

# Lantern Pharma

Corporate Presentation October 13<sup>th</sup>, 2021

Nasdaq: LTRN

Leveraging A.I., machine learning & genomics to transform the cost, pace, and timeline of oncology drug discovery and development



# 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; 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 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," "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 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 A.I. 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, 2020, filed with the Securities and Exchange Commission on March 10, 2021. You may access our Annual Report on Form 10-K for the year ended December 31, 2020 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.



## The Golden Age of A.I. in Medicine

 $m{10}$  Mega-Trends Setting The Stage for A.I. Led Transformation in Drug Development & Medicine



- 1. Large-scale, relevant and readily available data-sets
- 2. Methods, technologies and algorithms that are massively scalable
- 3. Computing, storage and transmission continue exponential advances
- Rapid rise of global talent and collaboration networks
- 5. Tremendous increase in quality of biological data and methods
- 6. Rise of sequencing as a highly available, on-demand, low-cost service
- Consumers willing to share personal data
- 8. Industries that have an increasing impetus to transform
- 9. New generation of investors demanding novel value creation
- 10. Executives and entrepreneurs rewarded for rapid change

Lantern is at the forefront of this model of A.I. driven transformation in the area of personalized oncology drug development to drive value for cancer patients and our investors



# Current oncology drug development is costly, risky, and inefficient ... a perfect problem for artificial intelligence & machine learning to solve

#### Challenges in drug development ...

3.3%

Avg. success rate of oncology drugs

\$2.8B

R&D investment to bring new cancer to market 2009-2018

17,000+

Oncology trials conducted from 2001-2015

4-12X

Success rate of oncology trials using biomarker

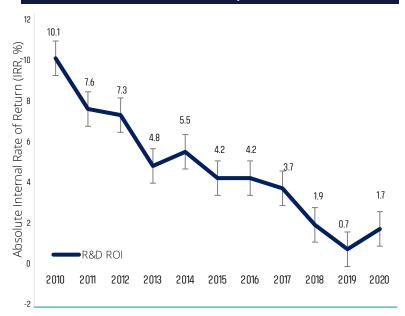
...are being met by data-driven, and A.I.-enabled approaches & technology





# There is a critical need to rescue drugs that failed or bring abandoned therapeutic assets to market in order to create ROI for biopharma

## ROI Among The **Top 15** Pharma – Continuous Decade of Decrease



Source: Deloitte research, 2020

## Two Central problems in Oncology drug development

1. "... low efficacies of cancer drugs might be attributed to the heterogeneity of the tested patient population, which essentially dilutes the strong therapeutic effect that a drug might have on a specific patient subgroup."

Thiebault Geoux, Ph.D.

Chemistry - Elsevier 11/9/2015

2. "The ever-increasing catalog of genetic changes involved in cancer development is fueling a new generation of targeted drugs that are designed to address specific weaknesses in tumor cells. But these drugs will only work in a subset of patients – creating a demand for genetic stratification.

Allison Halliday, Ph.D.
Cancer Research, 01/31/2020
Cancer Biomarkers: Powering Precision
Medicine



Solves these two central problems in oncology drug development with unprecedented speed and cost

This allows us to increase the *potential for success* and improve trial design



## Lantern leverages A.I. to reduce oncology drug development costs and improve the likelihood of success





- Drugs that fell short of statistical significance or abandoned by pharma / biotech companies in late stage trials despite tens to hundreds of millions spent on development, PK analysis, safety and efficacy studies
- Development of new compounds in drug classes that leverage our AI platform





**RADR®** 

- Big data (genomic, clinical, response) assembled and analyzed
- Patient subgroups identified through machine learning and artificial intelligence
- Mechanisms of action clarified
- Potential combinations identified
- Potential for faster and more efficient path to relaunching in the clinical trial setting



Responders



Non-Responders

- Patient stratification based on A.I. enabled genomic biomarker discovery
- New patient populations for failed or abandoned drugs based on validated biomarker signatures
- Aimed to shorten time to market
- Designed to reduce risk in development
- Potential for orphan or fast track status
- New Chemical Entities designed and filed

Potential to shorten clinical development by years, save tens to hundreds of millions of dollars in cost and substantially de-risk drug development versus the traditional model

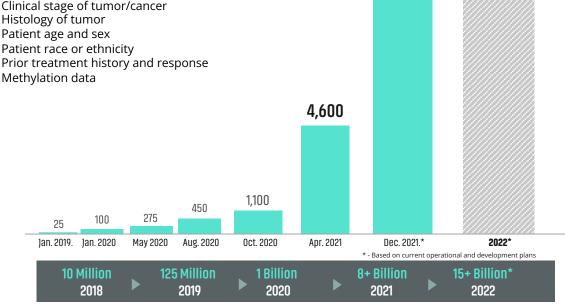


# 15,000

8,000

#### Data Points Powering RADR®

- Complete transcriptome data
- RNA gene expression data
- Drug sensitivity data
- DNA copy number & mutation data
- Clinical stage of tumor/cancer
- Histology of tumor
- Patient age and sex
- Patient race or ethnicity
- Methylation data



#### RADR® Enables...

Scientific Value +

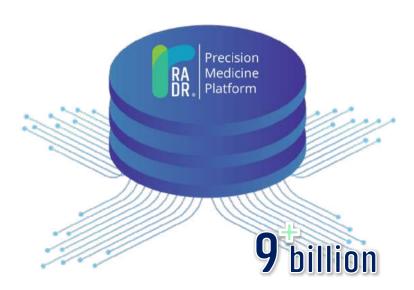
- **Rapid identification** of potential compounds to rescue and develop
- ➤ Improved and more nuanced understanding of responder groups, and non-responder groups based on biological networks
- > Feedback for potential mechanisms to be exploited in target-based development activity



- More rapid entry into clinical trials and patient subgroups
- > Robust companion diagnostics that can be used to accelerate trials and commercial traction
- > Potential for improved patient outcomes with drastically reduced costs and economic burden



# Response Algorithm for Drug Positioning & Rescue



- A proprietary integrated data analytics, experimental biology, oncology-focused, machine-learning-based platform focused on drug development
- Leverages cutting edge machine-learning approaches and techniques to generate powerful data-driven insights
  - Enables rapid informatics based hypothesis generation which can be validated in wet-lab
- Uses biology driven machine-learning algorithms to achieve higher prediction accuracy in real world settings
- A scalable, robust, expanding and replicable platform to support a range of drug development needs



## How RADR® is used by Lantern & Our Collaborators





Find Mechanism of Action

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



Derive ML-based signatures

RADR can derive Machine Learning based gene signatures which can guide biomarker strategies & CDx (Companion Diagnostics)



Identify Drug Combinations

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



Identify new indications

Identify and prioritize type/subtype of cancer for your compound with use of RADR



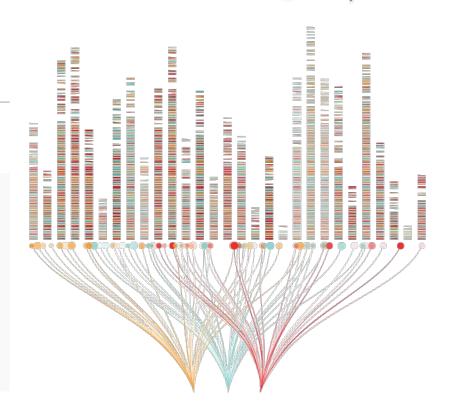
# Equity-Based Collaboration with Actuate Therapeutics that Leverages RADR®





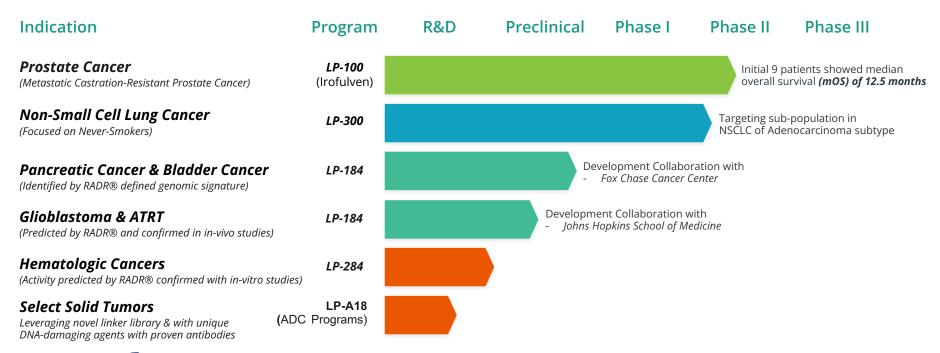
Actuate Therapeutics, Inc. is a private clinical stage biopharmaceutical company focused on the development of compounds for use in the treatment of cancer, and inflammatory diseases leading to fibrosis.

- Develop predictive model of sensitivity and a potential signature of biomarkers to identify response patients for 9-ING-41.
- 9-ING-41 is a widely researched GSK-3β inhibitor. There are multiple active oncology clinical trials in Phase I - II as monotherapy and in drug combinations.
- Lantern will be receiving equity in Actuate as part of the collaboration.





## Lantern's Unique & Rapidly Developing Pipeline



Accelerated Development by Leveraging the RADR® A.I. platform

Over 90+ issued patents and pending applications across 14 patent families



## Overview of Lantern's Developmental Stage Small Molecule Portfolio

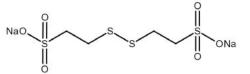
#### LP-100, Irofulven



- DNA Damaging Agent
- Mediates cytotoxicity through multiple mechanisms such as DNA adduct formation, RNA polymerase stalling and redox protein modification
- Use in a precision medicine, genomicsignature guided Phase II trial (NCT03643107) for metastatic, castrationresistant prostate cancer (mCRPC)
- Expansion into cancers with ERCC2/ERCC3 mutations (both germline and inherited)

#### **LP-300**

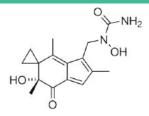




- Disulfide bond disrupting agent with cysteine modifying activity on select proteins (ALK) and modulator of protein function (EGFR, MET, ROS1)
- Chemosensitizer for combination therapies by inactivating proteins modulating cell redox status and drug resistance (TRX, GRX, PRX)
- Chemoprotectant activity that reduces toxicities associated with taxane/ platinbased chemotherapies

#### LP-184





- Novel DNA Damaging Agent member of the acylfulvene prodrug class
- Favorable *in vitro* and *in vivo* efficacy across multiple tumor types
- Broad anti-tumor agent that counteracts multi-drug resistance
- Nanomolar potency with ability to cross the blood brain barrier (BBB)
- A.I. generated, validated and published gene signature for solid tumors
- Key payload for ADC programs



# Over 500K patients annually worldwide with several billion \$USD in potential future oncology therapy sales

Drug Candidates in Development in Targeted Patient Segments With Clinical Need

#### **Prostate Cancer**

#### 1.3 million

2018 Estimated Global Incidence

208,000

2018 Estimated Global metastatic hormone-resistant prostate cancer subpopulation

# Pancreatic & Bladder Cancer

#### 1.1 million

2020 Estimated Combined Global Incidence

200,000

2020 Estimated Global cancer subpopulation with potential biomarker signature for response

#### Glioblastoma (GBM)

240,000+

2018 Estimate of new GBM cases globally

11,000-13,000

2019 estimated GBM Cases in the USA

#### Non-Small Cell Lung Cancer (NSCLC)

#### 2.2 million

2020 Estimated Global Incidence

254,000

2020 Estimated Global never-smoker NSCLC adenocarcinoma subpopulation

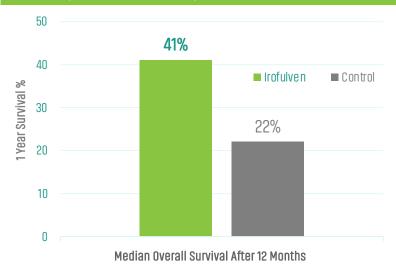
Sources: American Cancer Society, Globocan, AANS, NCI, Lantern Pharma meta-analysis



# LP-100 (Irofulven): Historical\* Phase II Trial Results & Current Status



Median 1 yr. survival was 86% greater in Irofulven in combination treated metastatic prostate cancer patients v. control



\*Historical data from Hart et al., Randomized phase II trial of irofulven/prednisone, irofulven/capecitabine/prednisone, or mitoxantrone/prednisone in hormone refractory prostate cancer (HRPC) patients failing first-line docetaxel. European Journal of Cancer Supplements (2006)

#### **Precision Phase II Trial & Current Status**

- Irofulven (LP-100) is in an *existing phase 2 clinical trial* for patients with metastatic, castration resistant prostate cancer *(mCRPC)* being conducted in Denmark
  - 9 patients [out of a targeted enrollment of 27] have been treated based on meeting criteria established by *Allarity's DRP*® (Drug Response Predictor) companion diagnostic technology.
  - Median overall survival (OS) for the initial group of 9
    patients has been 12.5 months, which is an improvement
    over other similar fourth-line treatment regimens for mCRPC
- Annually over \$200 million is spent in the US, and nearly \$700 million globally, for treatment for late-stage metastatic prostate cancer

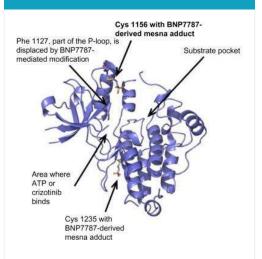


# LP-300 in development for never-smokers with NSCLC adenocarcinoma based on strong historical data & biomarker studies





#### Mechanism of action



- Disulfide bond disrupting agent
- · Disrupts by covalently modifying cysteine
- Inhibits and modulates activity of proteins in NSCLC pathways (ALK, EGFR, MET, ROS1)

#### **Prior Clinical Experience**

- Prior history in 5 phase 1 and 5 phase 2 and 3 clinical trials in lung and breast cancers as a combination agent
- LP-300 has been administered to over 1,000 patients and has been generally well tolerated
- Prior studies did not stratify or select patients based on biomarker or smoking status
- Overall survival increased by 91% -101% in never-smokers in phase 2 and phase 3 trials
- 2 year survival benefit increases of 125% were observed in never smokers in a global Phase 3 trial

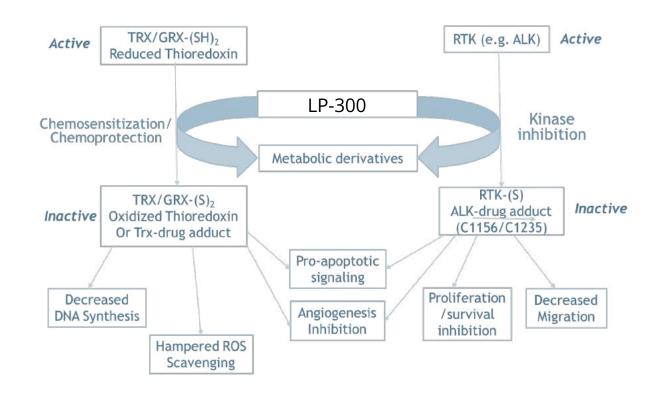
#### **Current status**

- Targeting never-smoker sub-population, as a potential targeted rare disease market
- Phase II clinical trial (N=90) for use in never-smokers with NSCLC adenocarcinoma that are chemo-naïve and relapsed from TKI therapy
- Expect to enroll 20-25 clinical sites in the U.S. starting in O4 2021
- Leveraging Al platform of patient recruitment partner, DeepLens, to accelerate enrollment and decrease clinical trial costs
- Additionally, exploring preclinical in vivo studies to characterize efficacy as a combination with approved targeted TKI therapies
- Leveraging RADR® to develop biomarker signature that can be used to predict patients most likely to respond to combination therapy with LP-300



#### LP-300 Multi-modal Mechanism of Action

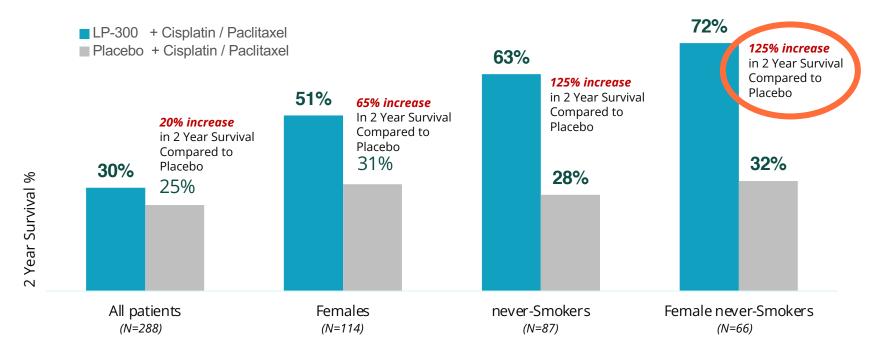






# Lantern's precision oncology approach in the LP-300 Phase II trial builds on a prior Phase III trial that did not meet clinical efficacy endpoints but demonstrated survival benefit in a patient subgroup





Source: Phase 3 clinical trial, study ID DMS32212R, conducted by BioNumerik Pharmaceuticals - subpopulations receiving paclitaxel/cisplatin



# LP-184 for multiple solid tumors and certain PTGR1 expressing cancers - Key payload template for ADC program



#### **Unique Features**

- Hydroxyurea Methylacylfulvene
- Nanomolar potency across multiple solid tumors (pancreas, prostate, liver) and CNS cancers
- Broad anti-tumor agent that counteracts multi-drug resistance and is independent of other mutations (p53, KEAP1)
- Favorable *in vitro* and *in vivo* efficacy supporting RADR-driven hypothesis
- Promising blood-brain-barrier (BBB) profile that can be leveraged in other CNS cancers including brain metastases

#### **Current status**







- 6 new patent filings: 2 new applications on synthetic manufacturing of new molecular entities
- Wet lab validated 16 gene signature leveraging NCI Cell Miner platform from our collaboration
- Published results at AACR virtual pancreatic forum 2021
- Validated BBB permeability in both nuerospheres and animals
- Collaboration with Georgetown in prostate cancer
- Q3 '21 expanded collaborations with Johns Hopkins and Fox Chase Cancer Center
- Advanced GMP manufacturing for phase 1 clinical trials in GBM and solid tumors



### Positive Preclinical Data in Glioblastoma (GBM)



- Completed a successful preclinical study demonstrating the ability of LP-184 to inhibit tumor growth and improve survival in animal studies of glioblastoma (GBM)
- LP-184 treatment drove tumor regression by greater than 106%
- LP-184 reduced subcutaneous xenograft tumor volume in mice by greater than 85% within the treatment group
- LP-184 resulted in a statistically significant (p < 0.0001) extension of median overall survival compared to the control group
- Based on the <u>encouraging results of the study</u>, Lantern extended and expanded its collaborative agreement with Kennedy Krieger Institute and Johns Hopkins

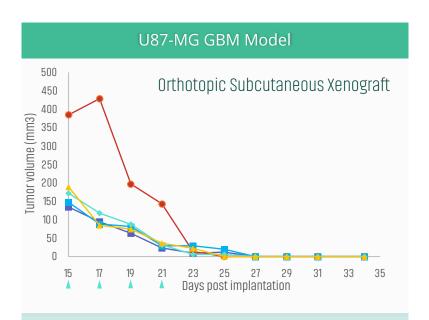


In August 2021, the U.S. FDA granted LP-184 Orphan Drug Designation (ODD) for the treatment of GBM and other malignant gliomas

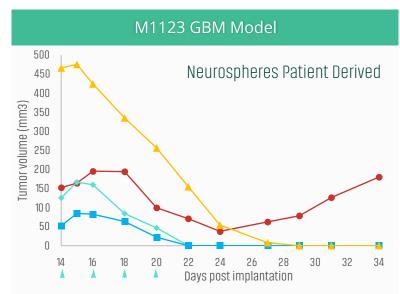


# LP-184 shows complete tumor regression in mice implanted with Glioblastoma in multiple models





- Complete Regression!
- No measurable tumors 12 days post final dosing (33 days after implantation)

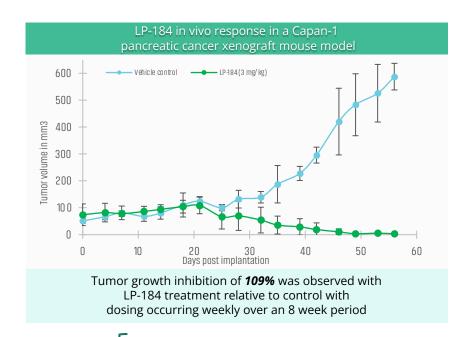


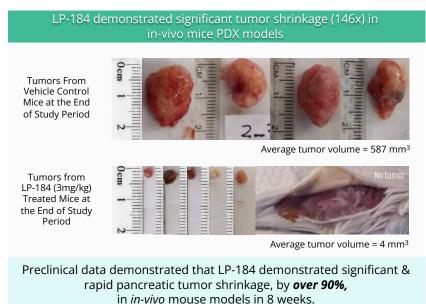
- · Complete regression during dosing!
- 3 out of 4 mice showed no tumor growth after final dosing



#### Positive Preclinical Data in Pancreatic Cancer





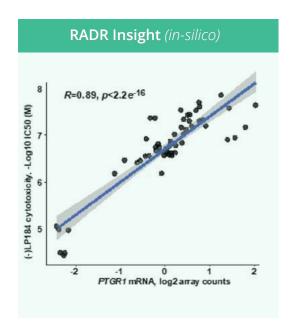


In August 2021, the U.S. FDA granted LP-184 Orphan Drug Designation (ODD) for the treatment of Pancreatic Cancer

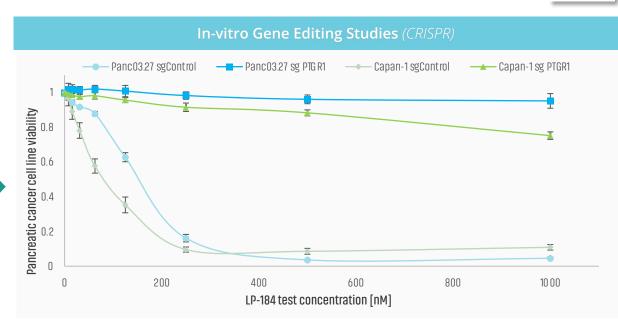


## As predicted by RADR ®, LP-184 cytotoxic activity is driven by PTGR1





LP-184 activity **positively correlates** with PTGR1 transcript levels in the NCI60 cancer cell line panel

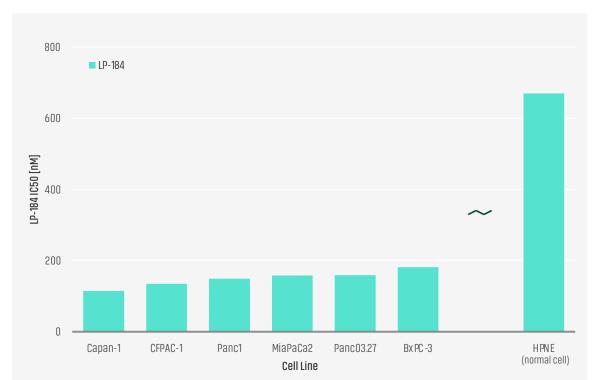


CRISPR-mediated depletion of PTGR1 expression in a pancreatic cancer cell line (Panc03.27) is sufficient to **fully diminish LP-184 activity**. This confirms the strict dependency of LP-184 cytotoxicity on PTGR1 expression



# LP-184 shows nanomolar in vitro potency in pancreatic cancer cell lines





| Drug /<br>Compounds | Range of IC50<br>[nM] across 6<br>cancer cell<br>lines | Median<br>IC50 [nM] |
|---------------------|--|---------------------|
| LP-184              | 100 - 200  | 154                 |
| Gemcitabine         | 30 - 1,000   | 149                 |
| Irinotecan          | 3,000 -<br>70,000                                      | 12,052              |
| 5-Fluorouracil      | 30,000 -<br>300,000                                    | 72,747              |

LP-184 IC50 in the *normal(non-cancerous)* pancreatic epithelial cell HPNE line: 670 nM



# What are Antibody-drug Conjugates (ADC) - an area of increasing future focus of Lantern Pharma



#### **Antibody-Drug Conjugates (ADCs)**

novel class of highly potent biological drugs conjugate a cytotoxic drug with a monoclonal antibody (mAb) through an applicable linker

#### High specificity

 ADCs take advantage of the high potency of cytotoxic payloads and the superior specificity of antibodies. The drug antibody conjugate thus maximizes efficacy and minimizes systemic toxicity

"ADC's ability to harness mAb specificity and target the delivery of a cytotoxic agent to the tumor may significantly enhance both mAb and drug activities."

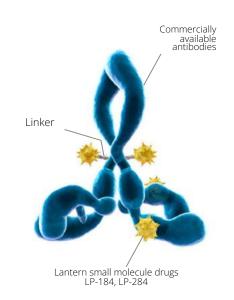
Stephen C et al.
Current Opinion in Chemical Biology- Elsevier
06/2010

#### Growing

2 of the 4 largest oncology licensing deals in 2020 were for ADC assets

"With so many ADCs in clinical development and the unprecedented approvals of the past year, it's clear that ADCs will continue to be a critical part of the therapeutic armamentarium against cancer"

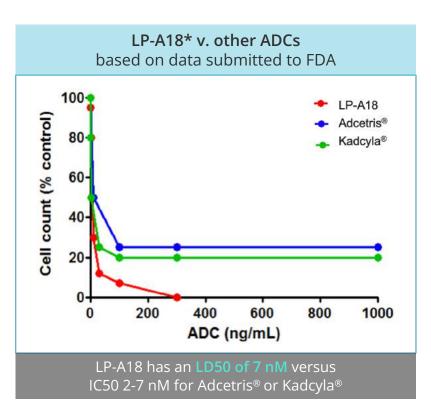
Dr. Amita Patnaik FRCPC, of START Center for Cancer Care

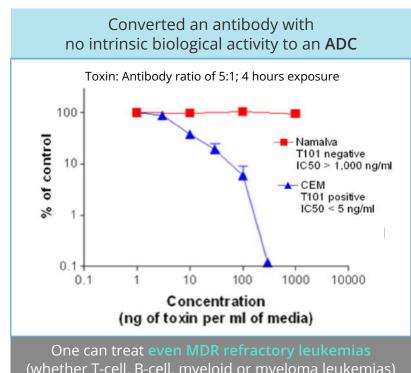




### Initial Data Supporting Lantern's ADC Program





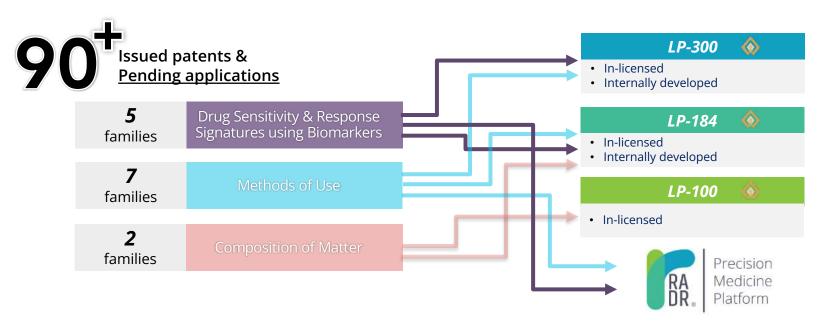


(whether T-cell, B-cell, myeloid or myeloma leukemias)



## **Intellectual Property Portfolio**





Extensive and continually growing position of <a href="www.example.com">wer 90 issued patents</a>
<a href="www.example.com">& patent applications</a>
<a href="www.example.com">across 14 patent families</a>
<a href="www.example.com">Filed an additional</a>
<a href="www.example.com">12 patent applications</a>
<a href="www.example.com">during 2021</a>



Studies & collaborations with top tier academic & research partners drives scientific validation, data access and patient insights













#### **Recent Milestones**



- ✓ Announced positive preclinical data in Glioblastoma (GBM) with LP-184
- ✓ Announced positive preclinical data in pancreatic cancer with LP-184
- ✓ FDA granted LP-184 Orphan Drug Designation in Pancreatic Cancer and GBM
- ✓ Initiated development of LP-184 in DNA damage repair deficient tumors, including bladder where nearly 40% of cancers have DNA repair gene mutations
- ✓ Progressed on validating indications of specific bloods cancers including lymphomas and rare blood cancers that are highly sensitive to LP-284
- ✓ Announced initial cohort of data from 9 patients in 27 patient mCRPC trial showing noted improvement in mOS at 12.5+ months with LP-100
- ✓ Progressed on site selection and final manufacturing of drug substance for LP-300 Phase 2 trial
- ✓ Filed 12 new patent applications, including 2 for the RADR A.I. Platform
- ✓ Expanded clinical trial management & operations team
- ✓ Furthered development of RADR data-lake with focus on blood cancers and DNA damage repair gene mutated cancers



### **Upcoming Milestones**



#### **Foundational Year**

Advance Platform Prepare Trial Launches Prioritize Additional Compounds

#### 2021

- Planned launch of Ph. 2 clinical trial for LP-300 in NSCLC (never-smokers that are chemo naïve and failed TKI therapy) – two arm 90+ person trial
- Update on LP-100 Ph. 2 EU trial in mCRPC
- Grow RADR® A.I. platform to 8+ billion datapoints
- Identify antibody target and tumor for ADC program
- Results from preclinical work w/ LP-184 in pancreatic, prostate, GBM, ATRT and other tumors
- Launch initial ADC indications in pre-clinical
- Showcase RADR® A.I. platform and drug portfolio during "Lantern Investor Day"



#### **Multiple Streams of Value Creation**

Launch Multiple Precision Trials Leverage Platform for Pharma Partners Secure Additional Compounds

#### 2022

- Launch Ph. 1 ADC program in solid tumors
- Launch Ph. 1 clinical trial for LP-184 in solid tumors
- Launch Ph. 1/2 clinical trial for LP-184 in GBM
- Progress LP-184 in ATRT towards Ph. 1/2 clinical trial
- Explore potential combinations for LP-184 & LP-300 with other existing approved drugs (inc. I-O agents)
- Strategically grow RADR® A.I. platform to 15 billion datapoints
- Licensing and partnership opportunities



## Financial Highlights and Cap Table

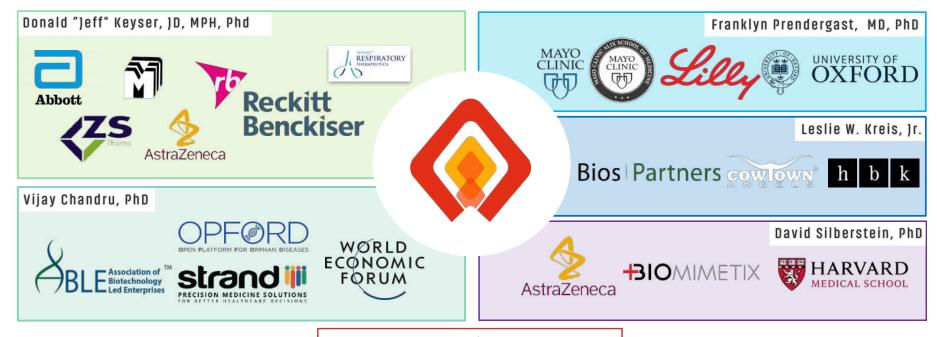
- Approx. \$80M of cash, cash equivalents and marketable securities as of June 30, 2021
- Management and Directors own over 30% of fully diluted shares outstanding
- Committed to creating enduring growth and value for LTRN shareholders

| LANTERN PHARMA INC. (LTRN)                    |           |
|---|-----------|
| Exchange                                      | Nasdaq    |
| Stock Price (10/13/21)                        | \$11.02   |
| Common Shares Outstanding (7/22/21)           | 11.2M     |
| Market Cap (10/13/21)                         | \$123.24M |
| Warrants (WAEP \$6.75)                        | 302K      |
| Options (Employees, Management and Directors) | 824K      |
| Fully Diluted Shares Outstanding              | 12.3M     |





#### **Board Members**



Panna Sharma

**CEO and President of Lantern Pharma** 



### **Investment Highlights**



Active drug rescue process and in the clinic with 2 compounds and accelerating additional compounds and combinations to clinical trials...potentially saving tens of millions and years of development



Growing A.I. based platform with clear roadmap to 8+ Bn. datapoints focused exquisitely on cancer therapeutic development and companion Dx in a high growth, high demand \$4 Bn market



Focused on cancer drug market segments with clear clinical need, understood mechanisms, targeted patient populations that exceed 1 Million, and multi-billion USD in annual sales potential



A novel ADC platform with the potential to develop and out-license or partner ADC assets in early phases



Multiple compounds in place with the potential for Orphan Disease Designation for LP-184 in multiple targeted indications (pancreatic and GBM granted) which can help accelerate development



Proven and growing library of A.I. & machine-learning methodologies published at ASCO, AACR and used to generate novel IP & patents and accelerate discovery by potentially years



Experienced and innovative management team w/ 70+ years experience in cancer and a passion to change the cost and outcome for cancer patients by using A.I. and genomics – *paradigm changing* technologies



Industry leading collaborations with National Cancer Institute, Georgetown, Johns Hopkins & Fox Chase Cancer Center

