

## TARGETING CANCER

New Science. New Cancer Therapies. New Hope.

Company Overview -- March 18, 2020



#### FORWARD LOOKING STATEMENTS

This presentation includes forward-looking statements (including within the meaning of §21E of the U.S. Securities Exchange Act of 1934, as amended, and § 27A of the U.S. Securities Act of 1933, as amended). Forward looking statements, which generally include statements regarding goals, plans, intentions and expectations, are based upon current beliefs and assumptions of Oncternal Therapeutics, Inc. ("Oncternal," or the "Company") and are not guarantees of future performance. Statements that are not historical facts are forward-looking statements, and include statements regarding the expected timing for achieving key milestones, including completing and announcing results of clinical trials of the Company's product candidates, and the anticipated market potential, duration of patent coverage, and ability to obtain and maintain favorable regulatory designations for the Company's product candidates and preclinical programs.

All forward looking statements are subject to risks and uncertainties, which include, but are not limited to: uncertainties associated with the clinical development and process for obtaining regulatory approval of Oncternal's product candidates, including potential delays in the commencement, enrollment and completion of clinical trials; inherent risks involved in the commercialization of any product, if approved; the risk that results seen in a case study of one patient likely will not predict the results seen in other patients in the clinical trial; the risk that interim results of a clinical trial do not predict final results and that one or more of the clinical outcomes may materially change as patient enrollment continues, following more comprehensive reviews of the data, as follow-up on the outcome of any particular patient continues, and as more patient data become available; the risk that unforeseen adverse reactions or side effects may occur in the course of developing and testing Oncternal's product candidates; risks associated with the COVID-19 outbreak, which may adversely impact our business and clinical trials; and the risk that Oncternal may be unable to obtain sufficient additional capital to continue to advance the development of its product candidates and preclinical programs.

Except as required by applicable law, Oncternal undertakes no obligation to revise or update any forward-looking statement. All forward-looking statements in this presentation are current only as of the date on which the statements were made. Additional factors that could cause actual results to differ materially from those expressed in the forward-looking statements are discussed in reports filed with the SEC by Oncternal, including its most recent Annual Report on Form 10-K, Quarterly Report on Form 10-Q, and Current Reports on Form 8-K filed with the SEC. Cirmtuzumab, TK216 and Oncternal's CAR-T targeting ROR-1 are investigational product candidates or preclinical programs that have not been approved by the U.S. Food and Drug Administration for any indication.

# **Corporate Highlights**



#### THREE NOVEL ONCOLOGY PRODUCT CANDIDATES IN DEVELOPMENT

## **TK216: TARGETED ETS INHIBITOR**

- Deep and sustained response observed in Ewing sarcoma Phase 1
- Additional opportunities in other cancers with ETS alterations

## **CIRMTUZUMAB:** ROR1 INHIBITORY MONOCLONAL ANTIBODY

- 50% interim complete response rate in MCL in Phase 1/2, higher than reported for ibrutinib alone
- Sustained responses in CLL in Phase 1/2 and TNBC in Phase 1b
- Additional opportunities in other ROR1 expressing cancers

## **ROR1 CAR-T:** PRECLINICAL DEVELOPMENT WITH CIRM AND SHANGHAI PHARMA

Potential to improve on CAR-T efficacy and safety

## **MULTIPLE DATA CATALYSTS EXPECTED IN 2020**

- Clinical data updates expected in Ewing sarcoma, MCL, CLL and breast cancer
- ROR1 CAR-T expected to reach clinic in 4Q 2020 in China

## **EXPERIENCED MANAGEMENT AND BOARD OF DIRECTORS**

## **Robust Pipeline – Novel Product Candidates in Multiple Indications**



Product Candidate	Indication	Preclinical	Phase 1	Phase 2	Phase 3	Modality	
Cirmtuzumab	Chronic Lymphocytic Leukemia (CLL)						
	Mantle Cell Lymphoma (MCL)	ROR1 mAb					
	Breast Cancer				RURI MAD		
<b>TK216</b>	Ewing Sarcoma						
	Acute Myeloid Leukemia (AML)	ETS oncoprotein inhibitor					
	Prostate Cancer						
ROR1 CAR-T	Heme Cancers						
	Solid Tumors				ROR1 CAR-T cell	therapy	

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## TK216

Targeted ETS Oncoprotein Inhibitor

## **TK216: First-in-Class Targeted ETS Oncoprotein Inhibitor**

## **OPPORTUNITY**

- Fast-to-market strategy in Ewing sarcoma
  - Potentially Pediatric Voucher eligible
- Significant market potential in other cancers with ETS alterations
  - AML, prostate cancer, DLBCL
- Patent coverage through 2037

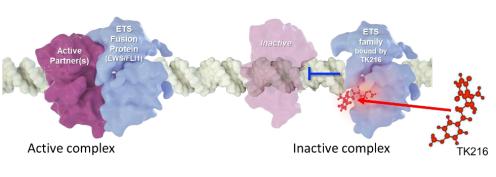
## **MECHANISM OF ACTION**

- Novel small molecule inhibitor of ETS family oncoproteins
  - Designed to prevent/disrupt formation of transcriptionally-active protein complex
- ETS transcription factors regulate many target genes implicated in cancer development and progression

## **DEVELOPMENT STATUS**

- Enrolling expansion cohort, Phase 1 clinical trial (n=18) in relapsed/refractory Ewing sarcoma
- Orphan Drug Designation and Fast Track Status granted by FDA







## Unmet Medical Need Relapsed / Refractory Ewing Sarcoma

- Orphan disease, second most common pediatric bone tumor
  - U.S. incidence ~430 p.a.<sup>(1)</sup>
  - U.S. prevalence ~4,000<sup>(1)</sup>
- Median age at diagnosis 15 years
- No standard second-line treatment and poor prognosis
  - Metastatic EWS: 5-year OS ~30%
  - Recurrent EWS: 5-year OS ~10-15%
- Nearly all Ewing sarcoma driven by translocations of ETS family oncogenes (EWS-FLI1 85-90%, EWS-ERG ~10%)
  - ETS transcription factors regulate many genes implicated in cancer development and progression

ETS = E26 Transformation-Specific oncogene family



(1) Incidence 1.3 per million, prevalence 12 per million – SEER data "ICD-0-3/WHO 2008 Ewing Tumor", accessed

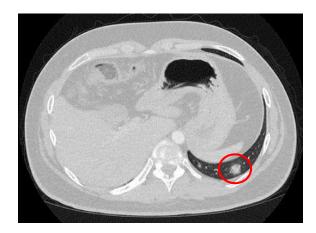
January 3, 2020; NCI Ewing Sarcoma Treatment (PDQ), accessed September 11, 2019; Company analysis



## Patient Story: Sustained Clinical Response with TK216 in Patient with Extensively Treated Metastatic Relapsed / Refractory Ewing Sarcoma



- 19-year old male
- Presented in 2015 with metastatic Ewing sarcoma involving his clavicle and lungs
- Failed numerous treatments:
  - radiation
  - VDC/IE: vincristine, doxorubicin, cyclophosphamide, ifosfamide, etoposide
  - irinotecan
  - temozolomide
  - bevacizumab
  - pazopanib



Baseline

- Enrolled in Phase 1 study of TK216 at MSKCC in 2019
- Received TK216 in final, highest dose-finding dosage cohort (200 mg/m<sup>2</sup>/day TK216 for 14 days)
- After two cycles of **single-agent** TK216: resolution of all target pulmonary metastases
  - Treatment well tolerated, with minimal myelosuppression
- Sustained response after 6 months of TK216
  - Vincristine added after 2nd cycle
- Residual non-target 7 mm lung lesion excised, leading to surgical complete remission
- No evidence of disease at 10+ months on study

#### 2 cycles single agent TK216

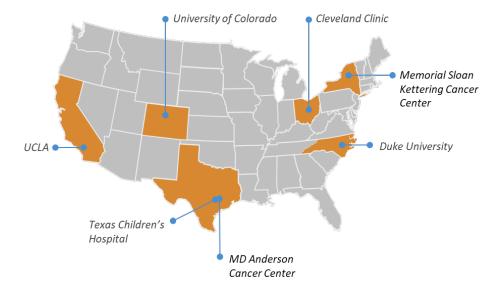
Target lesions resolved



## Phase 1 of TK216 in Patients with Relapsed / Refractory Ewing Sarcoma Phase 2 Dose Selected and Now Enrolling Expansion Cohort

Interim data presented at Connective Tissue Oncology Society (CTOS) 2019<sup>1</sup>:

- 3+3 dose and schedule escalation cohorts
  - 32 patients with relapsed, refractory Ewing sarcoma
  - Average of 4 prior therapies
  - Phase 2 dose selected: 200 mg/m<sup>2</sup>/day TK216 for 14 days
- <u>Safety</u>: generally well-tolerated, with dose limiting toxicity of manageable myelosuppression and no obvious off-target toxicity
- <u>PK</u>: drug plasma levels met or exceeded those associated with anti-cancer activity in preclinical models
- <u>Activity</u>: Phase 2 dose demonstrated early evidence of activity
  - Of 3 evaluable patients: 1 surgical CR (deep PR on single-agent TK216), 1 SD, 1 PD
- Expansion cohort opened in December 2019
  - 18 patients will be treated using Phase 2 dosing regimen



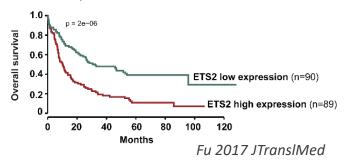
1 – Meyers MSKCC, 2019 CTOS Tokyo



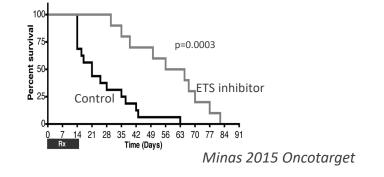


#### Acute Myeloid Leukemia (AML)

- ETS family proteins overexpressed in ~30% AML cases
- ETS expression is associated with shorter OS



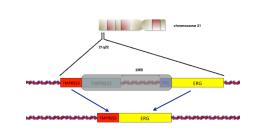
- Sensitivity of AML cell lines to TK216 was proportional to level of ETS overexpression
- ETS inhibition prolonged survival in EWS-FLI1 transgenic AML model



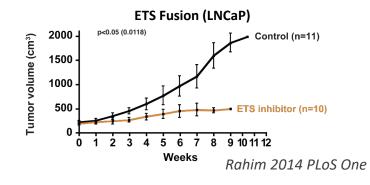
#### **Prostate Cancer**

 55% of men with advanced prostate cancer carry ETS family gene fusion TMPRSS2-ERG associated with androgen resistance and poor clinical outcomes

TMPRSS2 and ERG are located on chromosome 21

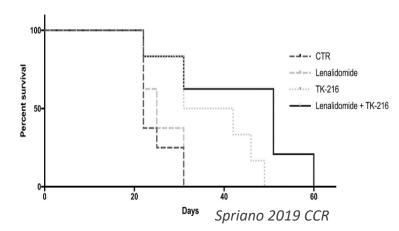


 ETS inhibition demonstrated antitumor activity in human prostate cancer xenograft model



## Diffuse Large B Cell Lymphoma (DLBCL)

- ETS proteins overexpressed in DLBCL
- ETS family member genes are essential for activated B-cell-like (ABC)
   DLBCL and germinal center B-cell type (GCB) DLBCL
- ETS inhibition demonstrated antitumor activity in xenograft models
- Synergy with lenalidomide and venetoclax shown in preclinical model





- Ewing sarcoma Phase 1 expansion cohort data for 7-12 patients **2H 2020**
- IND-enabling data in additional ETS-driven tumors

2H 2020



## CIRMTUZUMAB

ROR1 monoclonal antibody

## **OPPORTUNITY**

- Potential in multiple hematologic and solid cancers
- Supported by ~\$14M non-dilutive CIRM grant
- Patent coverage through 2033

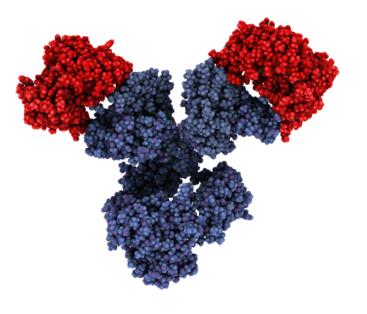
## **MECHANISM OF ACTION**

- High-affinity humanized ROR1 monoclonal antibody
- Inhibits Wnt5a stimulated ROR1 signaling
  - Decreased proliferation, invasion, metastasis, stemness
- Preclinical synergy observed with ibrutinib or paclitaxel

## **DEVELOPMENT STATUS**

- Well-tolerated and active in completed CLL Phase 1
- Phase 1b enrolled in CLL in combination with ibrutinib
- Randomized Phase 2 enrolling in CLL in combination with ibrutinib
- Phase 1b enrolling in MCL in combination with ibrutinib
- Phase 1b enrolling in HER2-negative breast cancer









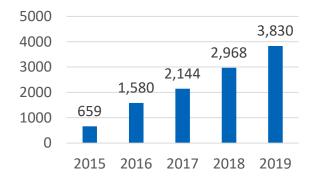
#### **Unmet Medical Need**

- While ibrutinib alone is active in CLL and MCL, patients are not cured and must continue treatment until intolerance or resistance develops:
  - CLL ibrutinib CR rate < 10%<sup>(1)</sup>
  - MCL ibrutinib CR rate ~25%<sup>(2)</sup>
- US incidence<sup>(3)</sup>
  - CLL ~20,000 p.a.
  - MCL ~4,200 p.a.
- Average age at diagnosis
  - CLL: 71<sup>(4)</sup>
  - MCL: mid-60s<sup>(3)</sup>
    - (1) O'Brien 2018 Blood; CR rate at 12 months of therapy
    - (2) Wang 2015 Blood
    - (3) seer.cancer.gov, Dec. 2019; Leukemia and Lymphoma Society
    - (4) cancer.net, Dec. 2019
    - (5) AbbVie Form 10-K Feb. 2020

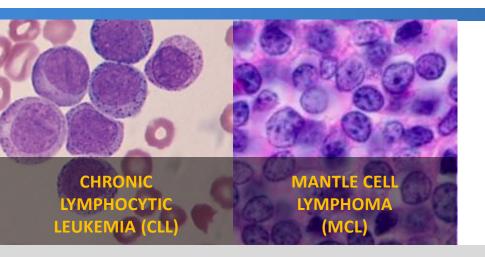
#### **Cirmtuzumab + BTKi Target Product Profile**

- Potential differentiation in CLL and MCL: achieve deeper and more durable responses than BTKi alone, with better tolerability or minimal added toxicity
- Become standard-of-care combination therapy for patients with CLL and MCL, particularly for patients who are older and/or have significant co-morbidities
  - Certain other combination therapies are associated with significant toxicities

## Ibrutinib U.S. Sales (\$M)<sup>(5)</sup>

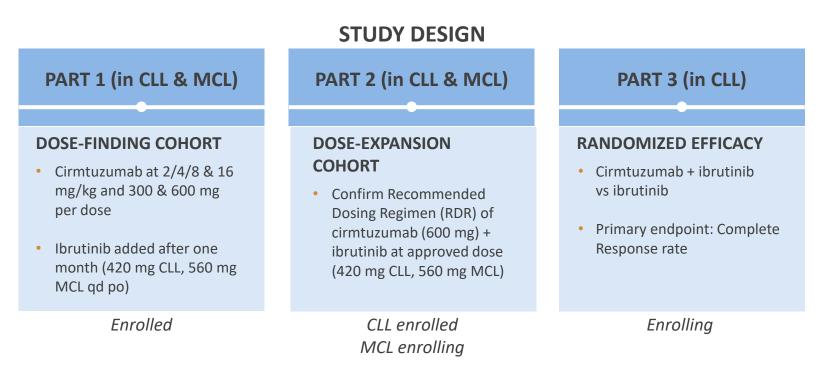






**CIRLL** Study:

- Cirmtuzumab and Ibrutinib targeting ROR1 for Leukemia and Lymphoma
- Data will determine whether to seek regulatory approval through accelerated approval pathway



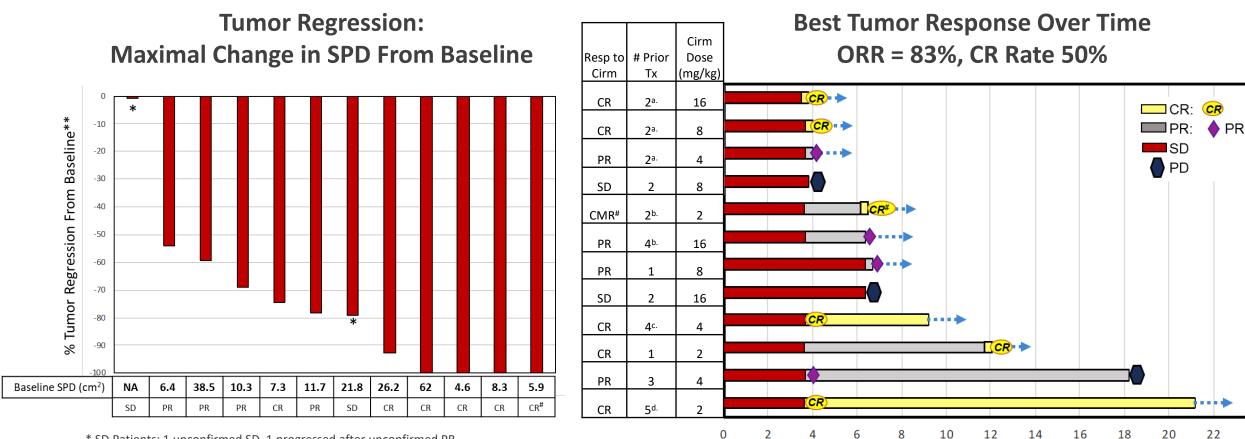


- 12 evaluable Part 1 patients with relapsed/refractory MCL
  - Median 2 prior therapies
    - 10 of 12 patients with ≥2 prior therapies
    - Auto-SCT (n=4), allo-SCT (n=1), CAR-T (n=1), ibrutinib (n=4)
- Median follow-up 6.4 months
- Efficacy: 6 CR\* (50%), 4 PR (33%), 2 SD (17%)
  - Best ORR 83% (10 of 12)
  - Clinical Benefit (CR, PR or SD) seen in 100% of subjects
  - Majority of CRs achieved within 3-4 months on cirmtuzumab + ibrutinib
- Adverse events typical for ibrutinib alone
  - No dose limiting toxicities or discontinuations due to cirmtuzumab
  - No Grade 3 or higher common adverse events attributed to cirmtuzumab alone

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## **CIRLL Trial: Interim MCL Part 1 Data Complete Responses in Heavily Pretreated Patients**





\* SD Patients: 1 unconfirmed SD, 1 progressed after unconfirmed PR

\*\* Change in tumor size (SPD: Sum of the Products of the Diameters)

CR<sup>#</sup> Complete metabolic response (CMR) by PET scan (Cheson2014), BM biopsy pending

Simon Rule Haematologica 2019: ORR 67% and CR rate 23% for ibrutinib in MCL with >1 prior lines of therapy in a pooled analysis across three third-party clinical studies

<sup>a.</sup> Prior ibrutinib/ritux, R-HyperCVAD

<sup>b.</sup> Prior chemo, auto-stem cell transplant (SCT)

<sup>c.</sup> Prior chemo, auto-SCT, CAR-T

<sup>d.</sup> Prior chemo, auto-SCT, allo-SCT

Months

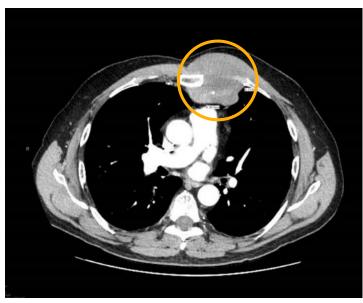
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## Patient Story: Durable Complete Response in Patient with Relapsed Mantle Cell Lymphoma in Clinical Trial of Cirmtuzumab and Ibrutinib



- 67-year old male
- Diagnosed with MCL in 2009
- Previously received and failed 5 treatment regimens including chemotherapy, biologics, autologous stem cell transplant, and allogeneic stem cell transplant before enrolling onto this study
- 9x7 cm mediastinal / chest wall lesion

#### **Baseline**

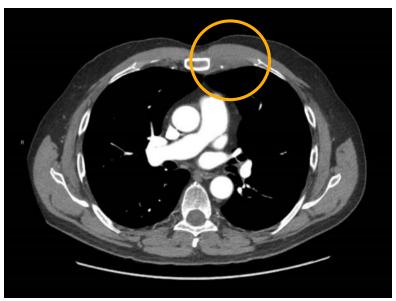


After 3 months

Complete Response

- Rapid clinical response with confirmed CR after 3 months cirmtuzumab + ibrutinib
- CR confirmed and durable at 20+ months on study

#### Cirmtuzumab + Ibrutinib



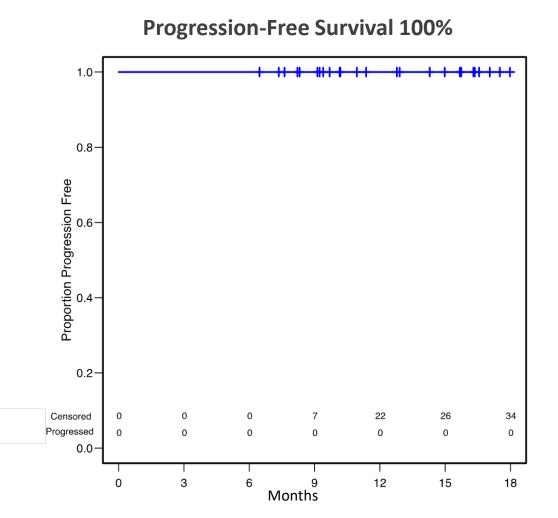


- 34 evaluable patients (22 relapsed/refractory, 12 treatment naïve)
  - Median 2 prior therapies for r/r patients
  - 79% of patients high risk based on del(17p), del(11q), unmutated IGHV
- Median follow-up 9.9 months
- Efficacy: 1 CR (3%), 29 PR (85%), 4 SD (12%)
  - Best ORR 88% (30 of 34)
  - Clinical Benefit (CR, PR or SD) seen in 100% of subjects
  - Additional 3 clinical complete responses (confirmatory bone marrow biopsies pending)
  - No progressive disease observed on study (PFS=100%)
- Adverse events typical for ibrutinib alone
  - No dose limiting toxicities or discontinuations due to cirmtuzumab
  - No Grade 3 or higher common adverse events attributed to cirmtuzumab alone
  - Neutropenia 13% (Grade 3-4: 8.7%) across CLL and MCL cohorts
    - Neutropenia 50-60% (Grade 3-4: 25%) in Imbruvica Prescribing Information

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## CIRLL Trial: Interim Part 1&2 CLL Results 100% PFS and Reduced Lymphocytosis

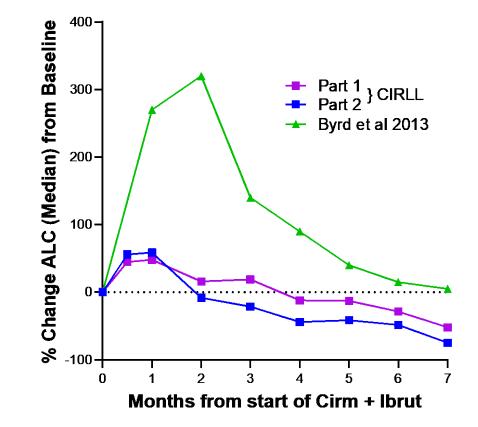




Note: 1 patient died of complications of acute cholecystitis off study without evidence of CLL progression

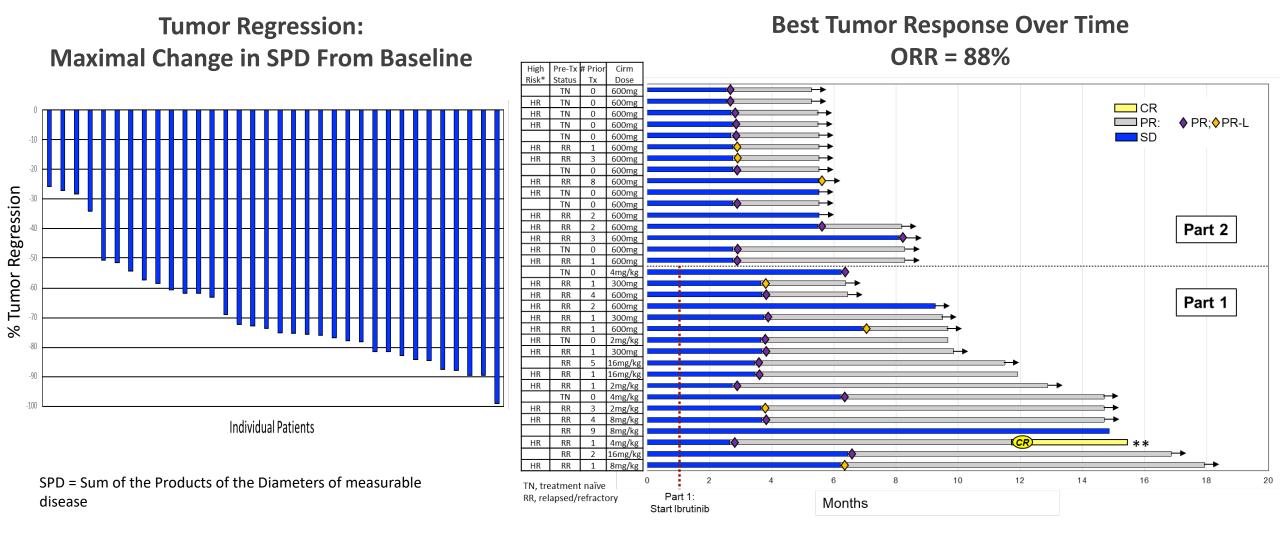
Source: Company data as of January 29, 2020

Reduced lymphocytosis compared to historical ibrutinib data



ALC = Absolute Lymphocyte Count





\* HR = known high risk factors: unmutated IgVH, del 17p/ TP53, and/or deletion 11q

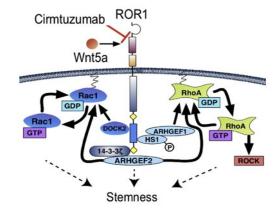
\*\* Sustained CR for 6+ months on no CLL therapy



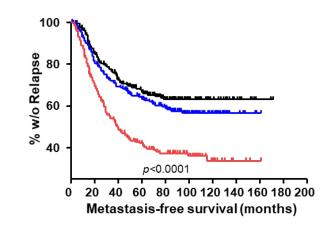
#### ROR1 Expressed on Multiple Solid and Liquid Tumors

MCL	95%
CLL	95%
Uterus	96%
Lymphoma	90%
Prostate	90%
Skin	89%
Pancreatic	83%
Adrenal	83%
Lung	77%
Breast	75%
Testicular	73%
Colon	57%
Ovarian	54%

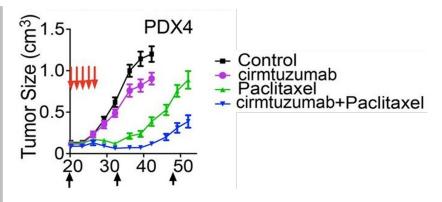
Zhang 2012 AJP



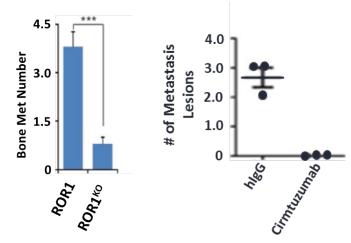
Wnt5a activation of tumor ROR1 is associated with a primitive, stem-like phenotype (Choi, Cell Stem Cell 2018)



High ROR1 expression in the breast cancer primary tumor is associated with a poor longterm prognosis (Cui CaRes 2013)



Cirmtuzumab and paclitaxel are at least additive against TNBC PDX growth, and eliminate tumor forming cells (Zhang PNAS 2019)



ROR1 knockout (L) or Cirmtuzumab (R) inhibit breast cancer xenograft metastases (Li Nature Cell Bio 2017, Zhang PNAS 2019) HER2-negative Breast Cancer: Interim Phase 1 Data Cirmtuzumab + Paclitaxel Presented at SABCS 2019: ORR 57%

BROR-002

BROR-007

BROR-008

BROR-012

BROR-005

BROR-009

BROR-011

50



HER2-negative breast cancer

SABCS 2019 presentation of interim data

- Investigator sponsored trial at UC San Diego, Barbara Parker & Rebecca Shatsky
- Patients with HER2 negative, metastatic or locally-advanced unresectable breast cancer
- 600 mg cirmtuzumab monthly + 80 mg/m<sup>2</sup> paclitaxel weekly
- No DLTs or discontinuations
- Adverse events consistent with paclitaxel profile
- PK consistent with half-life of 30 days

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Shatsky 2019 SABCS (data cutoff November 27, 2019)

10

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% Tumor Volume Reduction by Week of

Therapy

Tumor Response by Week of Treatment

30

Week

40

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-20

-40

-60

0

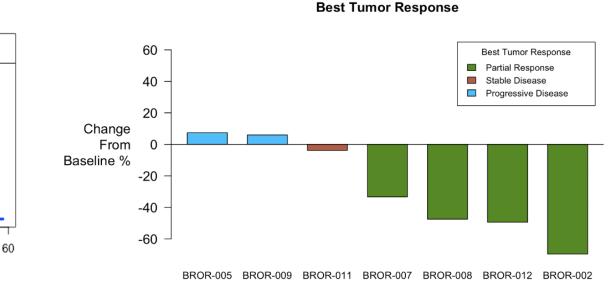
Change

Baseline %

From

#### Historical reported weekly paclitaxel ORR ~30%<sup>(1)</sup>

(1) Weekly paclitaxel ORR: 21% - Miller 2007 NEJM, 32-42% - Seidman 2008 JCO, 32% - Kim 2017 Lancet Oncol , 29% - Schmid 2019 JCO. Disclaimer: Results not based on head-to-head clinical studies. The results from historical trials not directly comparable and do not imply a clinical benefit of cirmtuzumab + paclitaxel over paclitaxel alone.



**Best Tumor Volume Response by Patient** 

ORR = 57% (4/7)

- MCL clinical data update for ongoing Phase 1/2
  - Follow-up for 15+ patients in Parts 1&2
- CLL clinical data update for ongoing Phase 1/2
  - 12-month follow-up for 34 patients in Parts 1&2
- HER2-negative breast cancer clinical data update for ongoing Phase 1b **2H 2020**
- IND-enabling data in additional indications

Mid-2020

Mid-2020

Mid-2020





## **CAR-T** Program

Targeting ROR1



#### Unmet Need: Emerging CAR-T Issues

#### **Treatment failures**

 Increasing number of patient relapses following CAR-T therapy, frequently due to mutations or loss of the target antigen tumor (e.g. CD19), evading CAR-T efficacy

#### Safety concerns

 Persistent CAR-T safety issues including deaths potentially related to activation by normal cells expressing the target antigen

#### Advantages to Targeting ROR1

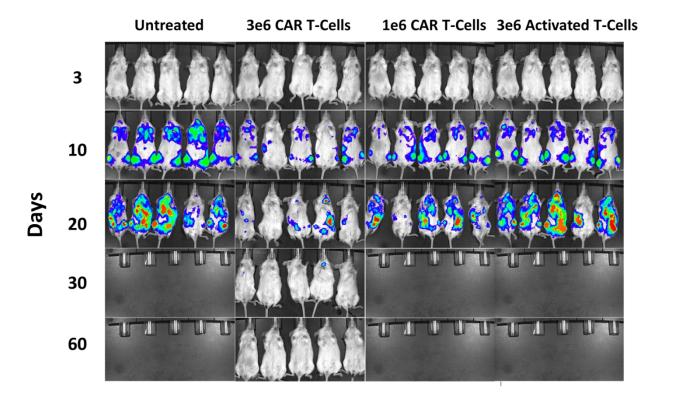
#### **Potential for fewer antigen negative relapses**

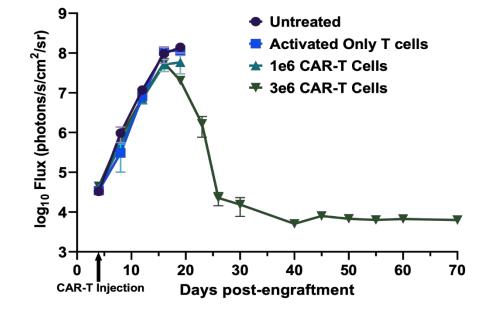
- ROR1 expression associated with aggressive tumor phenotype
- ROR1 mutation or antigen loss might render cancer cells less aggressive and susceptible to chemotherapy

## **Potential safety advantages**

- Cirmtuzumab did not bind to normal human tissues in GLP tissue cross-reactivity studies
- No serious adverse events related to cirmtuzumab-only reported in clinical studies







**Bioluminescence imaging of mice inoculated with MEC1-ROR1 cells and with ROR1 CAR T-cells.** Animals treated with CAR-T cells had reduced disease burden compared to controls. **Bioluminescence imaging of MEC1-ROR1 cells following treatment with ROR1 CAR-T cells**. Mice treated with 3e6 CAR-T reduced the leukemic burden to background levels by day 30 and controlled disease for remainder of study. Animals in the control groups (untreated, ATC or lower 1e6 dose) had to be sacrificed on day 20.

Prussak 2020 ASCO SITC

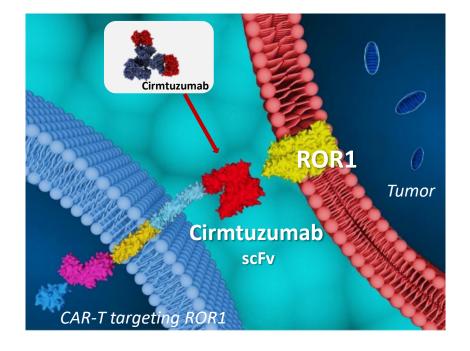
#### **DEVELOPMENT STATUS**

- Preclinical data in hematologic and solid tumor models
- Utilizing cirmtuzumab scFv as targeting component
- Ongoing process optimization and scale-up
- UCSD collaboration with non-dilutive financing from California Institute for Regenerative Medicine (CIRM)
- Shanghai Pharma collaboration, which covers certain manufacturing and clinical development costs

### **OPPORTUNITY**

- Selective targeting strategy applicable to multiple tumors with ROR1 expression
- Target initial human proof-of-concept in hematological cancers, then expansion into solid tumors







## BUSINESS & FINANCIALS

\$3,500,000

\$2,500,0



Ticker	ONCT (Nasdaq)		
Cash & Cash Equivalents @ 12-31-19 Cash Runway into 3Q 2020	\$20.1M		
Debt	\$0		
Capitalization:			
Common Shares Outstanding	15.4M		
Options & Warrants in the Money @ 2-28-20 <sup>(1)</sup>	0.5M		
Fully Diluted	15.9M		
Non-Dilutive Support			
<ul> <li>CIRM Grant for CIRLL Study</li> </ul>	~\$14M		
<ul> <li>Ibrutinib CTM for CIRLL Study</li> </ul>	Expanded Supply Agreement		

(1) Excludes out of the money options and warrants totaling 2.4M



• TK216	
<ul> <li>Ewing sarcoma Phase 1 expansion cohort data for 7-12 patients</li> </ul>	2H 2020
<ul> <li>IND-enabling data in additional ETS-driven tumors</li> </ul>	2H 2020
Cirmtuzumab	
<ul> <li>MCL clinical data update for ongoing Phase 1/2</li> </ul>	Mid-2020
<ul> <li>Follow-up for 15+ patients in Parts 1&amp;2</li> </ul>	
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<ul> <li>HER2-negative breast cancer clinical data update for ongoing Phase 1b</li> </ul>	2H 2020
<ul> <li>IND-enabling data in additional indications</li> </ul>	Mid-2020
<ul> <li>ROR1 CAR-T first-in-human dosing in China</li> </ul>	4Q 2020

## **Experienced Team**





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BOYALTY PARTNERS

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Potential to improve on CAR-T efficacy and safety

## **MULTIPLE DATA CATALYSTS EXPECTED IN 2020**

- Clinical data updates expected in Ewing sarcoma, MCL, CLL and breast cancer
- ROR1 CAR-T expected to reach clinic in 4Q 2020 in China

## EXPERIENCED MANAGEMENT AND BOARD OF DIRECTORS