of LP-300 in combination with standard-of-care chemotherapy, pemetrexed and carboplatin, on patient overall and progression-free survival. Lantern has activated 5 clinical trial sites at 12 different locations across the US, including Gabrail Cancer Center, Northwest Oncology, New York Cancer and Blood Specialists, Texas Oncology, and Cancer and Blood Specialty Clinic. Across the 5 Harmonic™ clinical trial sites, there is 1 consented patient that is anticipated to be dosed in Q1 2023 and 14 additional potential patients that have been pre-screened and are being monitored for possible enrollment. Multiple additional trial sites across the US are expected to be activated in the 1<sup>st</sup> half of 2023 and will bolster patient recruitment and enrollment. In the US, there are approximately 20,000-40,000 never-smokers with NSCLC diagnosed annually, representing an estimated annual market potential of \$1.5-2.0 billion. Additional information on the Harmonic™ trial can be found at the Harmonic™ website and the clinicaltrials.gov website.

This quarter, Lantern launched a first-of-its-kind iPhone app for the Harmonic™ clinical trial. The Harmonic™ app provides patients, caregivers, and the healthcare community with mobile access to up-to-date information on the Harmonic™ trial, including how NSCLC is different in never-smokers versus in tobacco users, what taking part in the Harmonic™ trial involves, the ability to contact the Harmonic™ clinical trial team, information on LP-300, and the locations of all currently active clinical trial sites. Download the Harmonic™ clinical trial app here.

- **LP-284** – The completion of the LP-284 IND enabling studies and submission of the IND application to the US FDA are anticipated in mid-2023. A first-in-human Phase 1 clinical trial launch is anticipated in 2023 for B-cell non-Hodgkin's lymphomas (NHL), where LP-284 has shown nanomolar potency across multiple in vitro and in vivo studies, including mantle cell lymphoma (MCL), double hit lymphoma (DHL), and other NHL cancer subtypes. Nearly all MCL patients relapse from the MCL standard-of-care agents Bortezomib and Ibrutinib and there is an urgent and unmet need for novel improved therapeutic options for these patients. In the US and Europe, MCL and DHL are diagnosed in approximately 9,000 patients each year and have an estimated annual market potential of \$1.2 billion.
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In January 2023, [the U.S. Food and Drug Administration \(FDA\) granted LP-284 an Orphan Drug Designation \(ODD\) for the treatment of MCL](#), based on LP-284's demonstrated anti-tumor activity across a comprehensive number of in vitro and in vivo models of mantle cell lymphoma (MCL). The ODD strengthens LP-284's clinical development path and provides the future potential opportunity for additional market exclusivity and commercial protection. In addition to the ODD granted for LP-284 in MCL, Lantern was previously granted ODDs by the FDA for its drug candidate LP-184 for the treatment of malignant gliomas, ATRT, and pancreatic cancer. Lantern has also been granted a Rare Pediatric Disease Designation for LP-184 in ATRT.

[At the 2022 American Society of Hematology \(ASH\) annual meeting](#), Lantern scientists presented new research on LP-284 for MCLs. The poster presentation featured results demonstrating that LP-284 treatment had between 91-105% greater tumor growth inhibition (TGI) in mice implanted with MCL cell-derived xenograft (CDX) tumors, when compared to treatment with current MCL therapies Ibrutinib or Bortezomib.

- **LP-100** – In LP-100's previous [Phase 2 trial in Denmark](#) for patients with metastatic castration resistant prostate cancer (mCRPC), the initial cohort of nine patients (out of a targeted enrollment of 27) experienced a median overall survival of 12.5 months, which is an improvement over other similar fourth-line treatment regimens for mCRPC.

[Based on Lantern's recent in silico and in vivo results demonstrating the synergies of LP-100 with PARP inhibitors \(PARPi\)](#), and the industry's development of entirely new classes of radio-ligand based therapy for mCRPC, the decision has been made to close the Phase 2 clinical trial in Denmark. Lantern believes that the strong anti-cancer synergy between LP-100 and PARPis will allow this drug combination to be positioned in earlier lines of therapy for treatment indications with larger market sizes.

Potential treatment indications for LP-100 and PARPi combination therapy may include homologous recombination repair (HRR) gene-mutated metastatic castration-resistant prostate cancer, first line platinum-responsive advanced ovarian cancer, and BRCA-mutated metastatic breast cancer. The total U.S. market size of these and other potential target development indications for the LP-100 and PARPi combination is estimated at between \$700 million and \$2 billion.

#### **Formation of Starlight Therapeutics:**

Lantern recently formed a wholly-owned subsidiary, Starlight Therapeutics Inc. ("Starlight"), to develop drug candidate LP-184's central nervous system (CNS) and brain cancer indications – including glioblastoma (GBM), brain metastases (brain mets.), and several rare pediatric CNS cancers. Starlight will refer to the molecule LP-184, as it is developed in CNS indications, as "STAR-001".

The programs being developed by Starlight were born from the analysis of billions of oncology-focused data points and by using Lantern's AI platform, RADR<sup>®</sup>. STAR-001's powerful anti-tumor mechanism of action, synthetic lethality, and collaborations with internationally recognized institutions, including the Kennedy Krieger Institute at Johns Hopkins and the Greehey Children's Cancer Research Institute at UT Health – San Antonio, make it well positioned to advance in targeted and efficient clinical development programs. Starlight intends to pursue human clinical trials for multiple CNS indications starting in late 2023, building on prior IND-enabling studies and the upcoming Phase 1A clinical testing that will be conducted by Lantern.

The clinical development of STAR-001 in CNS cancers beyond the Phase 1A trial will be conducted exclusively by Starlight. Following the launch of Starlight, Lantern will continue to advance LP-184's preclinical and clinical development for non-CNS indications (including pancreatic cancer and other solid tumors) and will also provide AI-driven bioinformatic and computational biology support to Starlight.

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"The formation of Starlight as a wholly-owned subsidiary allows Lantern to sharpen the focus on advancing STAR-001 through targeted clinical trials and dedicate increased time, resources, and personnel to progress one of the most promising drug candidates for CNS cancer patients in decades," stated Panna Sharma, Lantern's CEO and President. "We believe that by focusing our efforts via Starlight Therapeutics we can accelerate and deepen our commitment to the CNS cancer patient community, while also creating the potential for meaningful additional upside for our investors," continued Sharma.

#### **RADR<sup>®</sup> Platform Growth and Development:**

- RADR<sup>®</sup>, Lantern's AI and ML platform, continues to rapidly expand its 25+ billion oncology-focused datapoints. Lantern expects the platform to reach 50 billion datapoints in the coming year and to include new datasets with an increased focus on immuno-oncology and antibody drug conjugates. Additional advancements are simultaneously occurring in platform automation, scalability, and security.
- An expanded RADR<sup>®</sup> product development roadmap was recently announced, which will enhance RADR<sup>®</sup>'s capabilities for the development of novel and effective antibody drug conjugates (ADCs), which are highly specific cancer-targeted antibodies linked to potent anti-tumor small molecules. Globally, ADCs are one of the fastest growing drug development markets and are estimated to have a market potential of over \$14 billion by 2027.

#### **RADR<sup>®</sup> and Scientific Collaborations Update:**

- [Lantern recently established a new RADR<sup>®</sup> and AI-driven collaboration with TTC Oncology](#) to enhance the development of TTC's Phase 2 ready drug candidate TTC-352. TTC-352 is a novel, first- and best-in-class selective human estrogen receptor (ER) partial agonist (ShERPA) for the treatment of patients with metastatic ER+ breast cancer. The initial aims of the collaboration will be to identify biomarker or gene signatures to power potential patient selection for an upcoming TTC-352 Phase 2 clinical trial and to discover additional treatment indications for TTC-352. Under the terms of the collaboration, Lantern is receiving an exclusive right to license TTC-352, including any collaboration intellectual property (IP), during an exclusive option period.
- On March 21<sup>st</sup>, 2023 at 12:00 p.m. ET, Lantern will host a KOL webinar on synthetic lethality, the unique mechanism of action of Lantern's drug candidates LP-184, LP-284, and LP-100. Synthetic lethality can exploit vulnerabilities in cancer cells, known as DNA damage repair deficiencies, which are estimated to be present in 25-30% of solid tumors. The webinar will feature an internationally recognized expert in synthetic lethality, Zoltan Szallasi, M.D., who serves joint appointments as principal investigator at The Danish Cancer Research Center and as assistant professor of pediatrics at Boston Children's Hospital, a Harvard Medical School affiliate. Register for the webinar [here](#).

#### **Operational Highlights:**

- Lantern has expanded its clinical leadership team with several key additions, including Reggie Ewesuedo M.D., M.Sc., MBA, as Vice President of Clinical Development. Combined, the new clinical leadership team members represent over 40 years of proven success in clinical operations and bringing drugs to market. The expansion of the clinical development team will continue to advance the Harmonic<sup>™</sup> trial, as well as the upcoming first-in-human Phase 1 clinical trials for LP-184 and LP-284.
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#### Fourth Quarter and Fiscal Year 2022 Financial Overview:

- **Balance Sheet:** Cash, cash equivalents, and marketable securities were \$55.2 million as of December 31, 2022, compared to \$70.7 million as of December 31, 2021. The quarterly and annual cash burn for 2022 reflects our capital-efficient, collaborator-centered business model.
- **R&D Expenses:** Research and development expenses were \$2.3 million and \$8.6 million for the quarter and year ended December 31, 2022 compared to \$2.2 million and \$7.6 million for the quarter and year ended December 31, 2021.
- **G&A Expenses:** General and administrative expenses were \$1.6 million and \$5.8 million for the quarter and year ended December 31, 2022, compared to \$1.4 million and \$5.0 million for the quarter and year ended December 31, 2021.
- **Net Loss:** Net losses were \$3.4 million (or \$0.31 per share) and \$14.3 million (or \$1.31 per share) for the quarter and year ended December 31, 2022, compared to a net loss of \$3.5 million (or \$0.31 per share) and \$12.4 million (or \$1.13 per share) for the quarter and year ended December 31, 2021.

#### Earnings Call and Webinar Details:

Lantern will host its fourth quarter and fiscal year 2022 earnings call and webinar today, Monday, March 20, 2023 at 4:30 p.m. ET.

- [https://us06web.zoom.us/webinar/register/3616775268267/WN\\_94qgn\\_1IRnuRALmciLu0CO](https://us06web.zoom.us/webinar/register/3616775268267/WN_94qgn_1IRnuRALmciLu0CO)
- Related presentation materials will be accessible at: <https://ir.lanternpharma.com>
- A replay of the fourth quarter and fiscal year 2022 earnings call and webinar will be available at <https://ir.lanternpharma.com>.

#### About Lantern Pharma:

Lantern Pharma (NASDAQ: LTRN) is a clinical-stage oncology-focused biopharmaceutical company leveraging its proprietary RADR<sup>®</sup> AI and machine learning platform to discover biomarker signatures that identify patients most likely to respond to its pipeline of genomically-targeted therapeutics. By targeting drugs to patients whose genomic profile identifies them as having the highest probability of benefiting from the drug, Lantern's approach represents the potential to deliver best-in-class outcomes.

#### Contact:

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Please find more information at:

Website: [www.lanternpharma.com](http://www.lanternpharma.com)

LinkedIn: <https://www.linkedin.com/company/lanternpharma/>

Twitter: [@lanternpharma](https://twitter.com/lanternpharma)

Lantern Pharma Newsletter – The Spark: Sign-up [here](#)

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#### Forward-looking Statements:

This press release 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<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> 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, 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](http://www.lanternpharma.com) or on the SEC's website at [www.sec.gov](http://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 press release 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.

#### Lantern Pharma Disclosure Channels to Disseminate Information:

Lantern Pharma's investors and others should note that we announce material information to the public about our company and its technologies, clinical developments, licensing matters and other matters through a variety of means, including Lantern Pharma's website, press releases, SEC filings, digital newsletters, and social media, in order to achieve broad, non-exclusionary distribution of information to the public. We encourage our investors and others to review the information we make public in the locations above as such information could be deemed to be material information. Please note that this list may be updated from time to time.

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# Fourth Quarter 2022 Operating & Financial Results Conference Call / Webinar

March 20<sup>th</sup>, 2023  
4:30 PM Eastern Time



 Lantern Pharma

NASDAQ :LTRN

## 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<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> 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, 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](http://www.lanternpharma.com) or on the SEC's website at [www.sec.gov](http://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**  
Chief Executive Officer,  
President and Director



**David Margrave**  
Chief Financial Officer



**Kishor Bhatia**  
Chief Science Officer

## Host



**Nicole Leber**  
Investor Relations

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## 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



"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

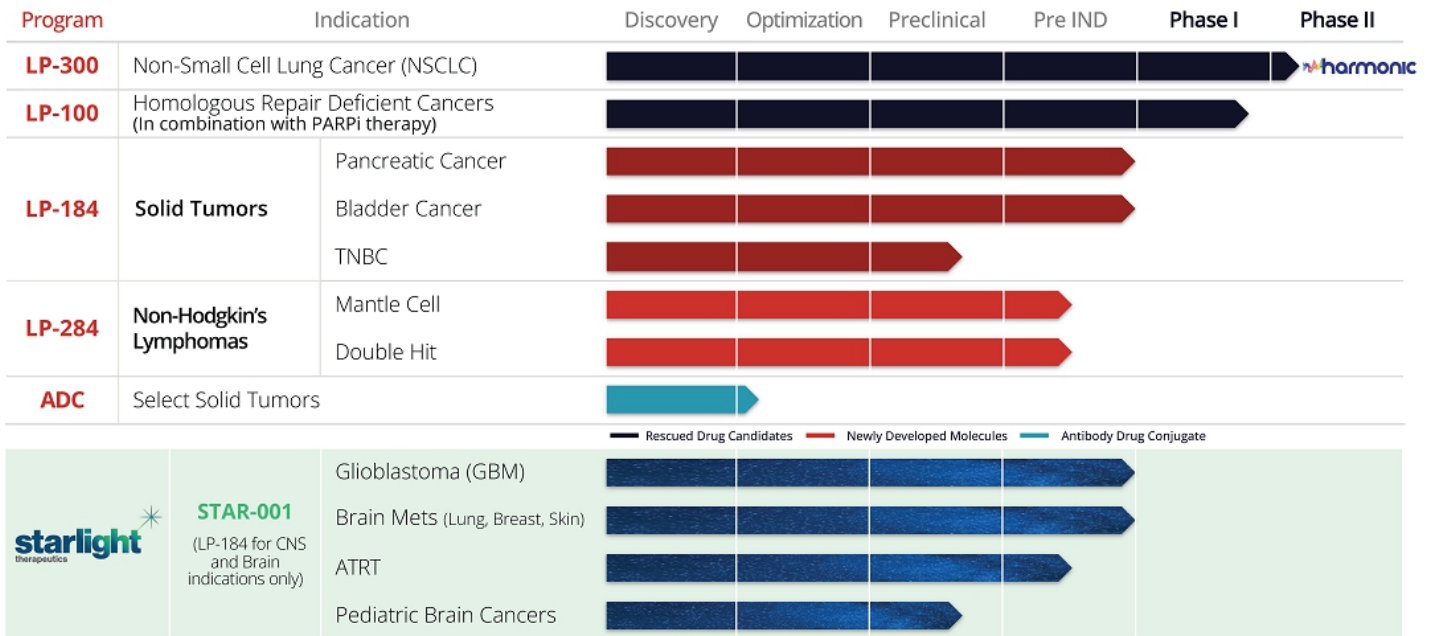


"**AI-driven patient stratification** helps to focus clinical trials with potentially fewer and more select patients, which are more likely to respond, ultimately saving time and money"

(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



## 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



### 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



### 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



### 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



### 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 21<sup>st</sup>, at 12PM ET (Register: <https://bit.ly/3l84Zui>)



### 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



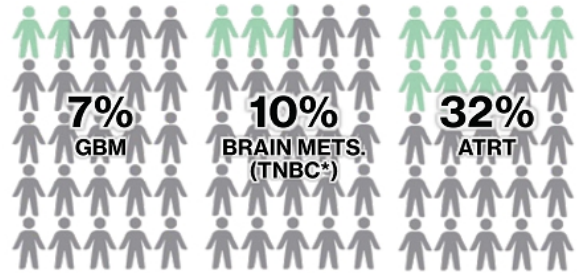
# Starlight Therapeutics' CNS and Brain Cancer Programs were Born from Billions of Datapoints and AI



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**



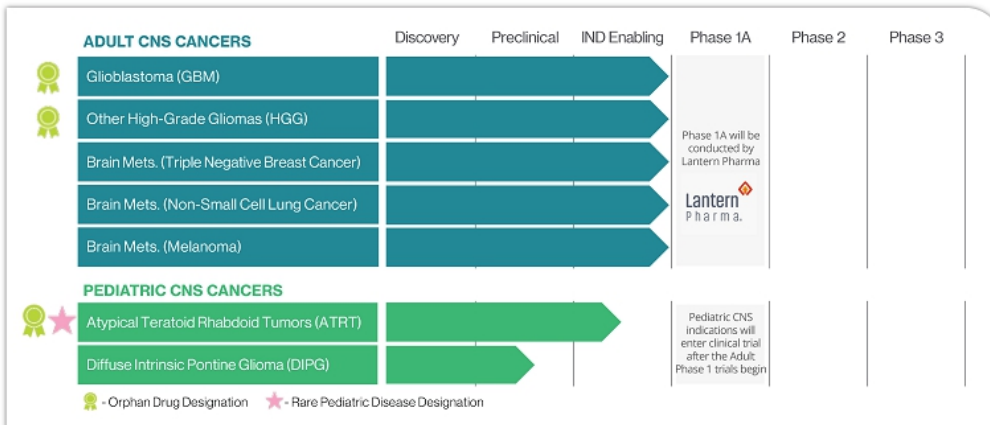
\*Triple Negative Breast Cancer



- **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



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+

- **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

# The Harmonic™ Trial for Never Smoker Patients with NSCLC



Phase 2



Non-Small Cell Lung Cancer



Never Smokers

90

Patients



Two arm, Open-label, Randomized Trial



Multi-Site

## Major Updates

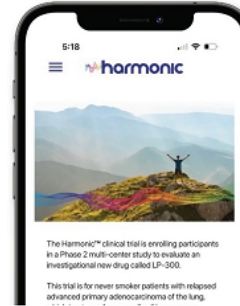
- Activated **5 sites** across **12 different locations** in the US
  - Gabrail Cancer Center
  - Northwest Oncology
  - New York Cancer and Blood Specialists
  - Texas Oncology
  - Cancer and Blood Specialty Clinic



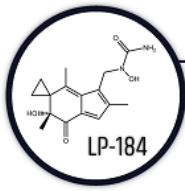
- Multiple additional sites across the US to be enrolled during 2023

## 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

## Program Highlights

- Unique Mechanism of Action:**
  - Synthetic lethality
    - Overexpression of PTGR1
    - Deficiencies in **DNA Damage Repair (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**

## Phase 1 trial in 2023

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

## World-class collaborators

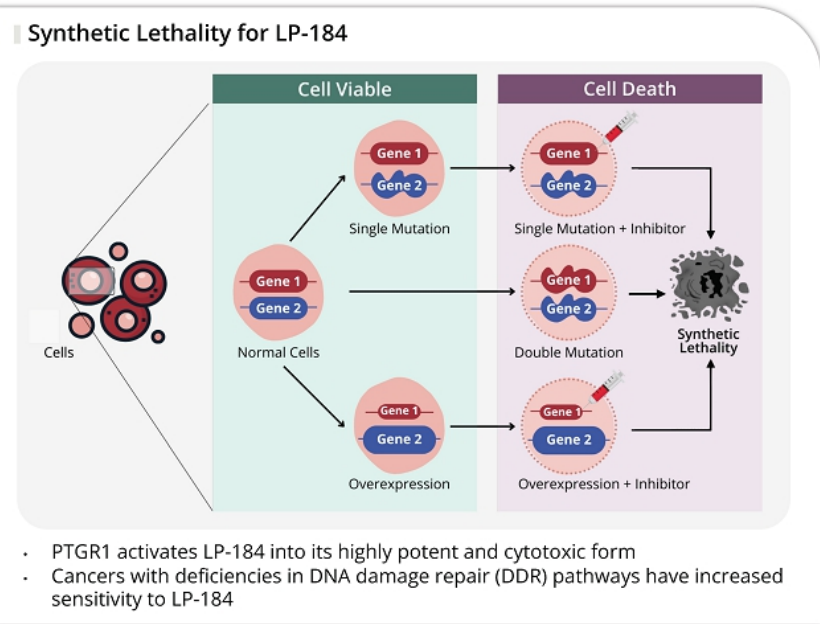


Danish Cancer Society



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

Genetic factors contributing to LP-184's Synthetic Lethality



### KOL Webinar on Synthetic Lethality



Dr. Zoltan Szallasi, M.D. Register: <https://bit.ly/3184Zui>

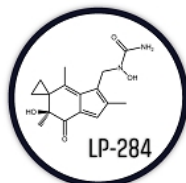
Principal investigator at Danish Cancer Society Research Center  
Assistant Professor of Pediatrics at Boston Children's Hospital  
affiliated with Harvard Medical School



Danish Cancer Society



## 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



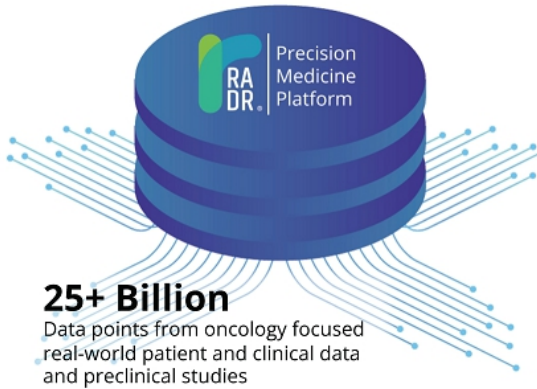
# RADR® is Lantern's AI and Machine-Learning Platform that Powers Oncology Drug Discovery and Development



Precision  
Medicine  
Platform

## Response Algorithm for Drug Positioning & Rescue

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



**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

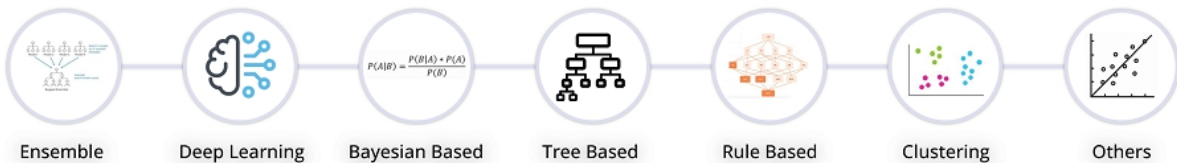
Use different algorithms and methods from RADR® to find potential Drug combinations

#### 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



### 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

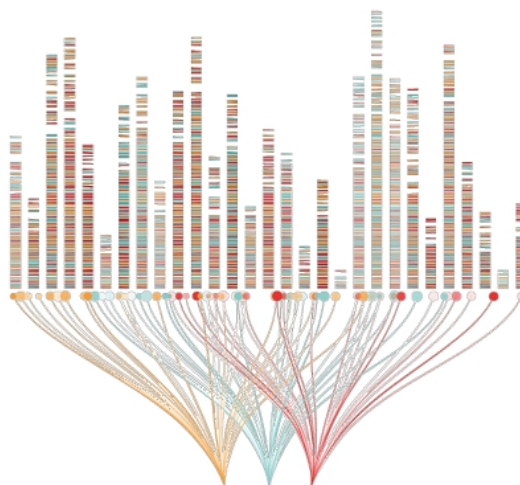


## What are Antibody Drug Conjugates (ADCs)?

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 (NCT03678863)

### 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

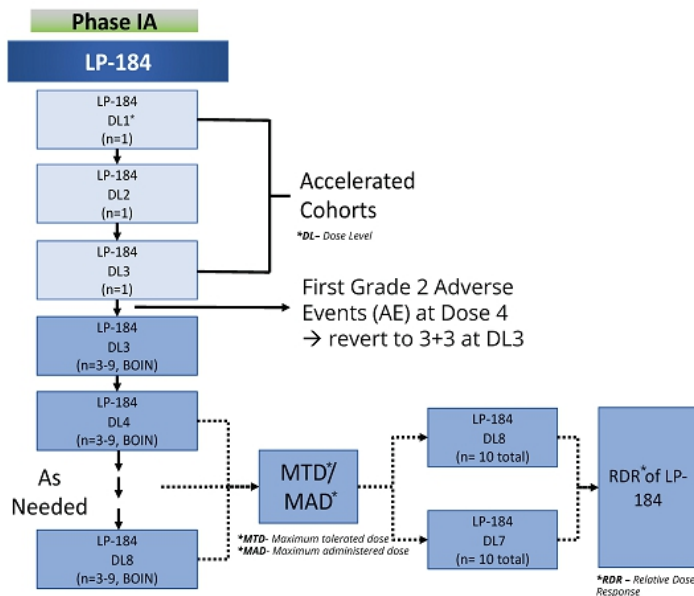
- Identify biomarker or gene signatures to power potential patient selection for an upcoming TTC-352 Phase 2 clinical trial
- Further characterize TTC-352's mechanism of action
- Discover additional treatment indications for TTC-352

### 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

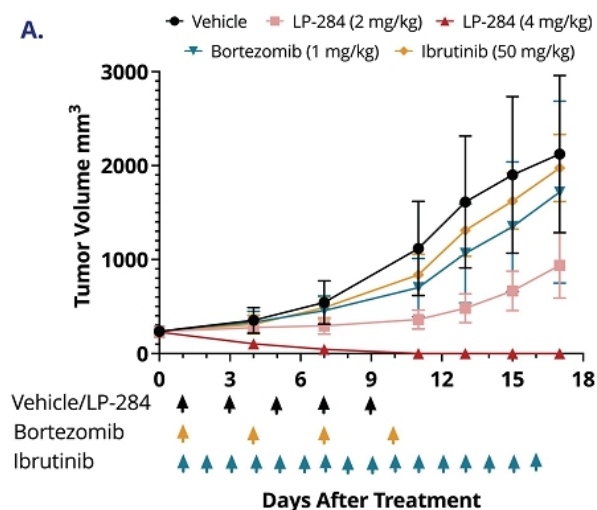


## LP-184 Phase 1A Clinical Trial Updates and Design

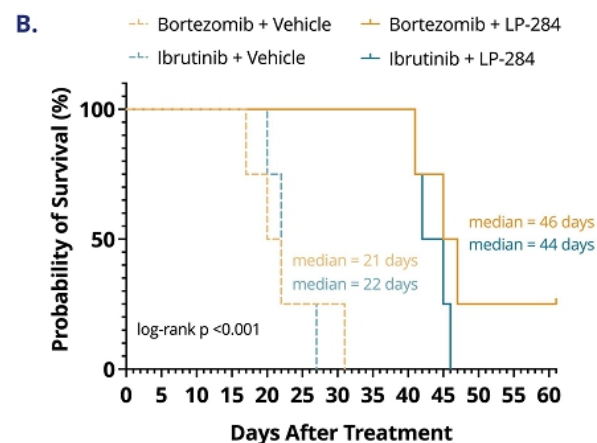
- Anticipated Phase 1A Clinical Trial Dates**
  - IND enabling studies completed
  - IND application submission – Early April 2023
  - Study-start up – Q2 2023
  - 1<sup>st</sup> patient dosed – Summer 2023
- Clinical Trial Design**
  - Bayesian optimal interval (BOIN) design
  - Anticipated starting 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
<b>Operating expenses:</b>				
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
<b>NET LOSS</b>	<b>\$ (3,381,105)</b>	<b>\$ (3,540,274)</b>	<b>\$ (14,259,946)</b>	<b>\$ (12,363,029)</b>
<i>Net loss per common share, basic and diluted</i>	\$ (0.31)	\$ (0.31)	\$ (1.31)	\$ (1.13)

## Balance Sheet Highlights & Summary

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

## Shares Outstanding

December 31, 2022

<b>LANTERN PHARMA INC. (LTRN)</b>	
Common Shares Outstanding	10,857,040
Warrants	177,998
Options (Employees, Management and Directors)	1,037,591
<b><i>Fully Diluted Shares Outstanding</i></b>	<b>12,072,629</b>

# 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





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