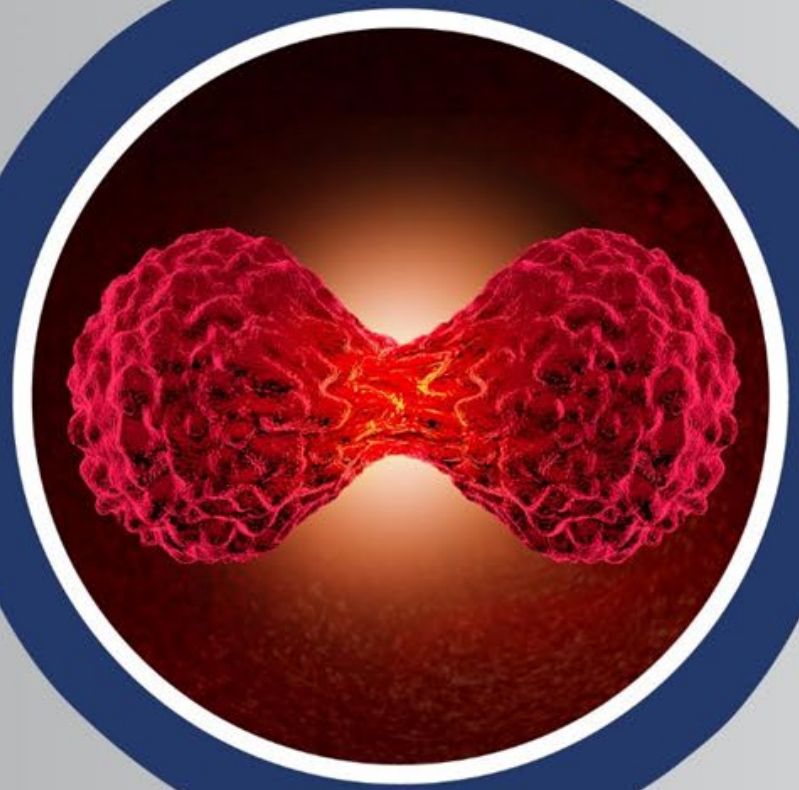

ONCTERNAL therapeutics™

TARGETING CANCER

New Science. New Cancer Therapies. New Hope.

Company Overview – January 2022

FORWARD-LOOKING STATEMENTS

This presentation contains 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") 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 the expected initiation of, and elements constituting, the ZILO-301 and ZILO-302 studies, the potential that the ZILO-301 study can serve as a registrational study, submission of an Investigational New Drug application for ONCT-808 and completing and announcing results of clinical trials of Oncternal's other product candidates, the anticipated market potential, duration of patent coverage, ability to obtain and maintain favorable regulatory designations, and potential accelerated approval pathways for Oncternal's product candidates and preclinical programs, and Oncternal's anticipated cash runway.

All forward-looking statements are subject to risks and uncertainties, including risks and uncertainties inherent in Oncternal's business, including risks associated with the clinical development and process for obtaining regulatory approval of Oncternal's product candidates such as potential delays in the commencement, enrollment and completion of clinical trials; 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; and other risks described in Oncternal's filings with the U.S. Securities and Exchange Commission ("SEC"). 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 Oncternal's filings with the SEC.

Zilovertamab, ONCT-216, ONCT-808, and ONCT-534 are investigational product candidates or preclinical programs that have not been approved by the U.S. Food and Drug Administration for any indication.

This presentation includes certain information obtained from trade and statistical services, third-party publications, and other sources. Oncternal has not independently verified such information and there can be no assurance as to its accuracy.

Corporate Highlights

ZILOVERTAMAB (FORMERLY CIRMTUZUMAB): POTENTIALLY FIRST-IN-CLASS MONOCLONAL ANTIBODY TARGETING ROR1

- Latest results for zilovertamab + ibrutinib in patients with MCL/CLL compare favorably to historical single-agent ibrutinib
- Agreement with U.S. FDA on Phase 3 registrational study design for the treatment of patients with R/R MCL

ONCT-808: AUTOLOGOUS CAR-T CELL THERAPY TARGETING ROR1

- IND-enabling activities supported by Lentigen (lentivirus manufacturing) and Miltenyi Biotec (process development)
- Research collaborations for next-gen allogeneic CAR-T and CAR-NK cell therapies with Karolinska Institutet & Celularity

ONCT-216 (FORMERLY TK216): TARGETED ETS INHIBITOR

- Two durable complete responses in patients with metastatic relapsed/refractory Ewing sarcoma in ongoing Phase 1/2
- Additional opportunities in ETS-driven tumor indications

ONCT-534 (FORMERLY GTX-534): DUAL-ACTION ANDROGEN RECEPTOR INHIBITOR (DAARI)

- Pre-clinical data in prostate cancer models suggest activity against tumors expressing androgen receptor splice variants

MULTIPLE DATA CATALYSTS

- Expected initiation of zilovertamab + ibrutinib global registrational Phase 3 Study ZILO-301 in 2Q 2022
- Clinical data updates in MCL, CLL, breast cancer and Ewing sarcoma
- ONCT-808 ROR1 CAR-T cell therapy IND submission planned in mid 2022

Clinical stage biotech focused on hematological malignancies and prostate cancer with multiple modalities and deep ROR1 expertise

ONCTERNAL therapeutics™

Hematological Malignancies

Zilovertamab – ROR1 monoclonal antibody

- Demonstrated clinical benefit of combination with ibrutinib compared to historical ibrutinib monotherapy
- Expect MCL registrational study initiation in 2Q 2022

ONCT-808 – ROR1 CAR-T Cell Therapy

- Expect IND submission in mid 2022

Prostate Cancer

ONCT-534 – Dual Action AR Inhibitor (DAARI)

- First-in-class MOA interacting with both N-terminal Domain and Ligand-Binding Domain of the androgen receptor inducing AR degradation
- Active preclinically against AR amplification, splice variant and LBD mutation models

Zilovertamab – ROR1 monoclonal antibody

- IND open for advanced prostate cancer

ONCT-216 – ETS inhibitor – currently under investigation in a Phase 2 study in Ewing sarcoma, preclinical studies in both heme malignancies and prostate cancer underway

Experienced Team

James Breitmeyer, MD, PhD
CEO, Founder, Director

Richard Vincent
CFO

Salim Yazji, MD
CMO

Gunnar Kaufmann, PhD
CSO

Raj Krishnan, PhD
CTO

Chase Leavitt
General Counsel

Pablo Urbaneja
SVP, Corporate Development

Steve Hamburger, PhD
SVP, Regulatory Affairs & Quality Assurance

David Hale
Co-founder
Board Chairman

Michael Carter, MD
Director

Jinzhu Chen, PhD
Director

Daniel Kisner, MD
Director

Rosemary Mazanet, MD, PhD
Director

Bill LaRue
Director

Xin Nakanishi, PhD
Director

Charles Theuer, MD, PhD
Director

Robert Wills, PhD
Director

Robust Pipeline – Novel Product Candidates in Multiple Indications

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Modality	Product Candidate	Indication	Preclinical	Phase 1	Phase 2	Phase 3
ROR1 mAb	Zilovertamab (Cirmtuzumab)	Mantle Cell Lymphoma (MCL)				
		Chronic Lymphocytic Leukemia (CLL)				
		Breast Cancer				
		Prostate Cancer				
ETS Oncoprotein inhibitor	ONCT-216 (TK216)	Ewing Sarcoma				
		Diffuse Large B Cell Lymphoma (DLBCL)				
		Prostate Cancer				
ROR1 Cell Therapy	ONCT-808 (Autologous CAR-T)	Hematological Malignancies				
	Allogeneic	Solid Tumors				
Dual-Action AR Inhibitor	ONCT-534	Prostate Cancer				

Table of Contents

ROR1 (Receptor Tyrosine Kinase-Like Orphan Receptor 1)

Compelling Tumor-Specific Target

ONCTERNAL therapeutics™

- Expressed on **most B-cell malignancies**, including
  - Mantle cell lymphoma (MCL), diffuse large B-cell lymphoma (DLBCL), chronic lymphocytic leukemia (CLL)
- Expressed on **many solid tumors**
  - Increased ROR1 expression associated with more aggressive tumors, shorter PFS and OS
- ROR1 activity associated with **aggressive phenotype**
  - Invasion, metastasis, stem cell-like behavior, and resistance to treatment
- Subject of **recent large pharma acquisitions**
  - ROR1-ADCs: Merck (VelosBio), Boehringer (NBE)
- **Oncternal ROR1 pipeline differentiated and advancing**
  - Deep target expertise and experience

Green 2008 Trends Cell Biol. 2008; Matsuda T 2001 Mech Dev.; Fukuda 2008 PNAS; Hudecek 2010 Blood; Zhang 2012 Am J Pathology; Zhang 2014 PNAS

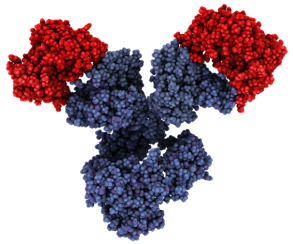
ROR1 Expressed on Multiple Solid and Liquid Tumors

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

Two Development Programs Targeting ROR1

Zilovertamab
ROR1 mAb



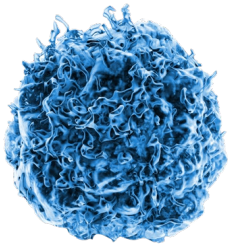
Background

- High-affinity IgG1 humanized ROR1 mAb
- Binds to tumors but not normal adult tissues
- Patent coverage through 2033
- Supported by ~$14M non-dilutive CIRM grant and ibrutinib product donation
- Zilovertamab is the mAb used in MK-2140 ADC
  - VelosBio spun out in 2018, acquired by Merck for $2.75B

Development status

- MCL: Agreement with U.S. FDA on Phase 3 study design for ibrutinib combo in patients with R/R MCL
- CLL: Phase 2 with ibrutinib (data: ASH 2021)
- FDA Orphan Drug Designations for MCL and CLL
- HER2-negative breast cancer: P1b with paclitaxel

ROR1
CELL THERAPY PROGRAM



Background

- ROR1 expression on many tumor types
- Potential safety and efficacy advantages
- MK-2140 ADC data at ASH 2021: no apparent off-tumor ROR1 organ toxicities

Development status

- ONCT-808 utilizing zilovertamab scFv selected as the lead autologous CAR-T product candidate
- Collaborations with Shanghai Pharma (China), Karolinska Institutet and Celularity
- IND enabling work ongoing with WuXi, Lentigen and Miltenyi Biotec
- IND submission expected in mid 2022

Agreement with U.S. FDA on Phase 3 Registrational Study Design for Zilovertamab in the Treatment of Patients with Mantle Cell Lymphoma

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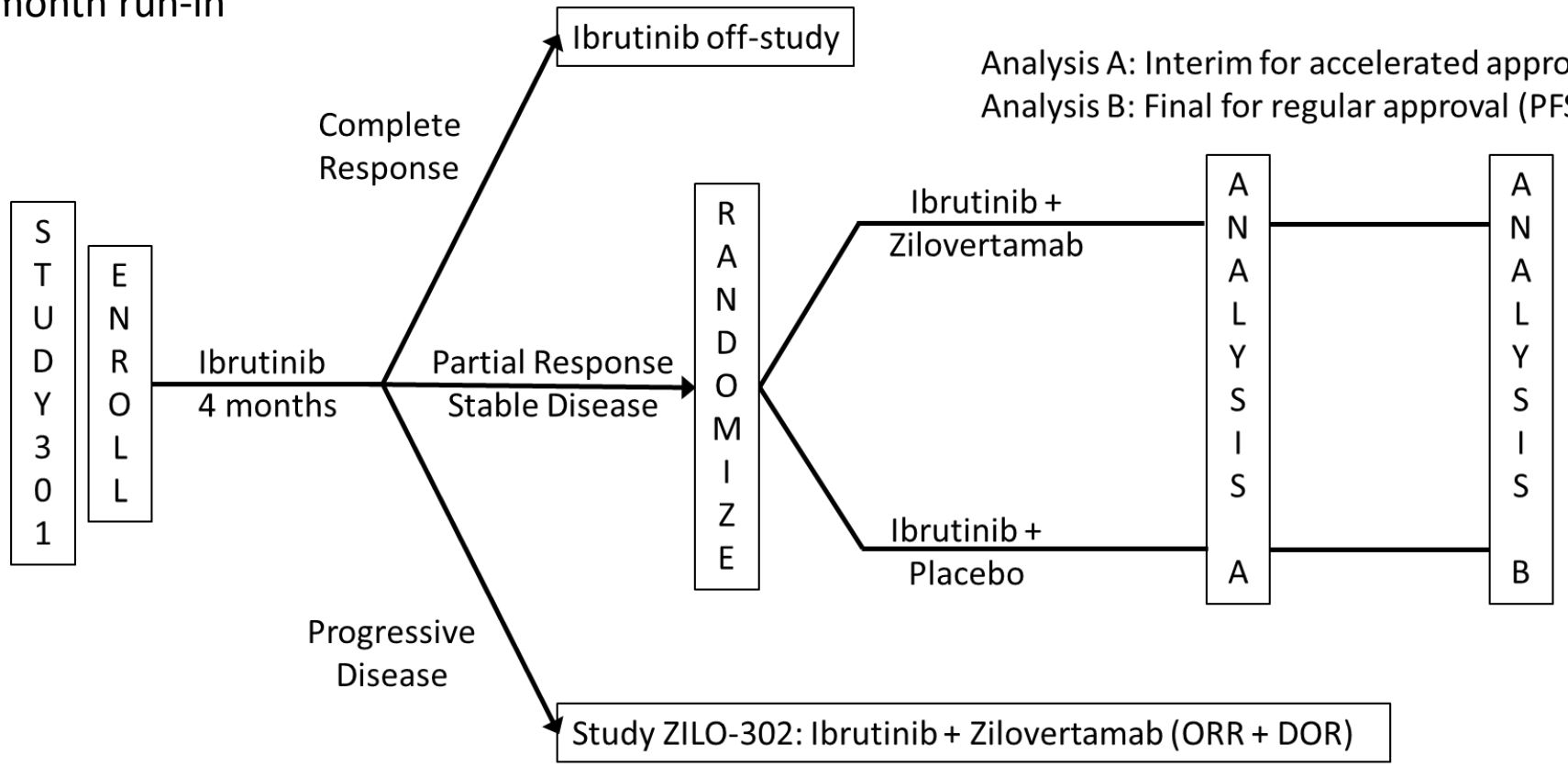
Successful End-of-Phase 2 FDA meeting (Dec 2021)

- Reached consensus on design and major details of Phase 3 superiority Study ZILO-301, to treat patients with R/R MCL with zilovertamab plus ibrutinib
- Positive feedback on the proposed key clinical and regulatory requirements of our development program for zilovertamab in MCL
- Agency previously provided positive feedback on the sufficiency of the preclinical and pharmacology studies of zilovertamab needed to support a BLA submission

Zilovertamab Registrational Study Plan

ZILO-301: Randomized, Double-blind, Placebo-controlled, Multi-center Phase 3 Study of Zilovertamab (A ROR1 Antibody) Plus Ibrutinib Versus Ibrutinib Plus Placebo in Patients with Relapsed or Refractory Mantle Cell Lymphoma

ZILO-302: Open-label companion study of zilovertamab plus ibrutinib for rescue of patient's refractory to ibrutinib during 4-month run-in



- Plan to randomize 250 patients
- Interim analysis ~2 years from first-patient-in (85% power)
- Final analysis ~3 years from first-patient-in (>90% power)

Global registrational study expected to be initiated in 2Q 2022

Zilovertamab Extensive Preclinical Research

Potential as combination therapy, multiple tumor indications and safety advantage

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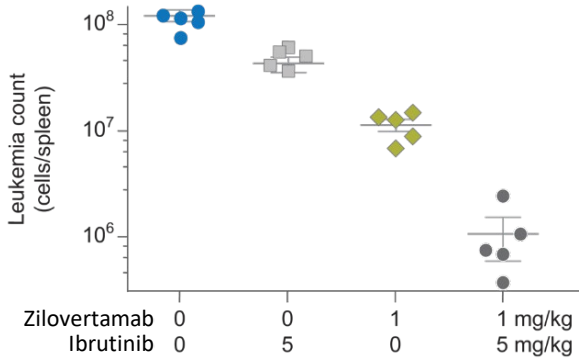
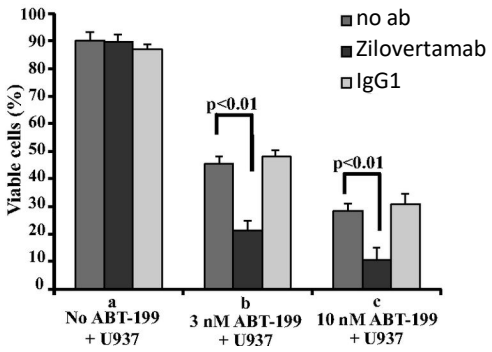
Synergistic with Targeted Agents

- Synergistic with ibrutinib in CLL + MCL



Yu 2017 Leukemia

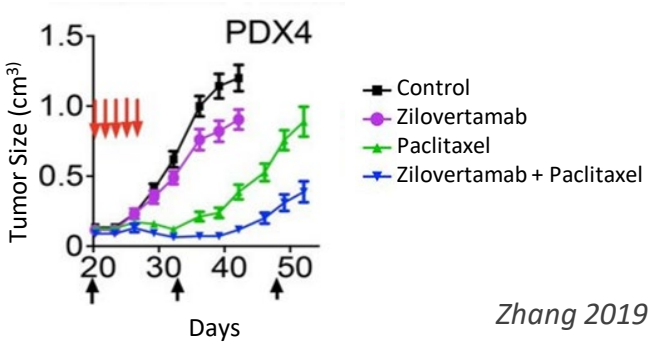
- Synergistic with venetoclax (ABT-199)



Rassenti 2017 PNAS

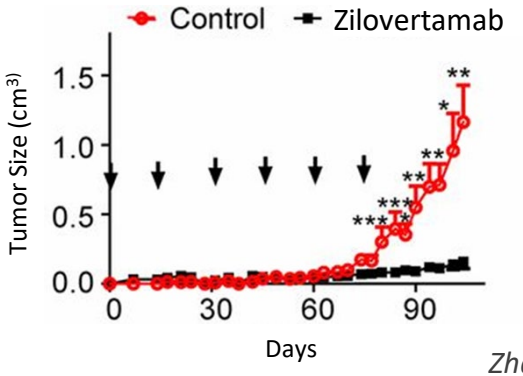
Active in Solid Tumor Models

- Zilovertamab and paclitaxel are at least additive against TNBC PDX growth, and eliminate tumor forming cells



Zhang 2019 PNAS

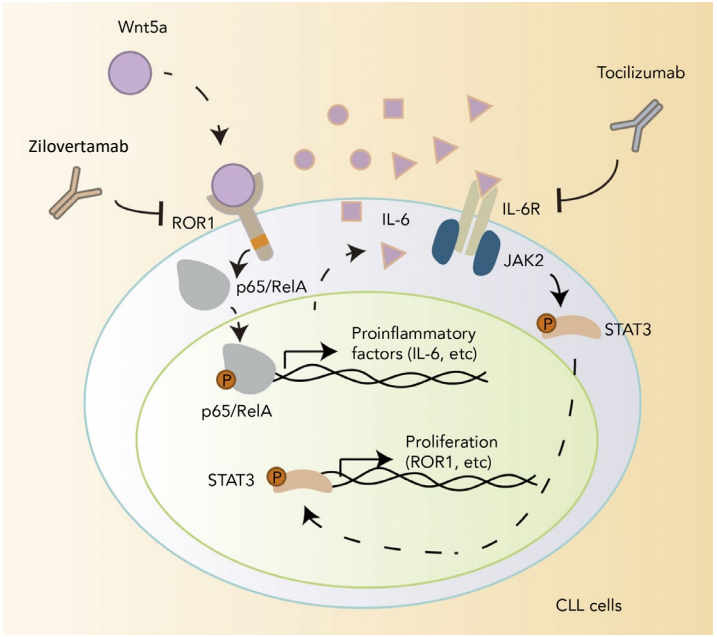
- Anti-tumor activity in PDX models of ovarian cancer



Zhang 2014 PNAS

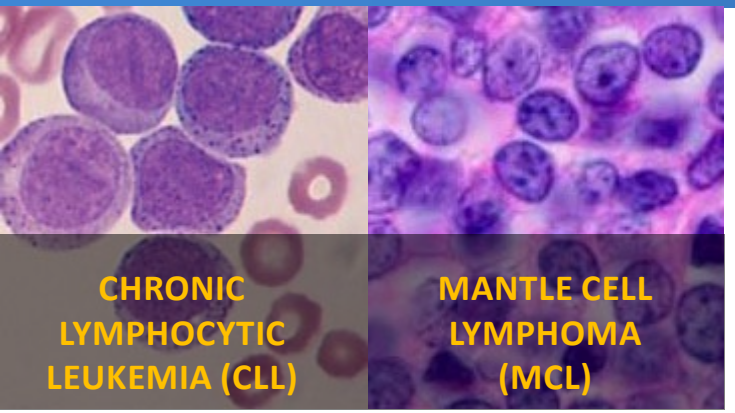
Inhibits Inflammatory Pathway

- Zilovertamab blocks pro-inflammatory JAK/STAT signaling pathway in CLL cells
- Mechanism for potential safety advantage observed in patients



Chen 2019 Blood

CIRLL Trial (CIRM-0001) – Phase 1/2 Study of Zilovertamab and Ibrutinib in Patients with MCL and CLL



- ✓ Encouraging interim clinical data in MCL and CLL presented at ASH 2021
- ✓ Opened new treatment cohort in MCL patients who are refractory to prior BTK inhibitor treatment, or who had an inadequate response to ibrutinib

STUDY DESIGN

PART 1 (in CLL & MCL)	PART 2 (in CLL & MCL)	PART 3 (in CLL)	PART 4 (in MCL)
DOSE-FINDING COHORT • Zilovertamab at 2, 4, 8 & 16 mg/kg and 300 & 600 mg doses evaluated • Ibrutinib added after one month	**DOSE-EXPANSION COHORT** • Confirm Recommended Dosing Regimen (RDR) of zilovertamab (600 mg) + ibrutinib at approved dose	**RANDOMIZED EFFICACY** • Zilovertamab + ibrutinib vs. ibrutinib • Primary endpoint: Complete Response rate	**EXPLORATORY** • Zilovertamab + ibrutinib (refractory to prior BTKi therapy or achieved an inadequate response (SD, PR) to prior ibrutinib therapy)
Enrolled	***MCL Phase 2 enrolling*** *CLL enrolled*	*Enrolled*	*Open for enrollment*

- Ibrutinib from Pharmacyclics/AbbVie
- Collaboration with UC San Diego and CIRM

ClinicalTrials.gov Identifier: NCT03088878

CIRLL = Cirmtuzumab and **I**brutinib targeting **R**OR1 for **L**eukemia and **L**ymphoma
CIRM = **C**alifornia **I**nstitute for **R**egenerative **M**edicine

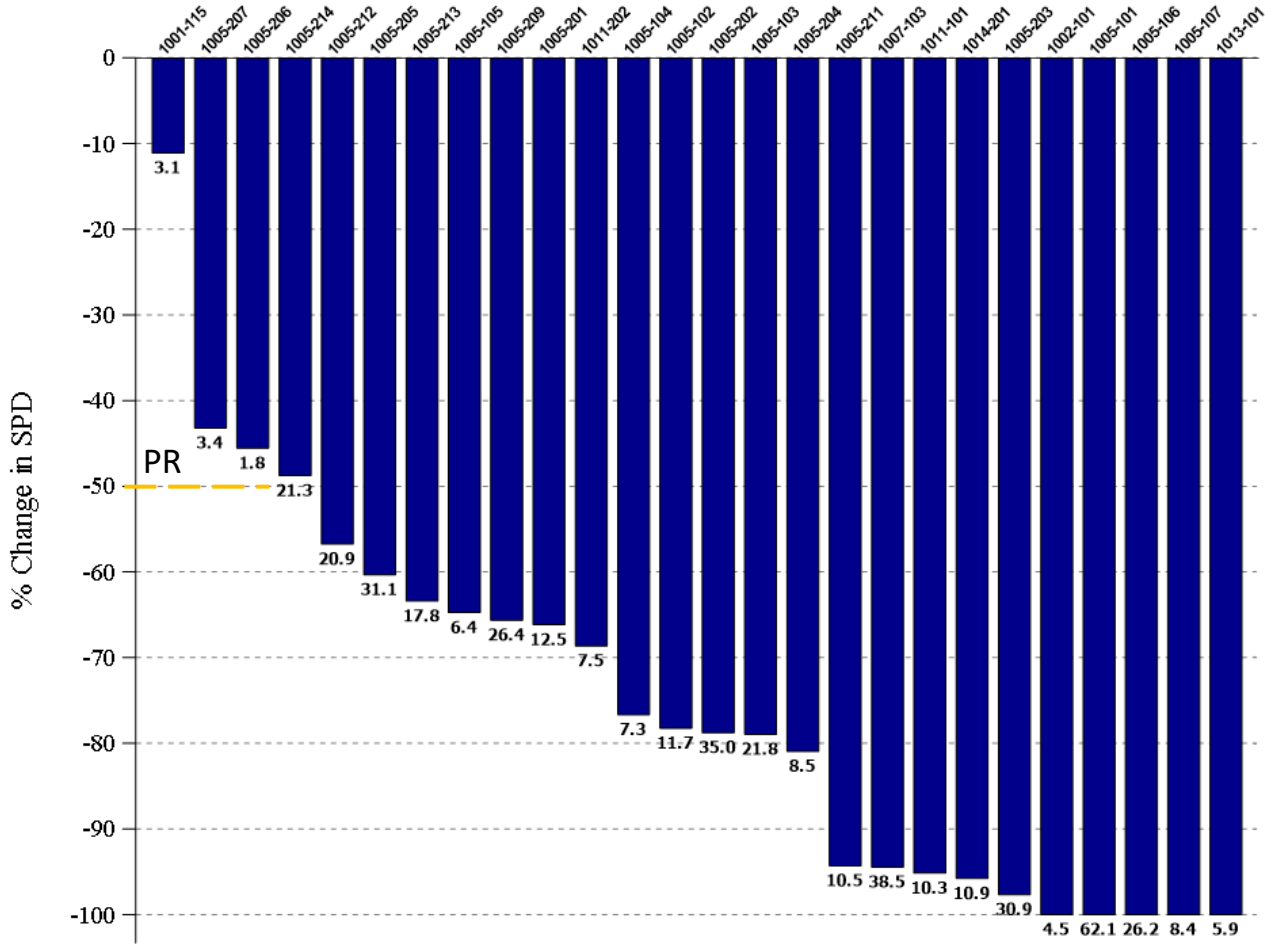
R/R MCL: Tumor Reduction and Progression-Free Survival

Zilovertamab + Ibrutinib Data Update at ASH 2021

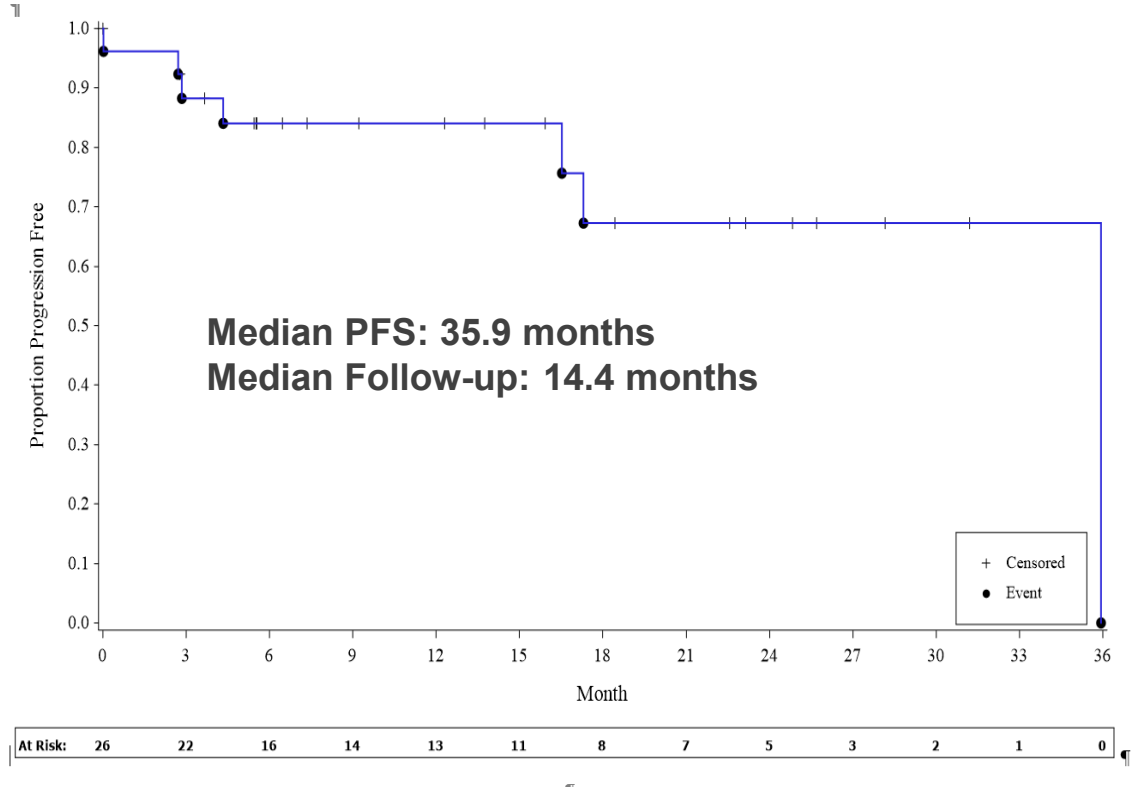
ONCTERNAL therapeutics™

81% ORR and median PFS of 35.9 months

Best Tumor Reduction (SPD)



Progression-Free Survival



Median PFS: 35.9 (95% CI: 16.5, 35.9)

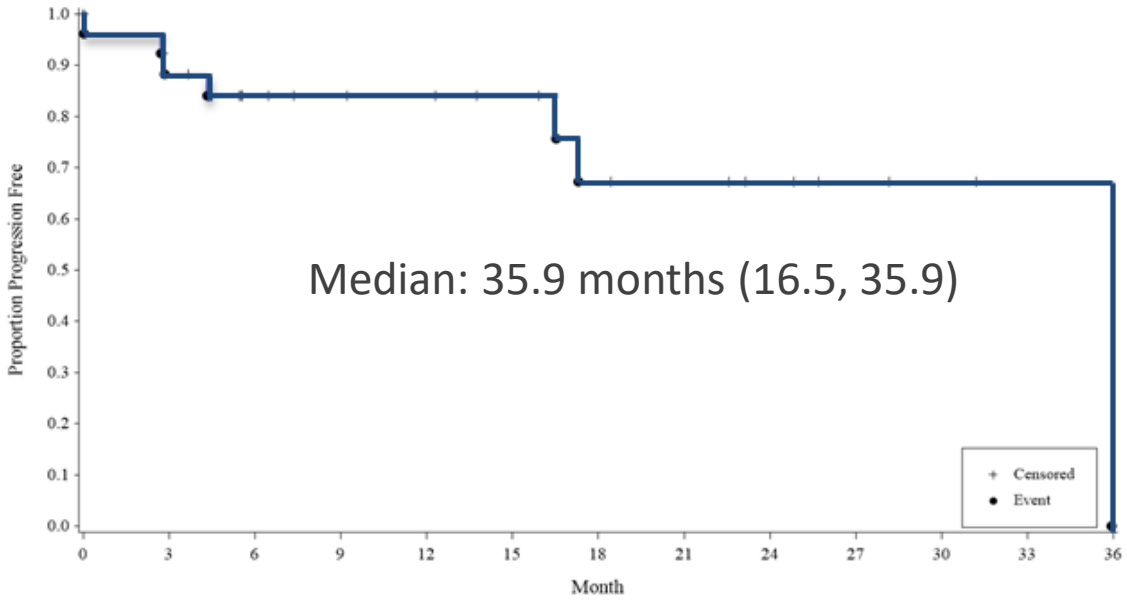
Data: 01OCT2021; Evaluable MCL Part 1 & 2 patients (n=26); Patients were considered evaluable for response if they had 1-dose of zilovertamab and had 1-post baseline tumor assessment; SPD= sum of product of diameters; Number under bars represent baseline SPD; NE= not estimable

R/R MCL: Compares Favorably to Historical Single-Agent Ibrutinib Data

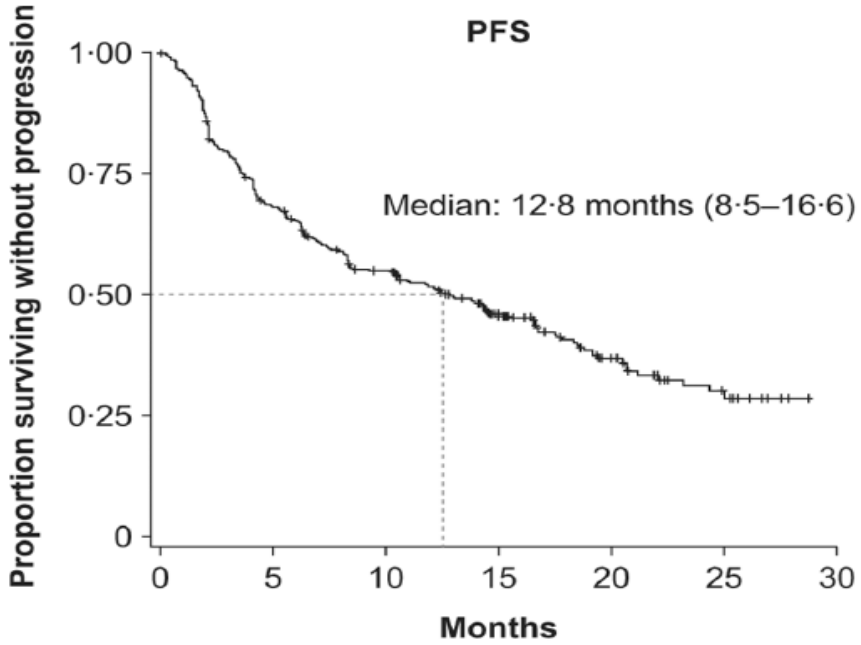
Zilovertamab + Ibrutinib Data Update at ASH 2021

Zilovertamab + ibrutinib (Oncternal Data Oct 2021)

PFS



Single-agent ibrutinib (Rule 2017 Br J Haematol)



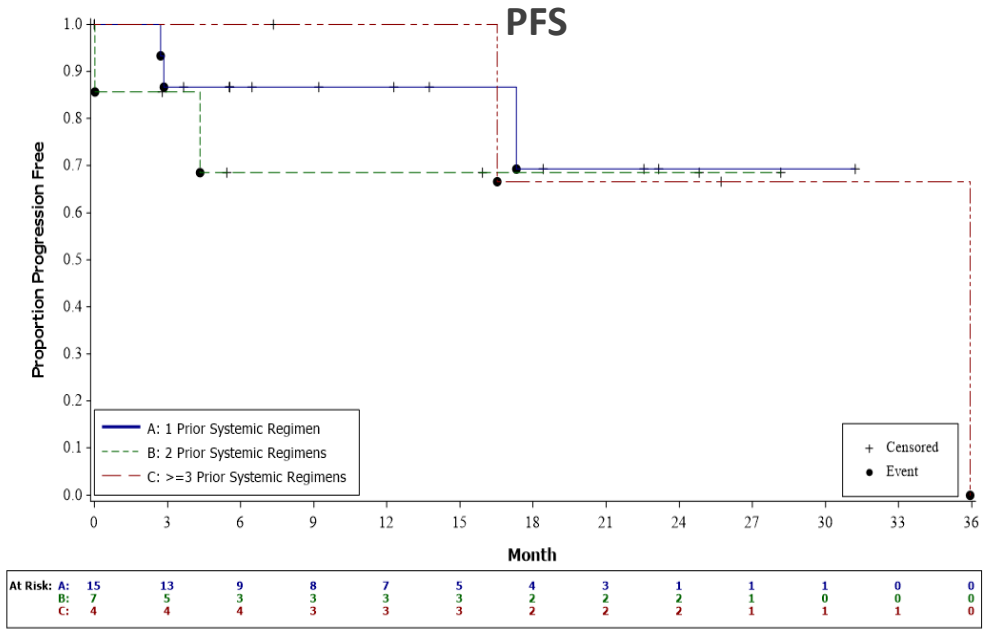
Baseline characteristics	**Median follow-up**	14.4 months	24-25 months
Clinical outcomes	**Median PFS**	35.9 months 95% CI: (**16.5 – 35.9 months**)	12.8 months. 95% CI: (**8.5 – 16.6 months**)
	ORR	**80.8%**	**66%**
	CR	**34.6%**	**20%**

Note: Data presented are from separate studies and such data may not be directly comparable due to differences in study protocols, conditions and patient populations. Accordingly, cross-trial comparisons may not be reliable predictors of the relative efficacy or other benefits of the combination of zilovertamab and ibrutinib compared to single-agent ibrutinib; NE= not estimable

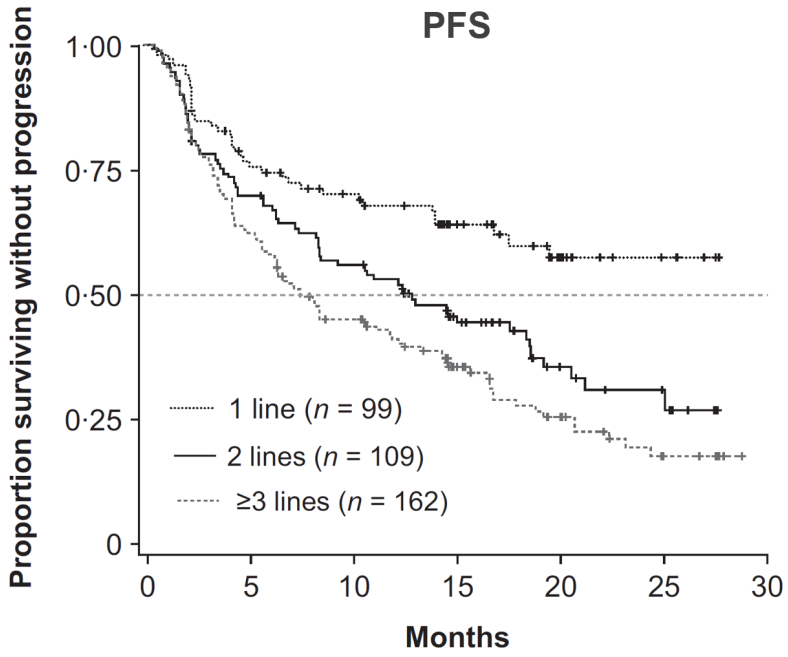
R/R MCL: Encouraging PFS observed based on prior line of therapy compared to historical ibrutinib alone

Zilovertamab + Ibrutinib Data Update at ASH 2021

Zilovertamab + ibrutinib (Oncternal Data Oct 2021)



Single-agent ibrutinib (Rule 2017 Br J Haematol)



PFS by Subtypes – Prior Systemic Therapy (months)

Prior sys. therapy	Zilovertamab + Ibrutinib PFS , median (95% CI)	Ibrutinib PFS median
1	NR (17.3, NE)	NR
2	NR (0.03, NE)	~12
≥ 3	35.9 (16.5, 35.9)	~8

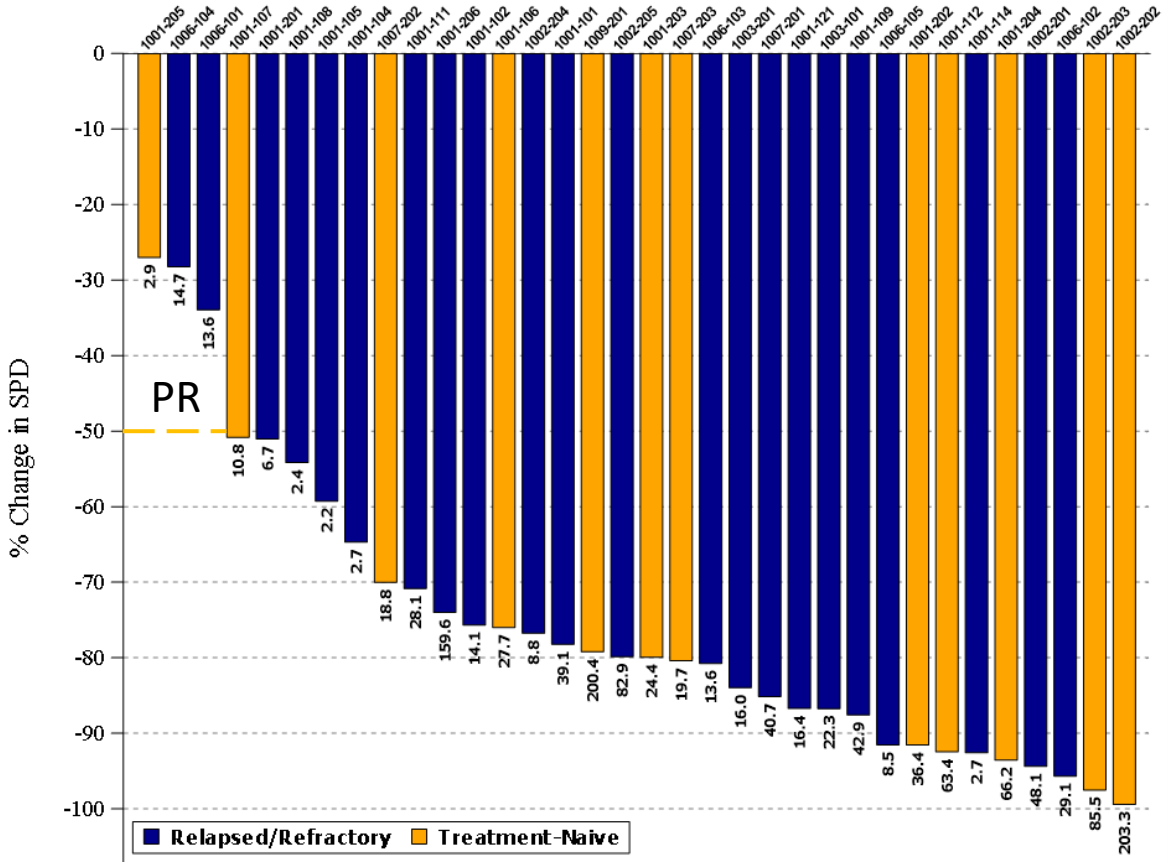
Note: Data presented are from separate studies and such data may not be directly comparable due to differences in study protocols, conditions and patient populations. Accordingly, cross-trial comparisons may not be reliable predictors of the relative efficacy or other benefits of the combination of zilovertamab and ibrutinib compared to single-agent ibrutinib; NE= not estimable

CLL: Tumor Reduction and Progression-Free Survival

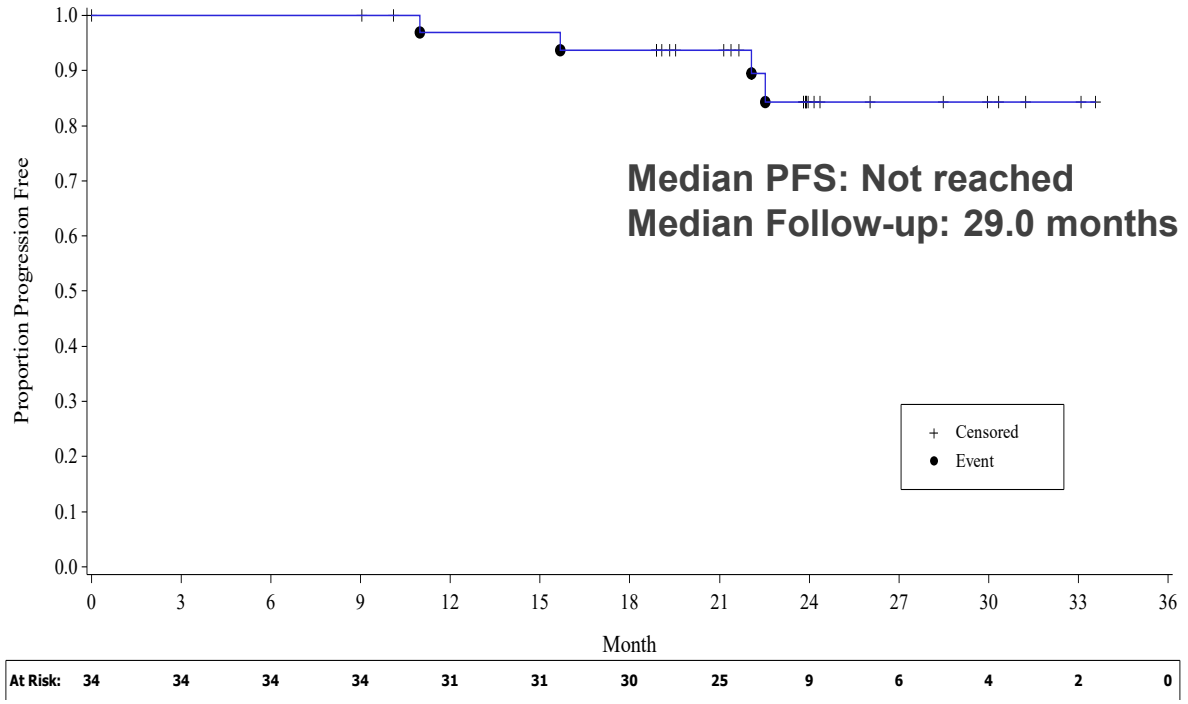
Zilovertamab + Ibrutinib Data Update at ASH 2021

91% ORR and median PFS was not reached in CLL

Best % Tumor Reduction
CLL Parts 1 & 2



Progression-Free Survival
CLL Parts 1 & 2



Median PFS: NE (95% CI: 36.26, NE)

Data: 01OCT2021; Evaluable CLL Part 1 & 2 patients (n=34); Patients were considered evaluable for response if they had 1-dose of zilovertamab and had 1-post baseline tumor assessment; SPD= sum of product of diameters; Number under bars represent baseline SPD; NE= not estimable

CLL: Encouraging landmark PFS based on number of prior lines of therapy

Zilovertamab + Ibrutinib Data Update at ASH 2021

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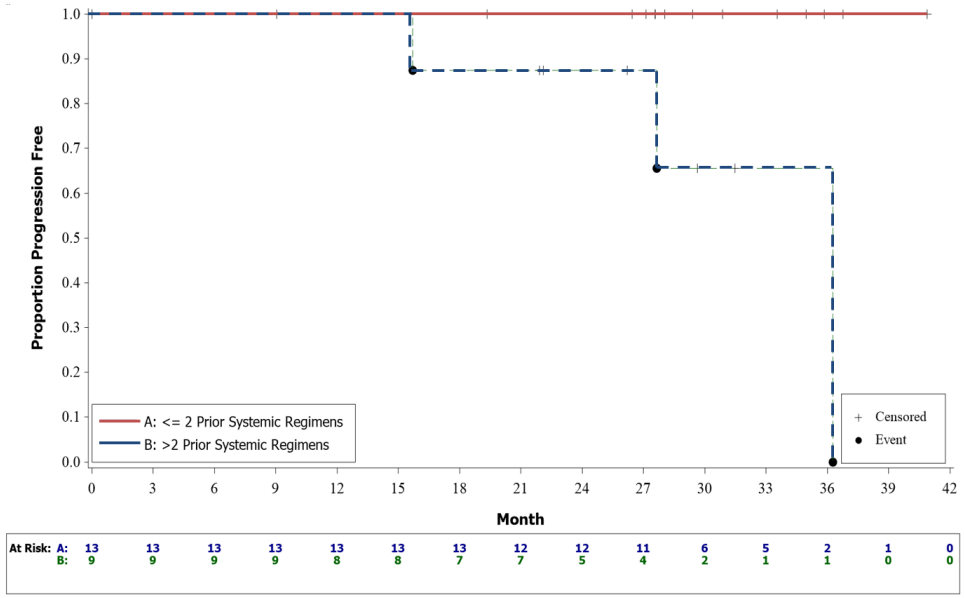
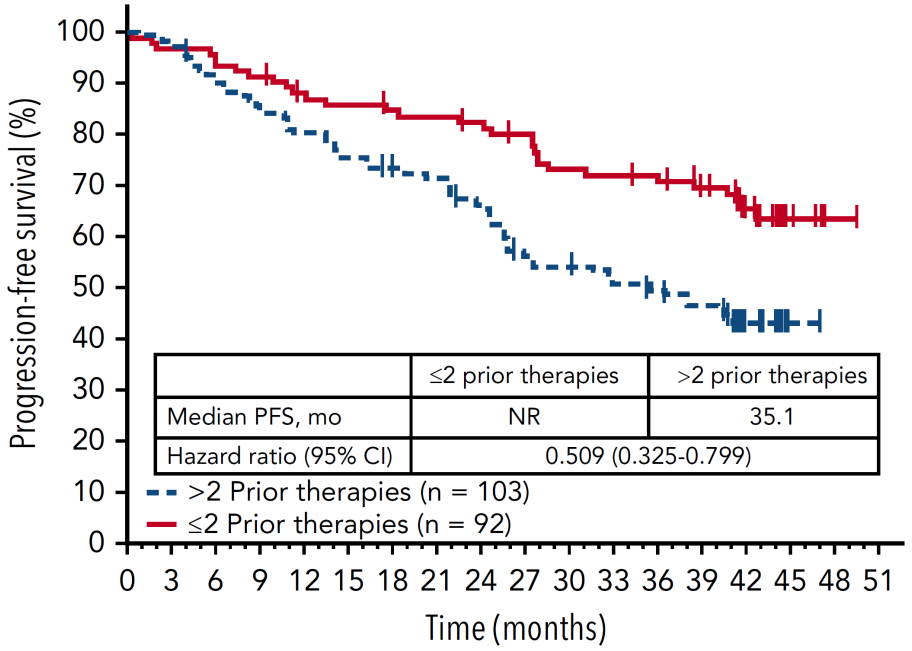
Zilovertamab + ibrutinib (Oncternal Data Oct 2021) PFS



PFS by prior therapies from single-agent ibrutinib treatment in high-risk, relapsed patients with CLL (Byrd, Blood 2019)



PFS by Subtypes – Prior Systemic Therapy

Prior sys. therapy	Landmark PFS 24 months	Landmark PFS 36 months	Landmark PFS 24 months	Landmark PFS 36 months
≤ 2	~100%	~100%	~85%	~75%
> 2	~85%	~65%	~65%	~50%

Data: 01OCT2021; PFS is defined as the time from the first dose to the time of objective disease progression or death from any cause, whichever occurs first; NR- not reached. NE – not evaluable

CIRLL Trial Summary

Zilovertamab + Ibrutinib Data Update at ASH 2021

ONCTERNAL therapeutics™

MCL:

- **Clinical activity compares favorably to published single-agent ibrutinib data(1)**
  - ORR 81% (21/26)
  - CR rate 35% (9/26)
  - CRs durable for up to 32 months
  - Median PFS of 35.9 months and OS not reached, regardless of prior # of therapies, after a median follow-up of 14.4 months
- **Encouraging clinical activity in high-risk sub-populations**
  - Prior SCT or CAR-T (n=7): 100% ORR (5 CR, 2 PR)
  - Ki-67 levels ≥30% (n=13): 85% ORR (4 CR, 7 PR)
  - > 1 prior systemic therapy (n=11): 82% ORR (5 CR, 4 PR)
  - Prior ibrutinib (n=5): 80% ORR (2 CR, 2 PR)

CLL:

- **The combination of zilovertamab plus ibrutinib is a well-tolerated and active regimen in CLL**
  - Updated Part 1 & 2 results:
    - ORR 91% (31/34)
    - CR rate 6% (2/34)
    - Clinical Benefit 100% (34/34)
    - Median PFS not reached after median follow-up of 29 months
  - Randomized cohort (Part 3) results
    - Data continue to mature with time
    - CR 93.3% (14/15 combo) vs 100% (7/7 mono)
    - Median PFS not reached for either arm after median follow up of ~18 months

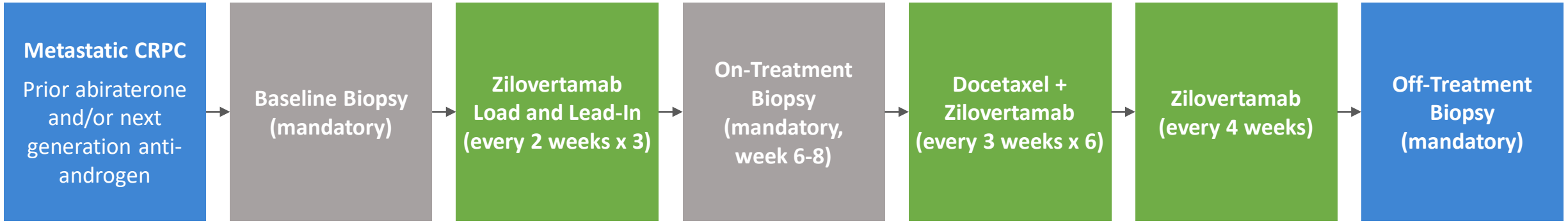
No additional toxicity when zilovertamab is combined with ibrutinib

The combination has been well tolerated, with treatment emergent adverse events and hematologic abnormalities consistent with, or slightly lower than those reported for ibrutinib alone. For example, in patients with MCL, Grade 3-4 neutrophil decrease was documented in **9.7%** of patients with zilovertamab plus ibrutinib, compared to **29%** for ibrutinib alone from its registration study

There have been no dose-limiting toxicities and no serious adverse events attributed to zilovertamab alone

(1) Historical data with single-agent ibrutinib in MCL population with similar distribution of prior lines of therapy reported overall ORR 66% and CR rate 20% (Rule et al. 2017 Br J Haem); such data may not be directly comparable due to differences in study protocols, conditions and patient populations.

Phase 1B IST Trial of Zilovertamab + Docetaxel in metastatic CRPC



Design: 3+3 dose escalation design with expansion (n=32)

Primary Endpoint: Determine the recommended phase 2 dose

Key Secondary Endpoint: Clinical benefit rate

Other Secondary Endpoints: ORR, PSA response rate, PFS, safety, tolerability

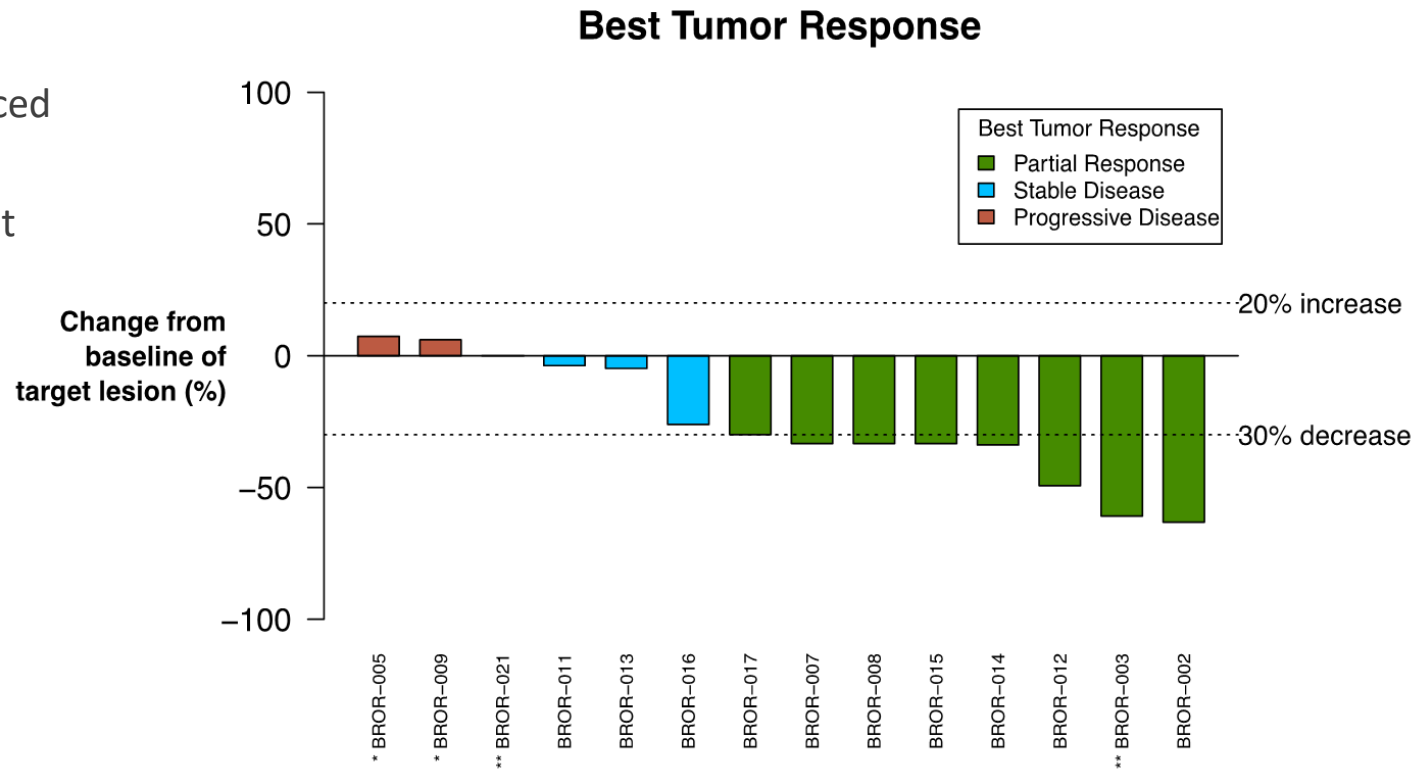
UC San Diego Health System

PI: R. McKay

HER2-negative Breast Cancer: Zilovertamab + Paclitaxel

Interim Data Presented at AACR: ORR 57%

- Fully enrolled investigator sponsored trial at UC San Diego (PIs: Barbara Parker & Rebecca Shatsky)
- Patients with HER2-negative, metastatic or locally-advanced unresectable breast cancer
- Zilovertamab 600 mg every 4 weeks + paclitaxel weekly at 80 mg/m^2 IV
- Median of 6 prior therapies for metastatic disease; 4 patients with triple negative breast cancer
- Adverse events (AEs) were consistent with known safety profile of paclitaxel alone
- 100% of tumors expressed ROR1 - 8/8 fresh or archival tissue
- **57% objective response rate**
  - Similar to previous interim data reported
  - 8 PRs among 14 evaluable patients per protocol
  - One PR durable for 52 weeks, ~6 months on zilovertamab alone
  - 4 additional patients had stable disease



* BROR-05 and BROR-09 had stable disease with targeted lesion response, overall response was PD due to new or worsening non-targeted lesions. ** BROR-03 and BROR-21 were still on treatment as of 2/26/2021. BROR-01 was not included in the graph due to progressive disease symptoms 3 weeks after treatment initiation requiring study discontinuation before first imaging assessment.

Historical reported weekly paclitaxel ORR ~30%(1)

Shatsky 2021 AACR
ClinicalTrials.gov Identifier: NCT02776917

(1) Weekly paclitaxel ORR (21%) Miller 2007 NEJM; ORR (32-42%) Seidman 2008 JCO; ORR (32%) Kim 2017 Lancet Oncol; ORR (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 zilovertamab + paclitaxel over paclitaxel alone.

Zilovertamab Consolidation for Treatment of CLL Patients with Detectable MRD on Venetoclax

- Investigator-sponsored, single-center two-stage study to determine the efficacy of zilovertamab in patients with measurable disease on venetoclax for at least 1 year who have detectable disease (MRD > 0.01% in the blood or marrow)
- Following 6 months of zilovertamab + venetoclax, patients are assessed for MRD in the blood/marrow

Screening
- Dx of CLL/SLL
- At least 1 year of venetoclax
- Detectable MRD in blood or marrow (>0.01%)

Zilovertamab 600mg IV day 1, 15, 29, then q28d (7 total infusions)

Venetoclax 400mp PO daily

Primary Endpoint
- uMRD in marrow at end of combination therapy

Primary Feasibility Endpoint:
- Undetectable MRD (uMRD) rate after Zilovertamab + Venetoclax

Secondary and Exploratory Endpoints:
- Safety
- Time to next treatment
- Gene expression changes

Main inclusion criteria:
- CLL or SLL
- Detectable CLL (> 0.01% CLL cells in the blood or marrow)
- Must have received at least 12 months of venetoclax(1)

Statistical Considerations
- Success rate of 25% uMRD considered compelling
- Success rate of < 5% would be considered not compelling
- n =16, 80% power to reject H_0, $\alpha < 5\%$

ClinicalTrials.gov Identifier: NCT04501939

(1) may be receiving venetoclax at the time of screening and study entry
uMRD = Undetectable Minimal Residual Disease

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Oncternal's Two-Stage ROR1 Cell Therapy Development Strategy

1 **ONCT-808 autologous ROR1 CAR-T cell therapy**

- Quick path to demonstration of safety and efficacy
- Reduced technology risk: autologous CAR-T cells
- Reduced indication risk: B-cell malignancies, including failures to prior CD19 CAR-T cell therapy
- IND submission on track for submission in mid 2022

2 **Next-generation allogeneic cell therapies targeting ROR1**

- Incorporate technologies to overcome immunosuppression & CAR-T resistance
- Partnerships with Celularity and Karolinska Institutet
- Allogeneic CAR-T and CAR-NK cell therapies
- Hematologic and solid tumor indications

Cell Therapy Scientific Advisory Board

Supporting ONCT-808 development and next-gen ROR1 Cell Therapies

ONCTERNAL therapeutics™

Michael Wang, MD

Endowed Professor in the Department of Lymphoma & Myeloma at MD Anderson Cancer Center

- Director of the Mantle Cell Lymphoma Program of Excellence and Co-Director of the B-Cell Lymphoma Moon Shot Program at MD Anderson
- Lead PI in Tecartus® registrational study
- Over 200 peer-reviewed publications

Angela Shen, MD, MBA

Clinical and Translational Market Sector Leader Mass General Brigham

- Deep clinical, regulatory, and strategic expertise in autologous and allogeneic cell therapies
- Experienced CMO in the cell therapy biotech space
- Led clinical team responsible for designing and launching Kymriah® registrational study

Marcela Maus, MD, PhD

Associate Professor, Medicine, Harvard Medical School
Director of Cellular Immunotherapy, Cancer Center, Massachusetts General Hospital

- Translational physician-scientist in cancer immunology
- Lab focuses on the design, generation, and use of innovative forms of immune cell engineering
- Trained in the laboratories of Katherine High, Michel Sadelain, and Carl June

Sadik Kassim, PhD

Chief Technology Officer at Vor Biopharma

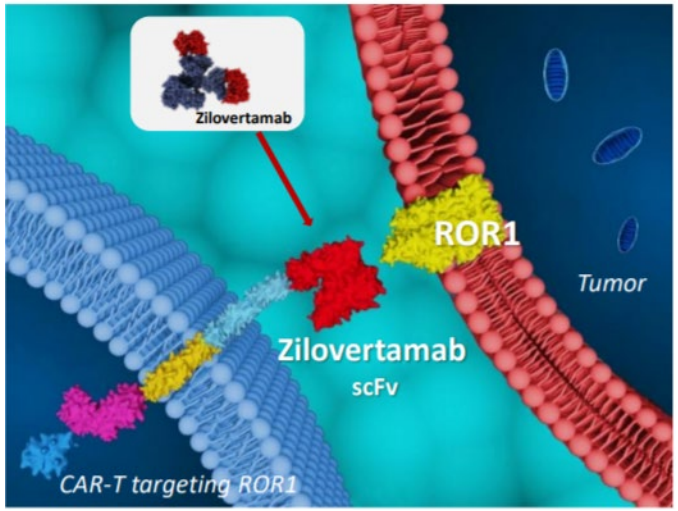
- Chief Scientific Officer at Mustang Bio
- Led the BLA and MAA CMC efforts for Kite's Tecartus®
- Former Head of Early Analytical Development for Novartis' Cell and Gene Therapies Unit

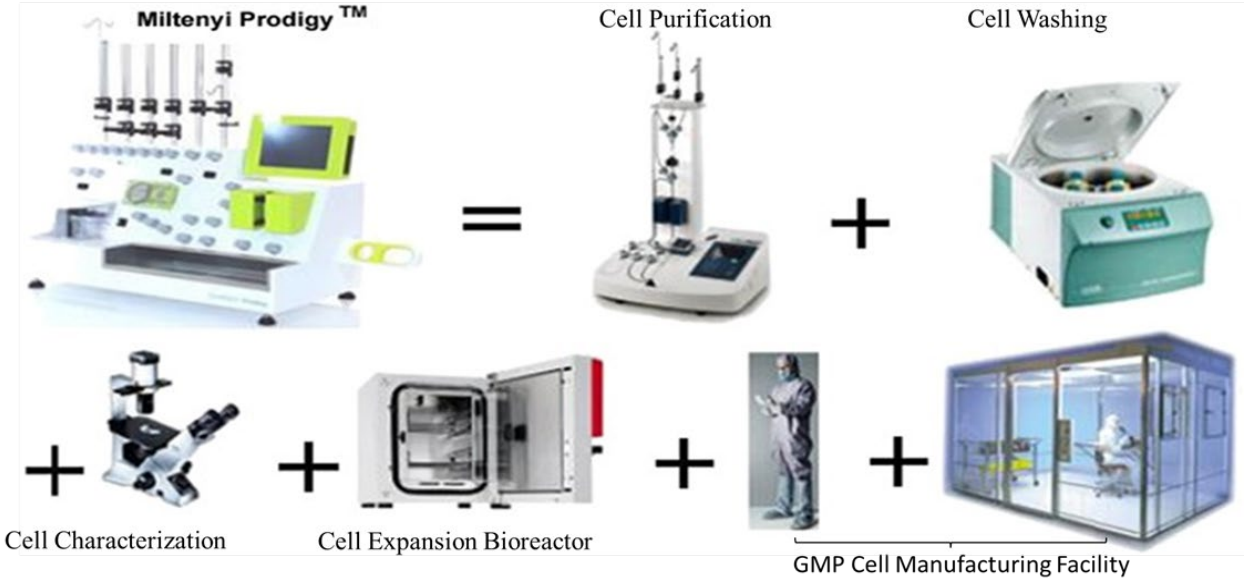
ONCT-808 CMC and Manufacturing Progress

1. **Lead ROR1 CAR construct optimized and selected with demonstrated high potency against ROR1+ cancer cell lines**

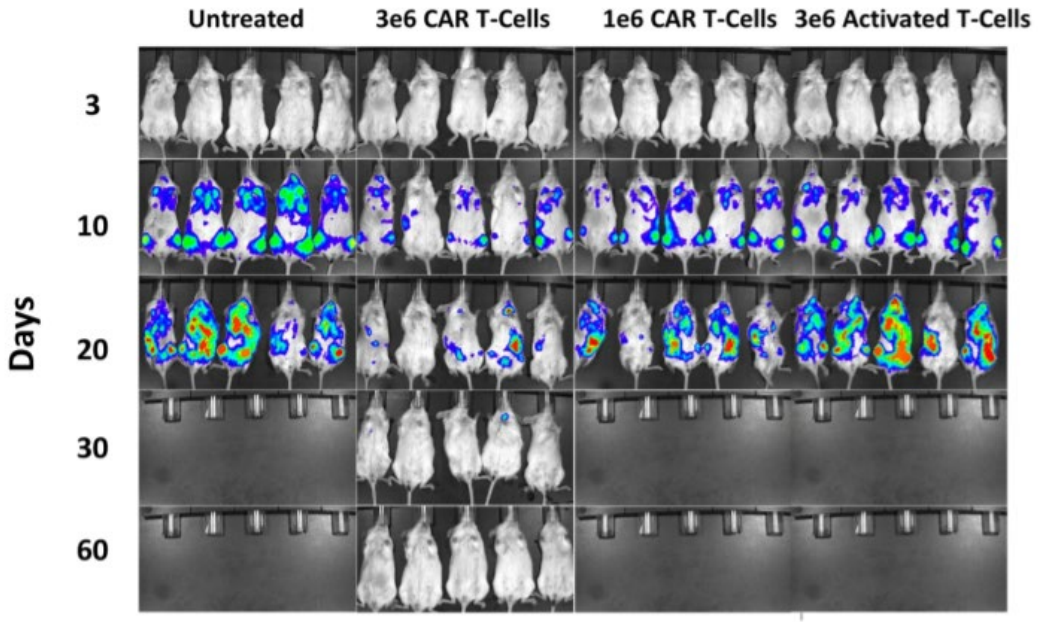
2. **Lentivirus production process confirmed with robust titers of greater than 1 E9 IFU/mL achieved**

3. **ROR1 CAR-T cell product process optimized and confirmed**
   - Leveraging a flexible, closed fully-automated platform
   - One week production process post-activation
   - Greater than 2 billion CAR+ T cells produced with over 60% CAR+ expression
   - Majority of CAR T cells with juvenile phenotypes (CD4 and CD8 stem central memory T cells)



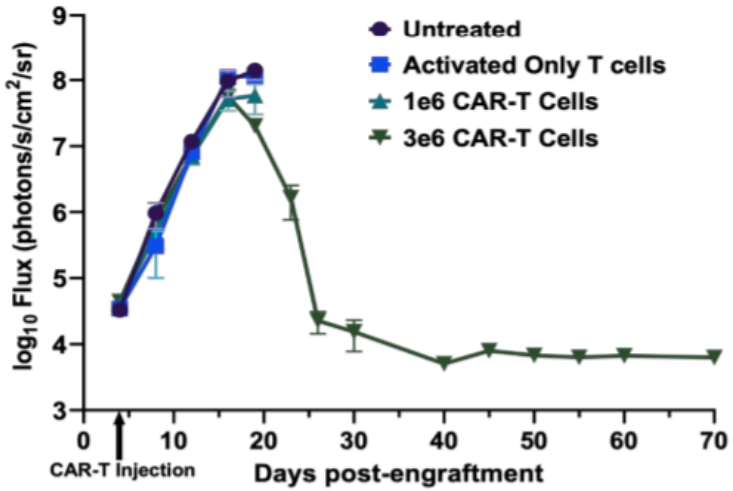


ONCT-808 Preclinical Update – Strong Anti-tumor Activity



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.

Prussak 2020 ASCO SITC



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.

- **Strong anti-tumor activity of ROR1 CAR-T cells demonstrated in CLL xenograft mouse model**
- **Additional IND-supporting in vivo studies are ongoing**

Next-generation ROR1 Cell Therapy Effort Overview

Vision

- Off-the-shelf ROR1-targeting immune cell therapy for both liquid and solid malignancies

Mission

- Utilization of our potentially best-in-class ROR1 targeting moiety with:
  - Specific immune cell subsets or entire immune cell populations
  - Adult donor cells or stem cells
  - Fortified against tumor microenvironment
  - Dual targeting approaches to eliminate specific tumor cell populations

Current partnerships supporting next-generation ROR1 cell therapy efforts

- Karolinska Institutet R&D collaboration for CAR-T cell and CAR-NK cell therapies
- Celularity research collaboration with on allogeneic cell therapies

Collaboration with Celularity will Explore Synergies between ROR1 Targeting and Novel Placental-Derived Allogeneic Cell Therapy Platform

ONCTERNAL therapeutics™

ONCTERNAL therapeutics™

First-in-class, clinically proven, ROR1-targeting monoclonal antibody and CAR construct

+

celularity®

Off-the-shelf placental-derived allogeneic CAR-NK and CAR-T cell therapy platform

- Research collaboration to develop and evaluate stem cell-derived cellular therapies targeting ROR1
- Will explore use of Oncternal's ROR1-targeting mAb and chimeric antigen receptor (CAR) constructs in combination with Celularity's natural killer (NK) and T cell therapies
- Will leverage advantages of placental-derived cellular therapies and specificity of ROR1 targeting to address significant unmet need in a wide range of cancers

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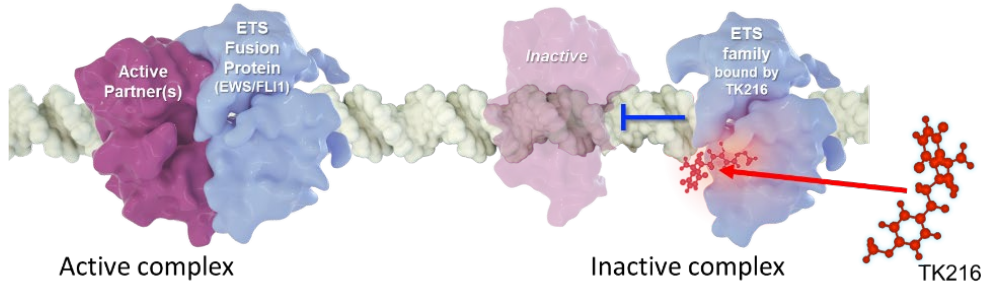
ONCT-216: First-in-Class Targeted ETS Oncoprotein Inhibitor

OPPORTUNITY

- Fast-to-market strategy in Ewing sarcoma (>95% ETS+)
  - Rare Pediatric Disease Designation, Orphan Drug Designation and Fast Track Status granted by FDA; Potentially Pediatric Voucher eligible
  - US prevalence ~4,000(1)
- Significant market potential in other cancers with ETS alterations
- Composition of matter patent coverage through 2037

ETS = **E**26 **T**ransformation-**S**pecific oncogene family



Erkizan NatureMed 2009

MECHANISM OF ACTION

- Novel small molecule inhibitor of ETS family oncoproteins
- Designed to prevent/disrupt formation of transcriptionally-active protein complex

DEVELOPMENT STATUS

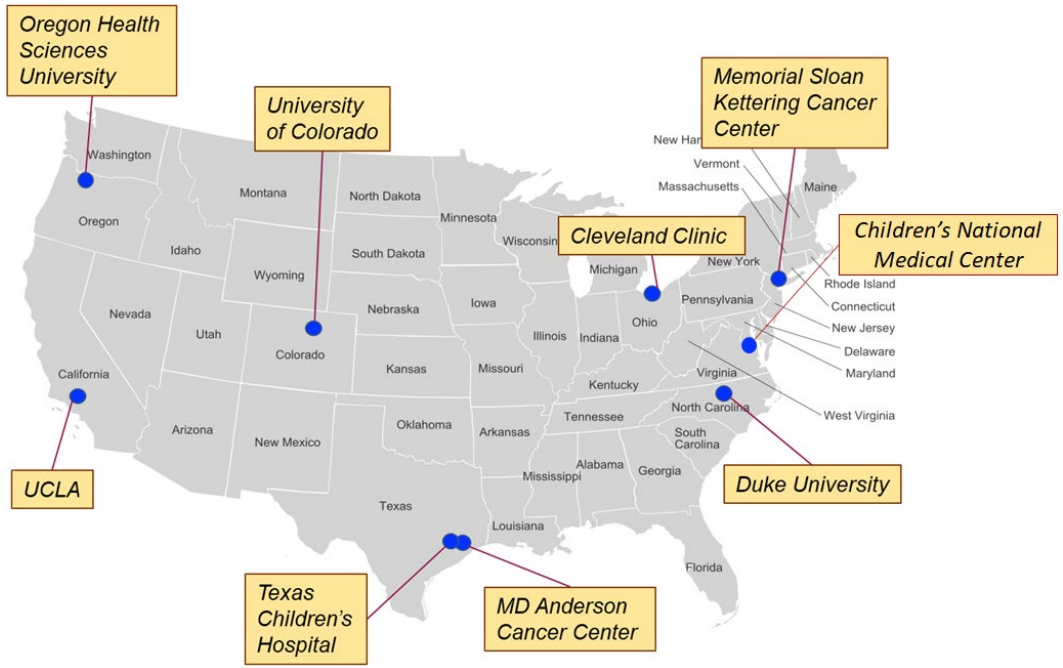
- Encouraging interim clinical data for ONCT-216 in patients with relapsed or refractory Ewing sarcoma presented in an oral session at ASCO 2021 & CTOS 2021
- Additional Phase 2 expansion cohort targeting up to 21 Ewing sarcoma patients to evaluate clinical responses to single agent ONCT-216 with intensified dosing

(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

Phase 1/2 Study of ONCT-216 in R/R Ewing Sarcoma patients

Early Evidence of Clinical Activity, Enrolling Additional Expansion Cohort

- 3+3 dose and schedule escalation cohorts completed
  - Total 74 patients with relapsed/refractory Ewing sarcoma treated with ONCT-216
  - Median number of prior systemic therapies: 3 (range: 1, 9)
- Safety: generally well-tolerated, with dose limiting toxicity of manageable myelosuppression and no obvious off-target toxicity
- PK: drug plasma levels at RP2D exceeded those associated with anti-cancer activity in preclinical models
- Activity: 41% disease control rate among 37 evaluable patients treated with ONCT-216 200 mg/m^2/day plus vincristine (RP2D)
  - 2 durable complete responses (one surgical CR): no evidence of disease at 29 months and 20+ months on study
- Additional phase 2 expansion cohort targeting up to 21 evaluable Ewing sarcoma patients to evaluate clinical responses to single agent ONCT-216 with intensified & extended dosing



ClinicalTrials.gov Identifier: NCT02657005

Ludwig 2021 CTOS presentation

R/R Ewing Sarcoma: Overall Best Clinical Response and PFS

ONCT-216 Data Update at CTOS 2021

ONCTERNAL therapeutics™

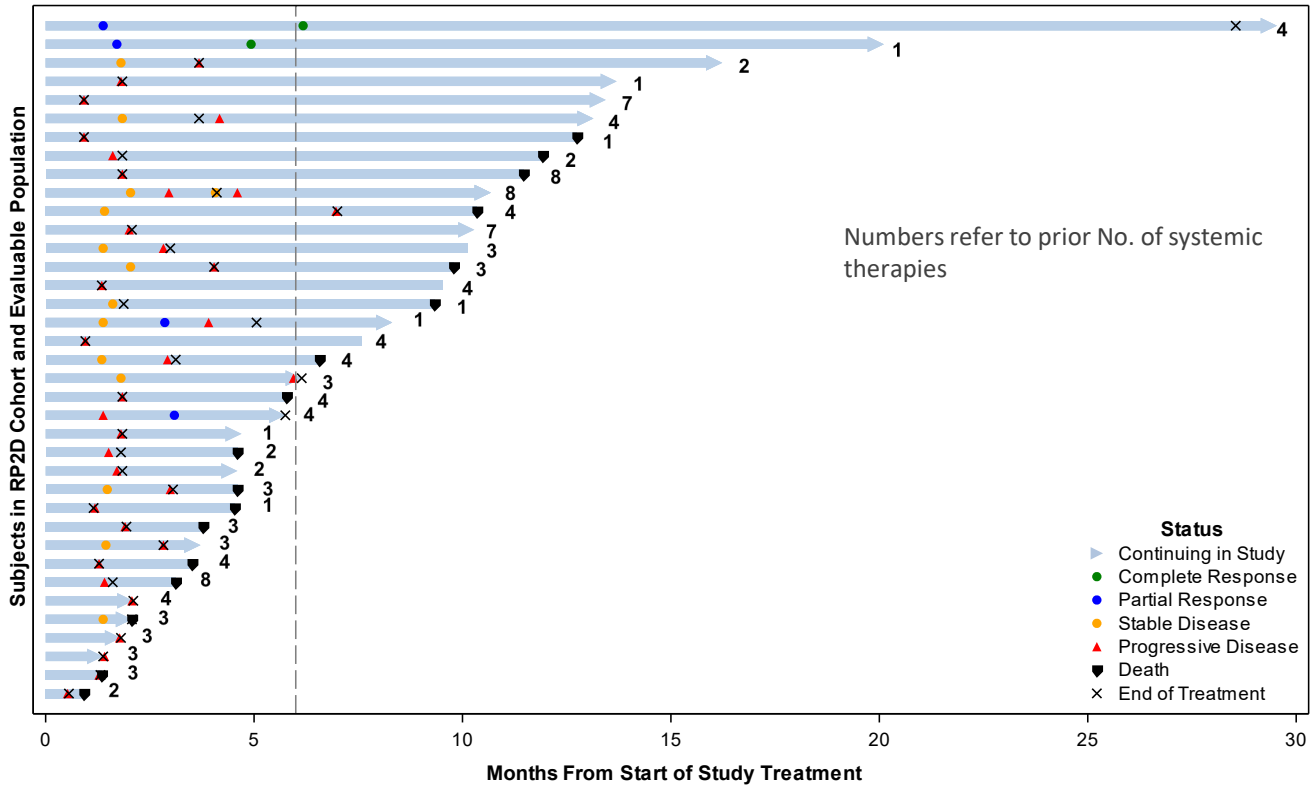
Notable responses and disease control observed at the RP2D

Overall Best Clinical Response

	All Subjects (N=60)	Cohort 9 & Expansion Cohort (RP2D) (N=37)
Overall Response (ORR), n (%)	3 (5.0%)	3 (8.1%)
Complete Response* (CR) , n (%)	2 (3.3%)	2 (5.4%)
Partial Response** (PR) , n (%)	1 (1.7%)	1 (2.7%)
Stable Disease (SD) , n (%)	14 (23.3%)	12 (32.4%)
Progressive Disease (PD) , n (%)	43 (71.7%)	22 (59.5%)
Disease Control Rate (DCR), n (%)	17 (28.3%)	15 (40.5%)
Duration of Response (months), median (95% CI)	14.7 (1.1, 28.6)	14.7 (1.1, 28.6)
6-month Progression-free-survival (PFS) rate (95% CI)	7.2% (2.4%, 15.8%)	12.0% (3.9%, 25.0%)

* Two confirmed CRs with 1 completed 2-year treatment after CR, 1 ongoing with no PD at the time of data cut; ** Unconfirmed PR observed in target lesion at Cycle 4 then PD observed at Cycle 6 in non-target lesions

Swimmer's Plot



Data cut: 01OCT2021; Patients were considered evaluable for response if they completed 1-cycle of treatment and had 1-post baseline tumor assessment; continuing in study includes long-term follow-up (survival);

Ludwig 2021 CTOS presentation

Case Study: First Sustained Complete Response with ONCT-216 in Patient with Metastatic Relapsed/Refractory Ewing Sarcoma

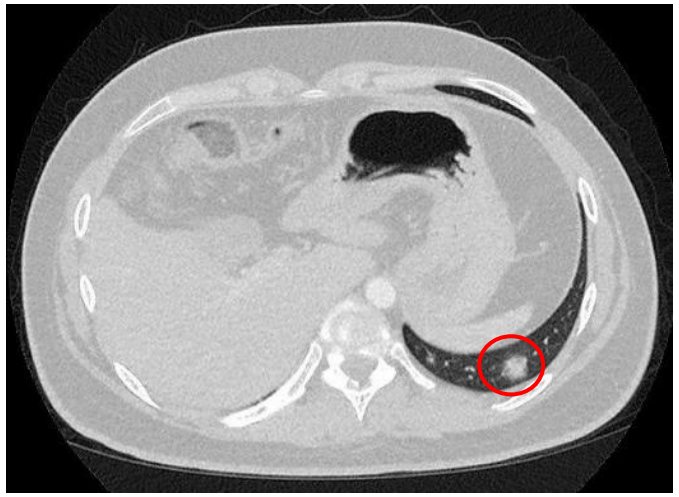
ONCTERNAL therapeutics™

Patient background

- 19-year-old male. Initially diagnosed with metastatic Ewing sarcoma involving the clavicle and lungs
- Prior treatment included VDC/IE, surgery, radiation, irinotecan/ temozolomide, bevacizumab, pazopanib
- Progressing with enlarging lung metastases when enrolled in ONCT-216 clinical trial
- Enrolled in Phase 1 study of ONCT-216 at MSKCC in 2019

Treatment and outcome

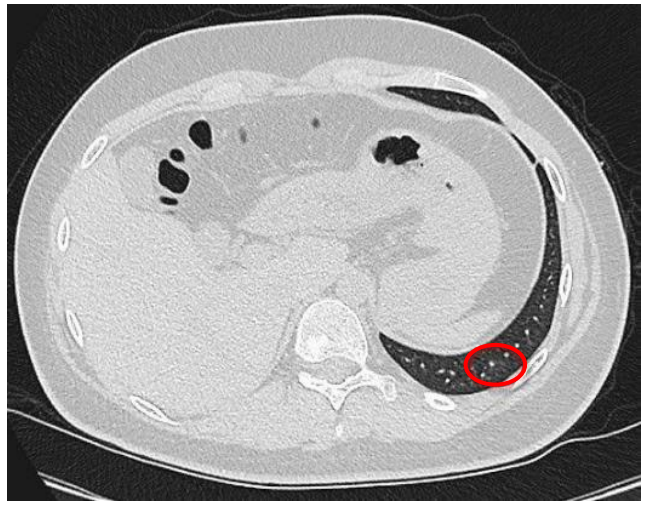
- Received ONCT-216 in final dose-finding cohort (200 mg/m^2/day)
- **Resolution of target lesions after two cycles of single-agent ONCT-216**
  - Treatment well tolerated, with minimal myelosuppression
  - Vincristine added starting in third cycle
- Residual non-target 7mm lung lesion excised after 6 cycles of therapy, leading to **surgical complete remission**
- **Durable complete response for 24 months on treatment, continues with no evidence of disease off all treatments for 4 months**



Baseline

2 cycles single-agent ONCT-216

All target lesions resolved



Ludwig 2021 CTOS presentation

Case Study: Second Complete Response with ONCT-216 in Patient with Metastatic Relapsed/Refractory Ewing Sarcoma

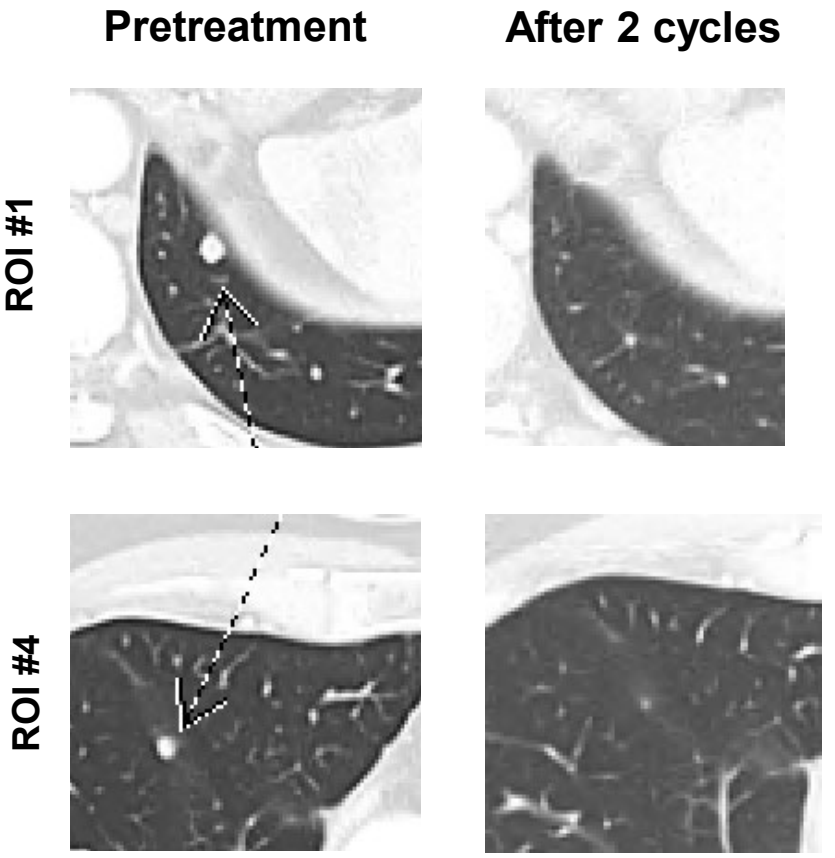
ONCTERNAL therapeutics™

Patient background

- 51-year-old with Ewing sarcoma diagnosed June 2018
- 10-cm tumor near the right kidney and multiple lung metastases
- Extensive prior treatment
  - Chemotherapy: VDC/IE, high-dose ifosfamide
  - Surgery: right nephrectomy and vascular reconstruction
- Recurrence prior to enrollment: Multiple new and enlarging lung lesions

Treatment and outcome

- ONCT-216: Enrolled at MD Anderson Cancer Center in January 2020
  - Treated at RP2D (ONCT-216 200 mg/m2/day for 14 days + vincristine 0.75 mg/m^2 day 1)
  - Myelosuppression in Cycle 1, did not recur in Cycle 2 with growth factor support and no ONCT-216 dose reduction
- **Deep partial response after 2 cycles, with 90% reduction of target lesions, complete response after 6 cycles of therapy**
- **Treatment ongoing, with no evidence of disease at >20 months on study, no vincristine since month 3.7**



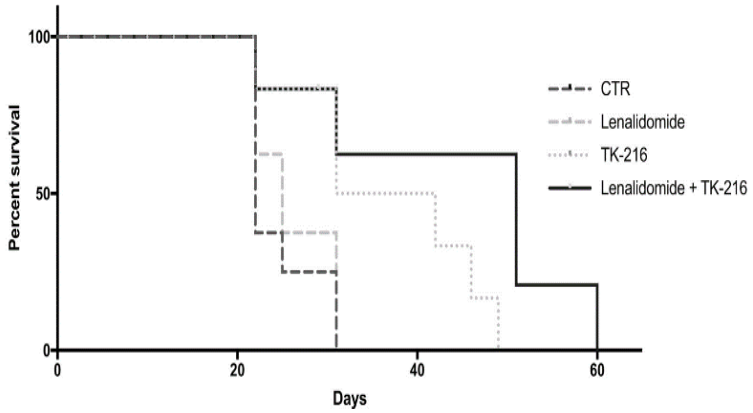
Pre-treatment: each lesion 10 mm
After 2 cycles: one lesion 0 mm, one lesion 2 mm

Ludwig 2021 CTOS presentation

Additional Opportunities for ONCT-216 in Cancers with ETS Alterations

Diffuse Large B-Cell Lymphoma

- 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
- Synergy with lenalidomide and venetoclax shown in preclinical models
- Single agent ONCT-216 and combo therapy demonstrated potent anti-tumor activity in DLBCL xenograft model

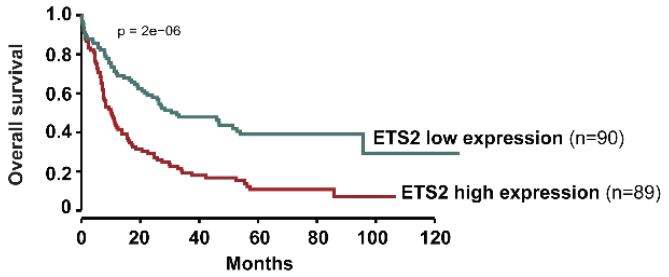


Spriano 2019 CCR

Acute Myeloid Leukemia

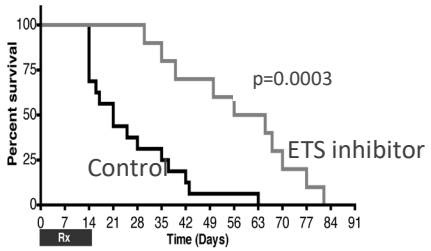
ETS family proteins overexpressed in ~30% of AML cases

- ETS2 overexpression associated w/ shorter OS



Fu 2017 JTranslMed

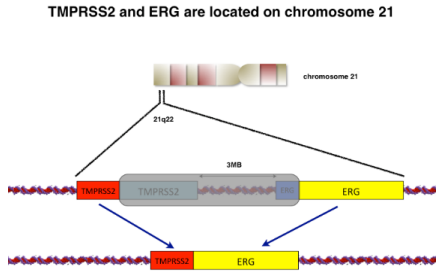
- ETS Sensitivity of AML cell lines to ONCT-216 was proportional to level of ETS overexpression
- ETS inhibition using ONCT-216 precursor prolonged survival in EWS-FLI1 transgenic AML model



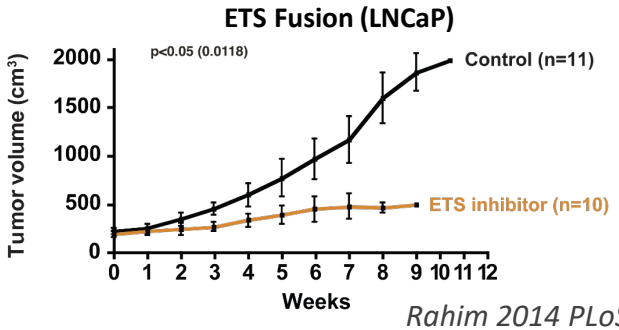
Minas 2015 Oncotarget

Prostate Cancer

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



- ETS inhibition using ONCT-216 precursor demonstrated anti-tumor activity in human prostate cancer xenograft model



Rahim 2014 PLoS One

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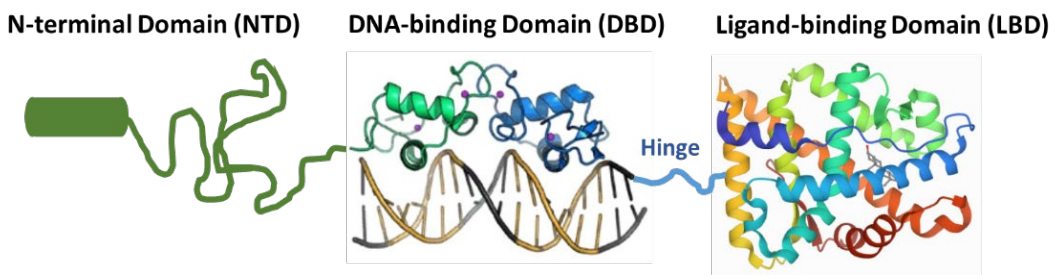
ONCT-534: Dual-Action Androgen Receptor Inhibitor (DAARI)

Differentiated Mechanism of Action

- ONCT-534 binds to both N-terminal Domain (NTD) and Ligand-Binding Domain (LBD) of the androgen receptor (AR) and induces AR degradation
- NTD binding potentially relevant to activity against splice-variants
- Current standard of care treatment options, such as enzalutamide or apalutamide, bind to LBD only



Potential to address unmet needs in prostate cancer

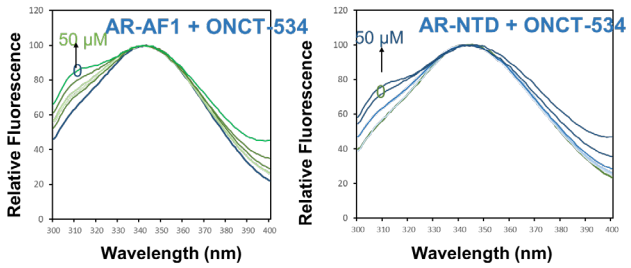
- Potential next-generation treatment option for patients with advanced prostate cancer
  - Focus on addressing emerging unmet medical need related to resistant androgen receptor splice variant (AR-SV)-expressing tumors(1)
- Strong preclinical efficacy in vitro and in vivo
  - Activity against enzalutamide-sensitive and enzalutamide-resistant models, including AR-SV-expressing tumors
- Potential in other AR-driven disease, including luminal AR-triple negative breast cancer (LAR-TNBC) and non-oncology indications

(1) Antonarakis NEJM 2014

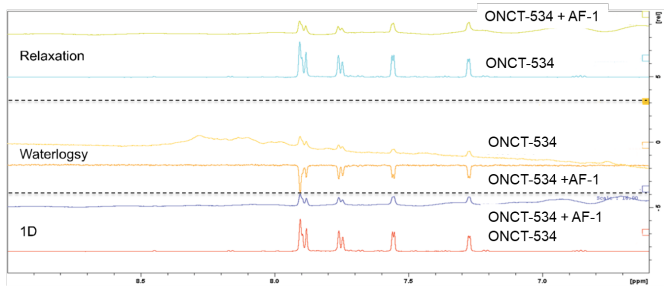
ONCT-534 in-vivo data show potential as treatment option for splice variant-expressing prostate cancers

Biophysical studies suggest ONCT-534 interacts with AR N-terminus (AF-1)

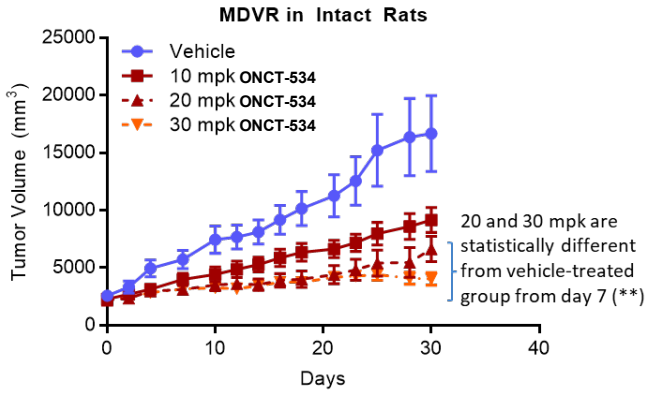
Fluorescence polarization studies with purified AR AF-1

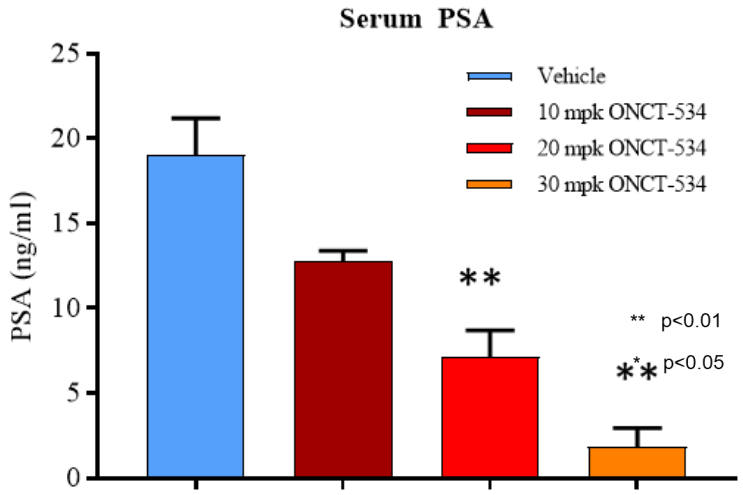


NMR with purified AR AF-1 protein in the presence or absence of ONCT-534



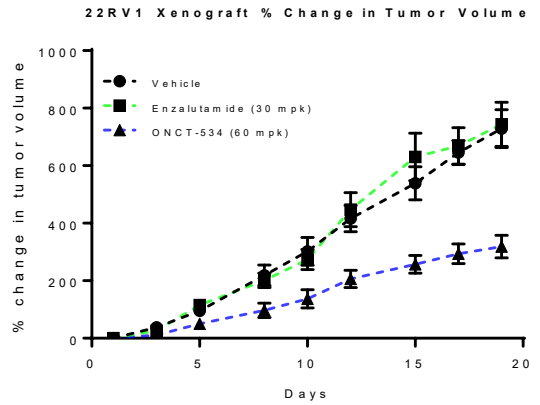
Inhibition of enzalutamide-resistant PCa Xenograft in non-castrated animals



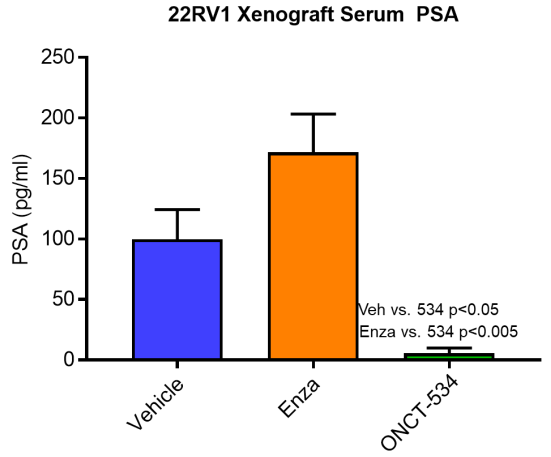


Anti-tumor activity against AR-Variant 7 (AR-V7) xenografts in castrated animals

Inhibition of AR-V7-Positive 22RV1 CRPC Xenograft



Lowering of Serum PSA Levels in 22Rv1 Tumors



Source: Narayanan, Virtual Poster Presentation at 2021 AACR-NCI-EORTC Virtual International Conference on Molecular Targets

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Financial Information

Description	Ticker: ONCT (Nasdaq)
Cash & Cash Investments @ December 31, 2021 Cash Runway into mid-2023	$90.8M
Debt	$0M
Capitalization:	
Common Shares Outstanding	49.4M
Options / Warrants in the Money @ December 31, 2021(1)	0.4M
Fully Diluted in the Money	49.8M
Non-Dilutive Support	
• CIRM Grant for CIRLL Study thru March 2022	~$14M
• Ibrutinib CTM for CIRLL Study	Supply Agreement

(1) Excludes out-of-the-money stock options and warrants totaling ~10.3M

Anticipated Pipeline Milestones

ONCTERNAL therapeutics™

Zilovertamab

- MCL global registrational Phase 3 Study Zilo-301 initiation — **2Q 2022**
- MCL & CLL clinical data update for ongoing Phase 2 — **2Q 2022**
- Prostate cancer mCRPC IST Phase 2 enrollment — **mid 2022**
- HER2-negative breast cancer IST clinical data update — **Fully Enrolled**

ONCT-808 ROR1 CAR-T cell therapy

- B-Cell malignancies IND submission — **mid 2022**

ONCT-216

- Ewing sarcoma dose-intensive cohort interim data — **4Q 2022**

ONCT-534

- Prostate cancer IND-enabling preclinical development — **Ongoing**

Corporate Highlights

ZILOVERTAMAB (FORMERLY CIRMTUZUMAB): POTENTIALLY FIRST-IN-CLASS MONOCLONAL ANTIBODY TARGETING ROR1

- Latest results for zilovertamab + ibrutinib in patients with MCL/CLL compare favorably to historical single-agent ibrutinib
- Agreement with U.S. FDA on Phase 3 registrational study design for the treatment of patients with R/R MCL

ONCT-808: AUTOLOGOUS CAR-T CELL THERAPY TARGETING ROR1

- IND-enabling activities supported by Lentigen (lentivirus manufacturing) and Miltenyi Biotec (process development)
- Research collaborations for next-gen allogeneic CAR-T and CAR-NK cell therapies with Karolinska Institutet & Celularity

ONCT-216 (FORMERLY TK216): TARGETED ETS INHIBITOR

- Two durable complete responses in patients with metastatic relapsed/refractory Ewing sarcoma in ongoing Phase 1/2
- Additional opportunities in ETS-driven tumor indications

ONCT-534 (FORMERLY GTX-534): DUAL-ACTION ANDROGEN RECEPTOR INHIBITOR (DAARI)

- Pre-clinical data in prostate cancer models suggest activity against tumors expressing androgen receptor splice variants

MULTIPLE DATA CATALYSTS

- Expected initiation of zilovertamab + ibrutinib global registrational Phase 3 Study ZILO-301 in 2Q 2022
- Clinical data updates in MCL, CLL, breast cancer and Ewing sarcoma
- ONCT-808 ROR1 CAR-T cell therapy IND submission planned in mid 2022