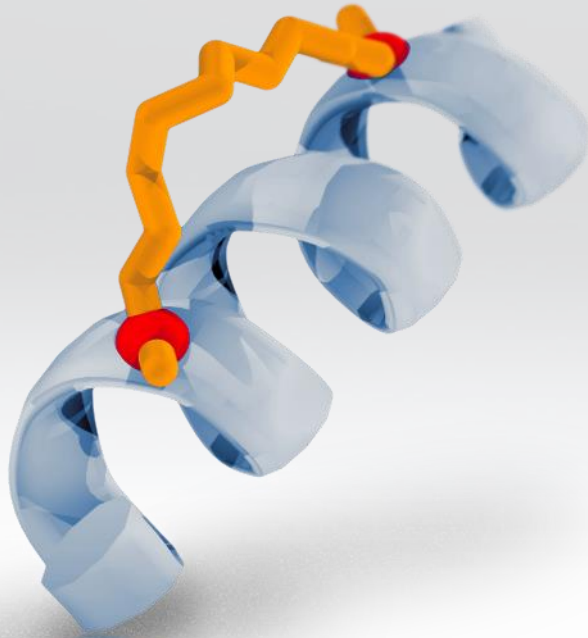
AILERON THERAPEUTICS

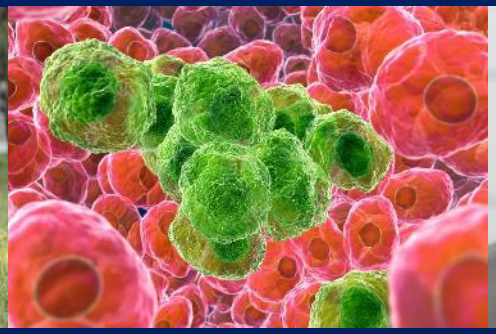


Canaccord|Genuity 38th Annual Growth Conference August 9, Boston, MA

Manuel Aivado, MD, PhD
SVP, Chief Medical and Chief Scientific Officer

Donald Dougherty, CFA, CPA
SVP, Chief Financial Officer



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This presentation also contains market data and other statistical information that are based on independent industry publications, reports by market research firms or published independent sources. Some market data and statistical information are also based on the Company's good faith estimates, which are derived from management's knowledge of its industry and such independent sources referred to above. While the Company is not aware of any misstatements regarding the market and industry data presented herein, such data involve risks and uncertainties and are subject to change based on various factors, including those discussed under the headings “Forward-Looking Statements” and “Risk Factors” in the Company’s quarterly report on Form 10-Q.

Aileron - Corporate Highlights

- Clinical-stage **leader in stapled peptide therapeutics** for cancer and other diseases
- Our lead anti-tumor clinical candidate ALRN-6924
  - has potential to be the **best-in-class** p53 reactivator, and
  - is the **only** dual MDMX/MDM2 inhibitor in clinical development
- **Clinical proof-of-concept with multiple complete and partial remissions** showing that stapled peptides successfully engage with intracellular targets
- Preclinical data and clinical safety profile support clinical evaluation of **combination therapies with anti-PD-L1, CDK4/6 inhibitors, and paclitaxel**
- **Over 200 US and foreign patents** protecting ALRN-6924 and the stapled peptide platform
- $36m in cash and equivalents as of June 30, 2018. Expected cash runway into 2H 2019

Aileron Pipeline:

Program	Indication	Discovery	Preclinical	Phase 1	Phase 2
ALRN-6924 **Dual MDMX- and MDM2 Antagonist**	All-comers solid tumors & lymphomas				Enrollment completed patients ongoing
	PTCL				
	AML & MDS				
	AML & MDS (+ Ara-C)				
	MDM2↑ tumors (+ CDK4/6i)				
	Solid tumors (+ anti-PD-L1)				
	Breast cancer (+ Paclitaxel)			Investigator-initiated trials planned with MD Anderson, Dana-Farber	
	Pediatric solid tumors (Mono)				
	Pediatric leukemias (+ Ara-C)				
Bcl-2/Mcl-1 Dual Inhibitor **ß-catenin**	Solid & liquid tumors				
StAMPs	Gram-negative infections				

PTCL: Peripheral T-cell Lymphoma; AML: Acute Myeloid Leukemia; MDS: Myelodysplastic Syndrome; StAMPs: Stapled Anti-Microbial Peptides; MDM2↑: MDM2 amplified

ALRN-6924 Clinical Trials Summary

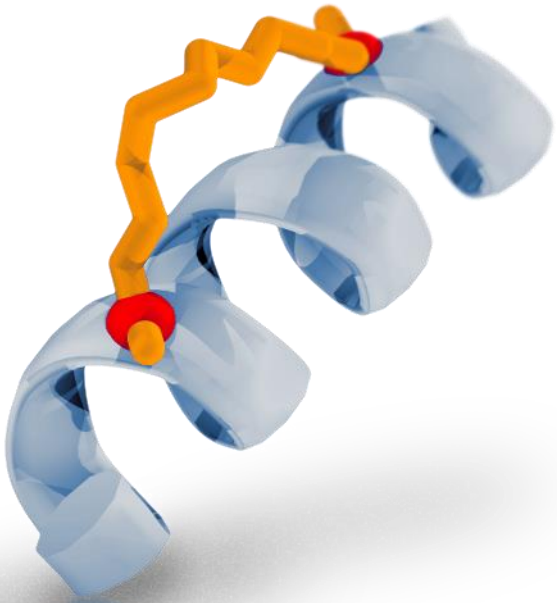
Where we've been: Completed trials	• 71 patient Ph1 First-In-Human dose-escalation in all-comers
	• QWx3* Ph2a monotherapy expansion in PTCL
	  • Overall Response Rate = 21%, Disease Control Rate = 36%
	• QWx3 Ph1/1b monotherapy + Ara-C combo dose-escalation in AML/MDS
	  • Recommended phase 2 combo dose determined

Where we are: Ongoing trials	• TIWx1 Ph2a monotherapy expansion in PTCL • TIWx2 Ph1 monotherapy dose-escalation in AML/MDS • QWx3 Ph1b Ara-C combo expansion cohort in MDS
Where we're going: New trials	• Combo trial with CDK4/6 inhibitor in MDM2-amplified cancers • Combo trial with anti-PD-L1 in cancers that failed anti-PD-L1 mono • Ph1b with Paclitaxel in metastatic breast cancer (MD Anderson-initiated, single center) • Ph1/1b with Ara-C in pediatric solid tumors (mono) and leukemias (with Ara-C) (DFCI-initiated, multi-center: UCSF, Baylor, UPenn)

(Data as of July 13, 2018)

*QWx3: days 1,8,15 on a 28-day cycle
TIWx1: days 1,3,5 on a 21-day cycle
TIWx2: days 1,3,5,8,10,12 on a 21-day cycle

Stapled Peptide Technology



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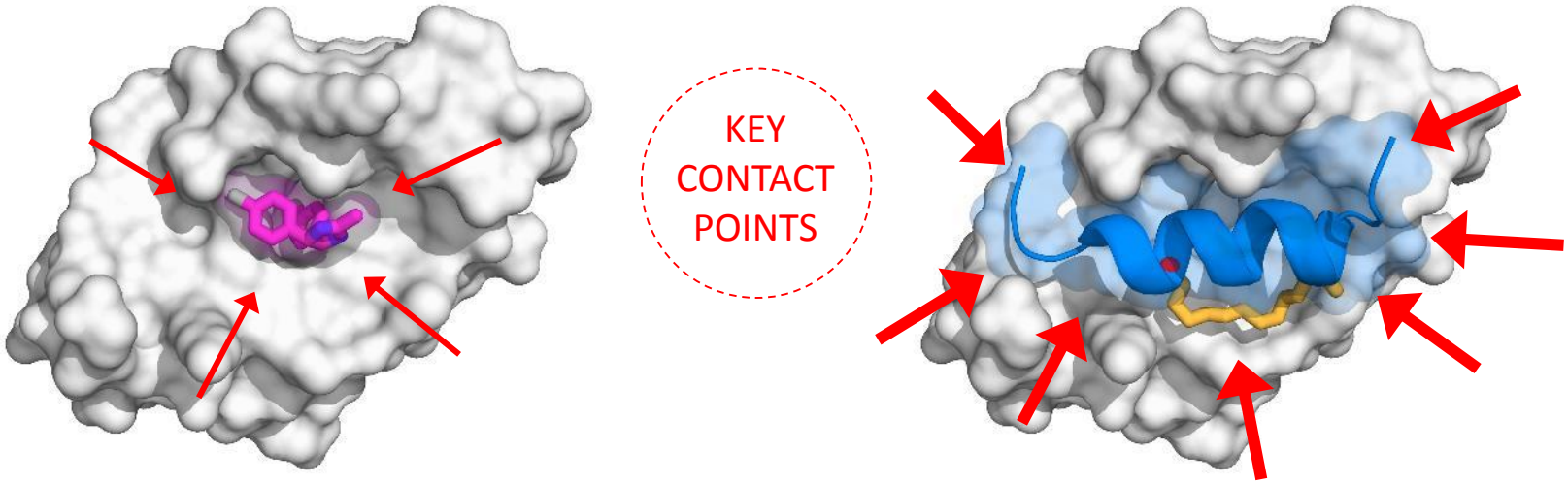
THERAPEUTICS

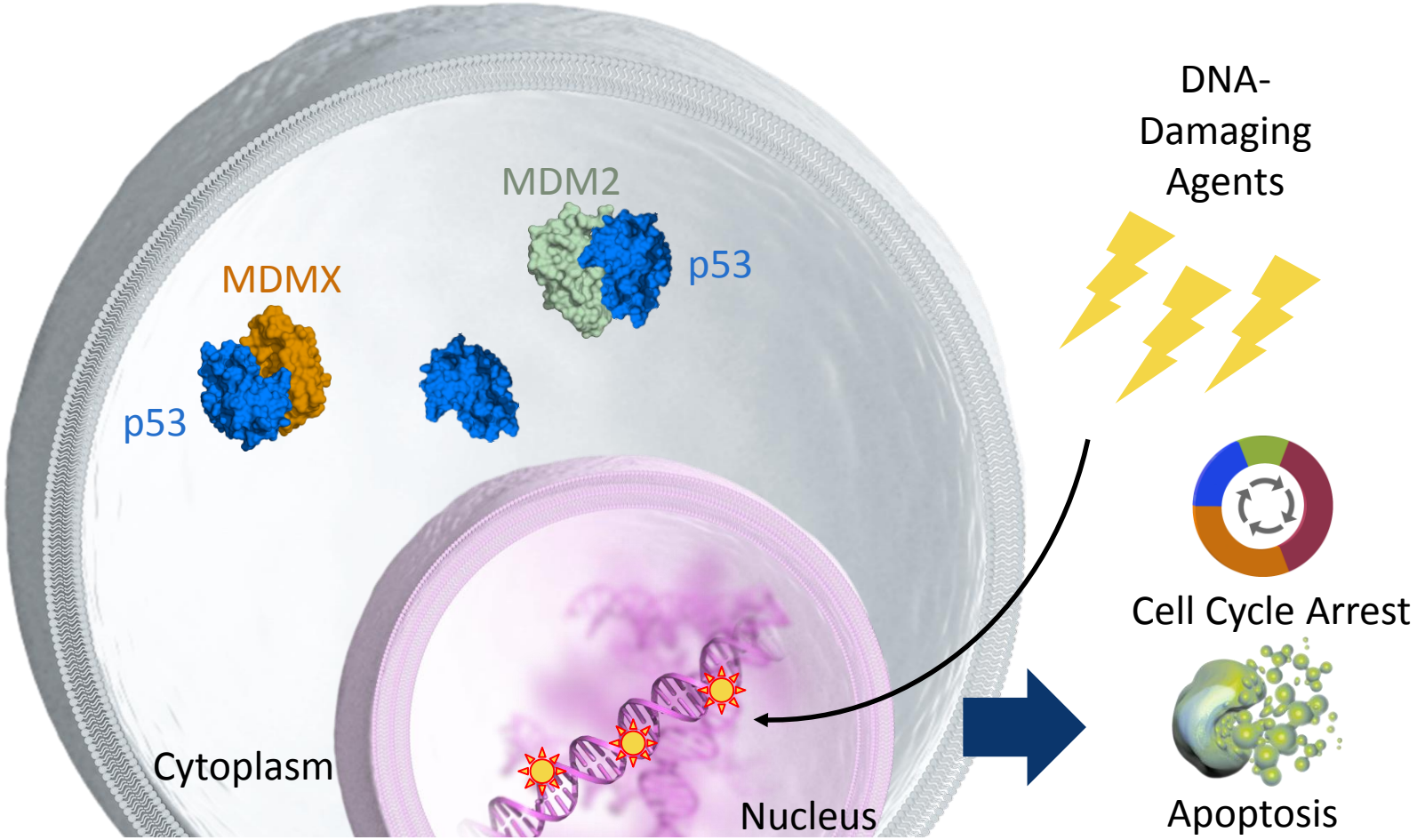
Stapled peptides bind intracellular targets that are undruggable with small molecules

SMALL MOLECULES:
Not enough contact points to bind

STAPLED PEPTIDES:
Able to bind entire interaction surface

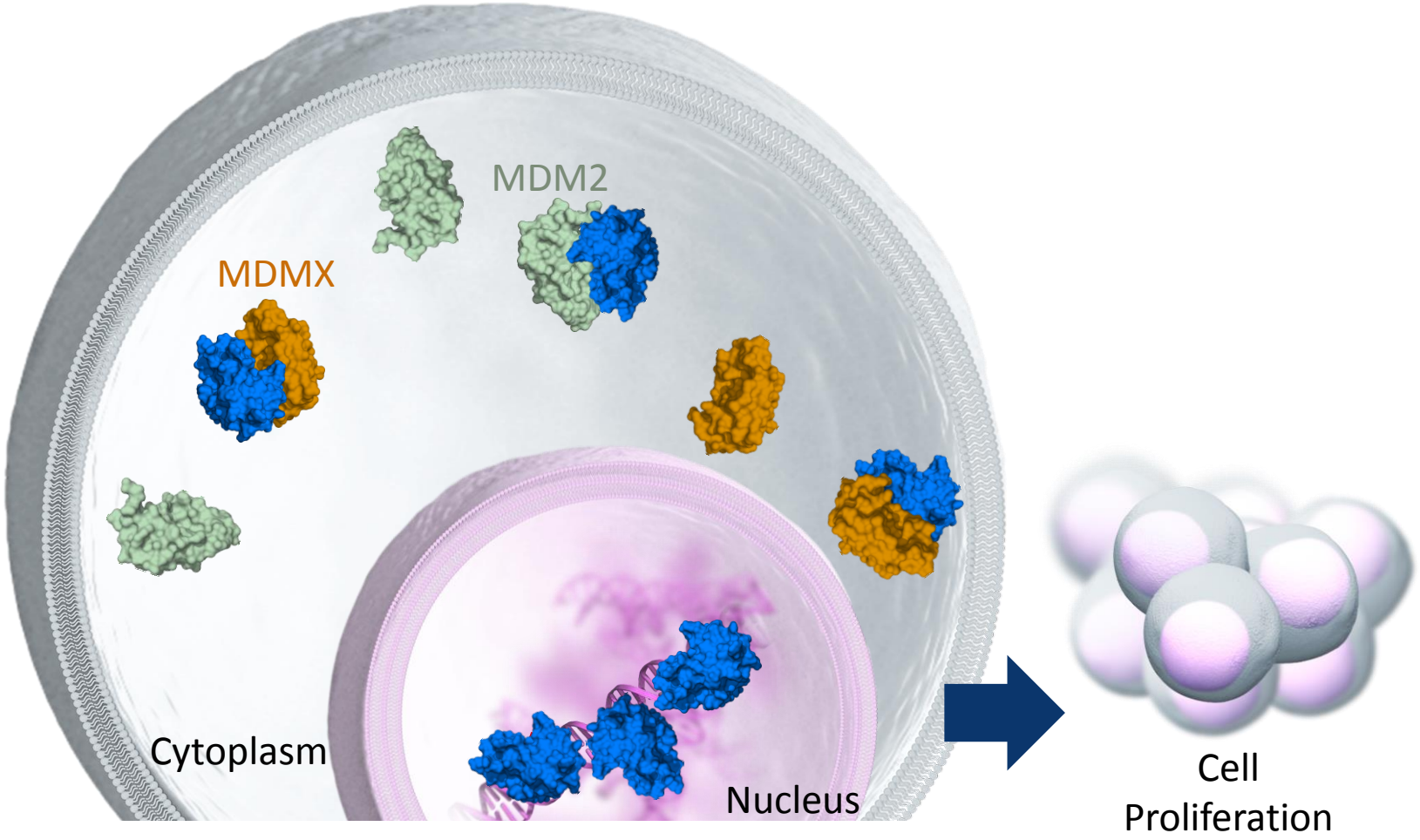


Opportunity: Reactivating p53, the “Guardian of the Genome”



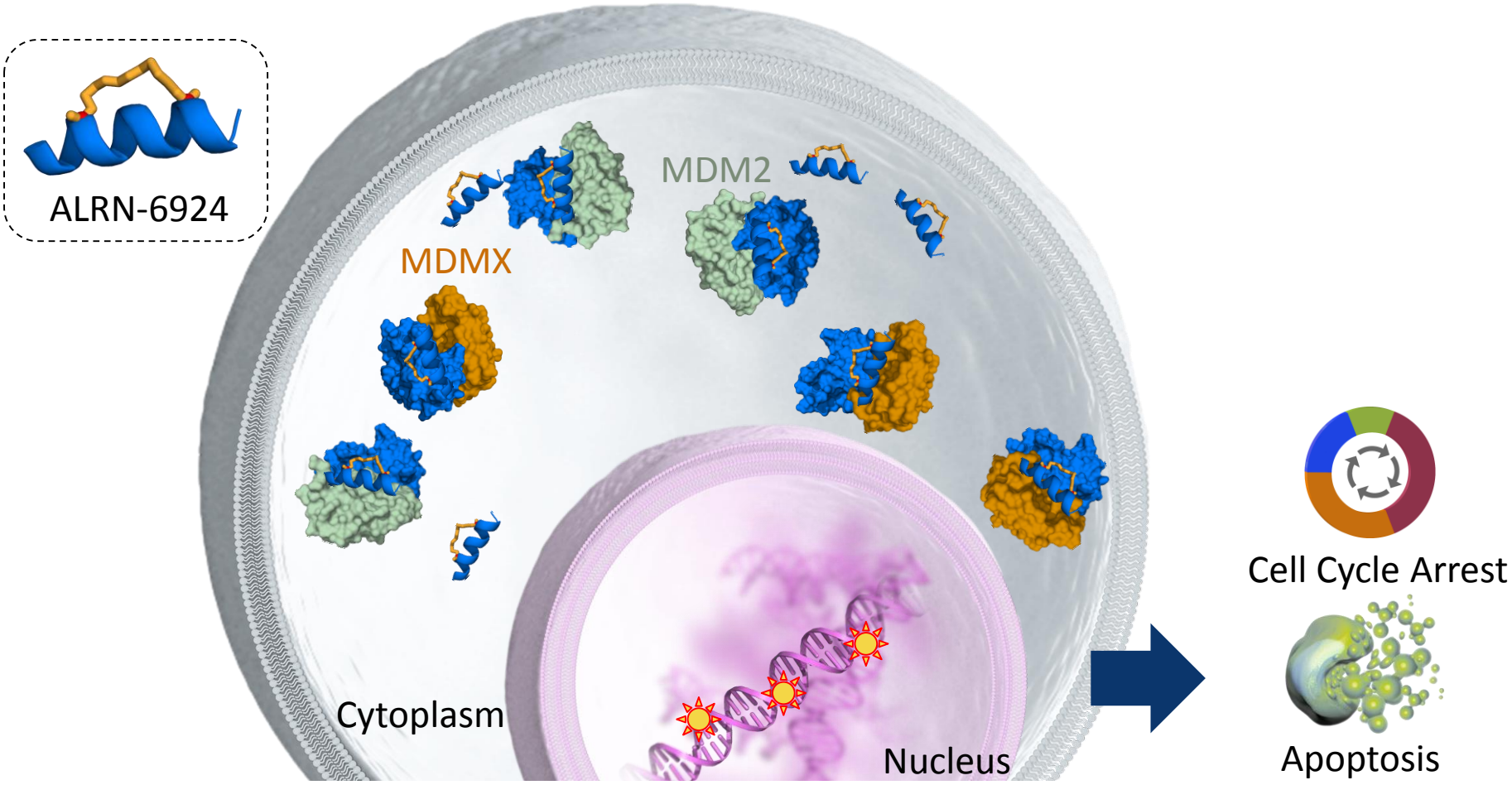
DNA damage activates p53, inducing cell cycle arrest and apoptosis

Opportunity: Reactivating p53, the “Guardian of the Genome”



MDMX + MDM2 overexpression sequesters p53, leading to cell survival and proliferation

Opportunity: Reactivating p53, the “Guardian of the Genome”



ALRN-6924 is a decoy that mimics p53 and selectively binds to MDMX + MDM2, releasing and reactivating p53 to induce cell cycle arrest and apoptosis

ALRN-6924 Collaborative Research – Two high-profile papers in 2018

April 2018

SCIENCE TRANSLATIONAL MEDICINE | RESEARCH ARTICLE

CANCER

Dual inhibition of MDMX and MDM2 as a therapeutic strategy in leukemia

Luis A. Carvajal et al

May 2018

Targetable vulnerabilities in T-and NK-cell lymphomas identified through preclinical models

Samuel Y. Ng et al

AILERON THERAPEUTICS

ALRN-6924: Externally Recognized & Validated Science

Presentations and Awards

ASCO 2017

Oral presentation and selected for "Best of ASCO"

ISEH 2017

Oral presentation and gold medal investigator award

ASH 2017

Two oral presentations

Editorial Highlights

Journal of Clinical Oncology

Clinical Cancer Advances 2018

Heymach et al., JCO 2018 Apr 1;36(10):1040

nature reviews DRUG DISCOVERY

Constrained peptides' time to shine?

Chris Morrison, Nature Reviews Drug Discovery, July 2018

The Hematologist
ASH NEWS AND REPORTS®

New Means to Reactivate p53 in Leukemia: A Stapled Peptide Inhibitor of MDMX & MDM2

Omar Abdel-Wahab, MD, The Hematologist, July 2018

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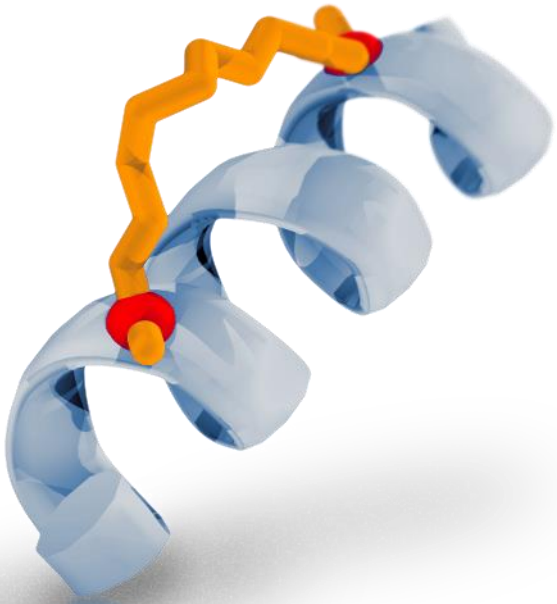
Data from Clinical Trials with ALRN-6924



AILERON THERAPEUTICS

ALRN-6924 First-in-Human: IV Drug with Favorable Safety Profile

Trial Design:

- Dose-escalation in patients with solid tumors or lymphomas
- Endpoints: Safety, PK, preliminary efficacy in p53 wild type cancers
- Testing ALRN-6924 as once-a-week (QW) or twice-a-week (BIW) infusion:
  - QW = Days 1, 8, and 15 every 28 days; BIW = Days 1, 4, 8, and 11 every 21 days
- Enrolled 71 patients

Safety Results:

- Less than 5% of patients experienced a treatment-related SAE
- Most frequent treatment-related adverse events were mild/moderate gastrointestinal side effects, fatigue, anemia and headache. QW and BIW not significantly different.
- **Unlike Ph1 trials with other MDM2 targeting agents**, no DLTs due to thrombocytopenia
  - MDM2i's ≥ G3 thrombocytopenia: 15-33%; ≥ G3 neutropenia: 12-23%
  - ALRN-6924 ≥ G3 thrombocytopenia: 0%, ≥ G3 neutropenia: 3%

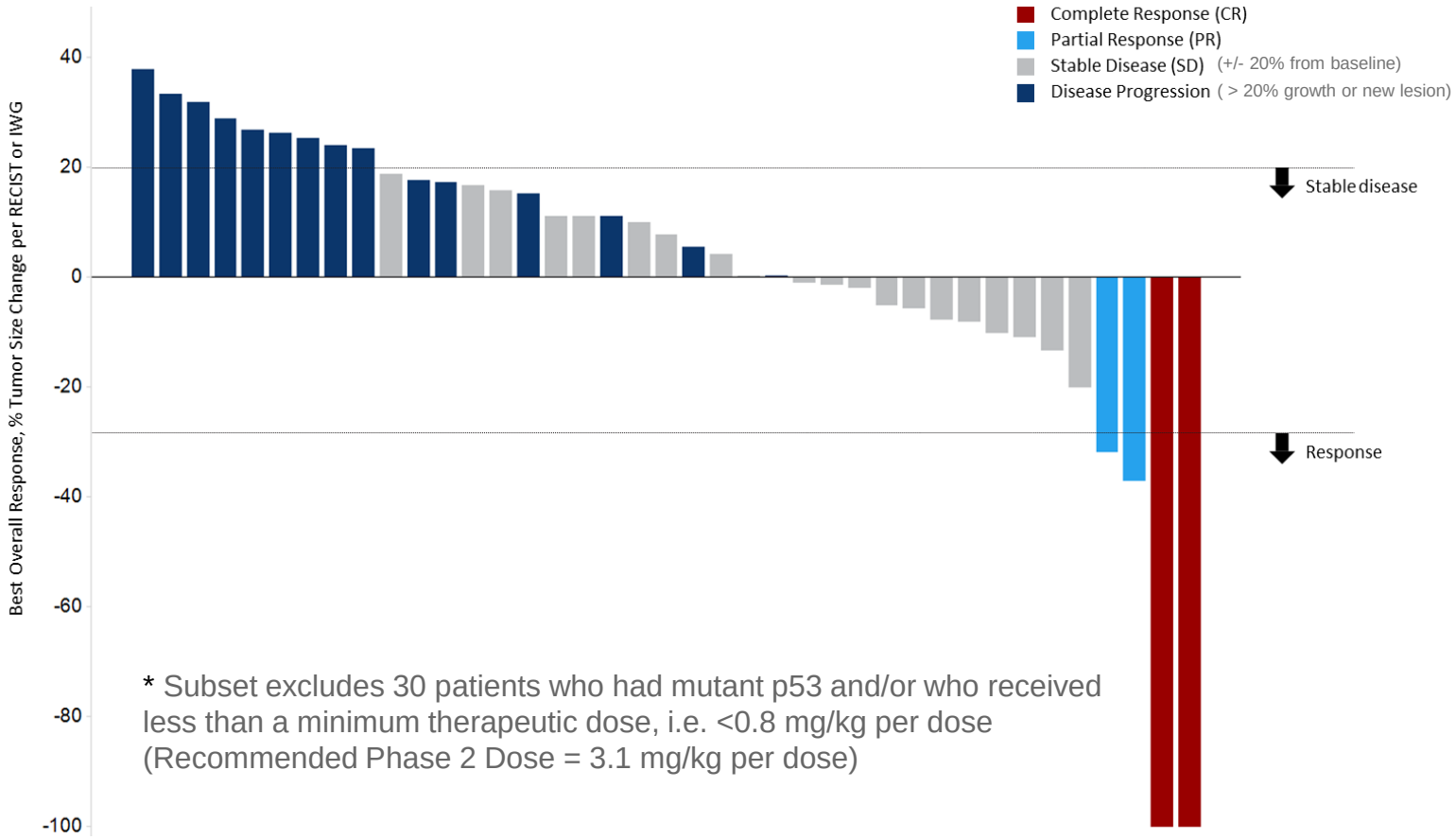
(Data as of February 26, 2018)

AILERON THERAPEUTICS

ALRN-6924 First-in-Human:
59% Disease Control Rate - 13 Different Cancer Types

2 patients with CRs, 2 with PRs, 11 others experienced tumor reduction. 5 ongoing, 10 treated 6-32+ months

Subset of 41 evaluable patients*:

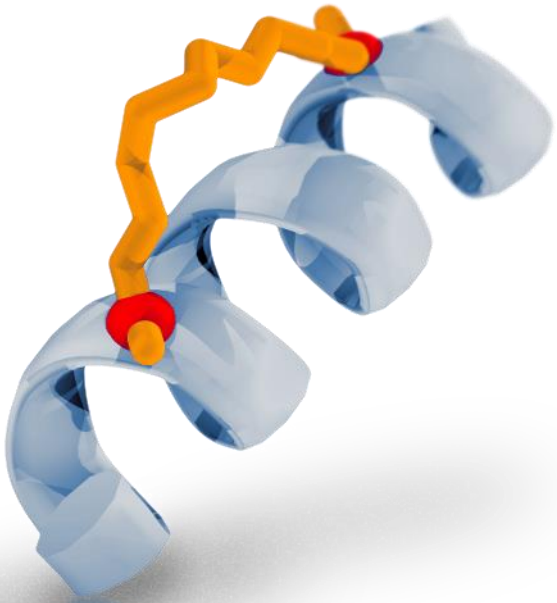


* Subset excludes 30 patients who had mutant p53 and/or who received less than a minimum therapeutic dose, i.e. <0.8 mg/kg per dose (Recommended Phase 2 Dose = 3.1 mg/kg per dose)

(Data as of February 26, 2018)

AILERON THERAPEUTICS

ALRN-6924 Phase 2a for Peripheral T-cell Lymphoma



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Significant Unmet Need Exists in 2nd Line PTCL

Market Opportunity

- 10-15% of all NHL are Peripheral T-cell Lymphoma
- PTCL: approx. 7,200 – 10,800 cases (US annually)
- Prognosis: post 1st-line treatment, median overall survival of relapsed/refractory pts ≈ 5.5 months

Rationale for Pursuing PTCL

- Unmet medical need
  - Significant percentage of 2nd-line pts pursue experimental options
- Fast-to-market regulatory potential
  - Pivotal single arm study, relatively low patient number precedent
- Aileron preclinical & clinical data

(Data as of July 13, 2018)

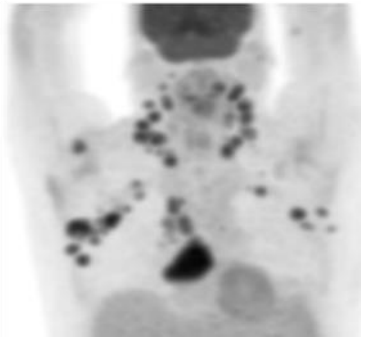
AILERON THERAPEUTICS

ALRN-6924 Achieves Proof-of-Concept in 2nd Line Treatment of PTCL

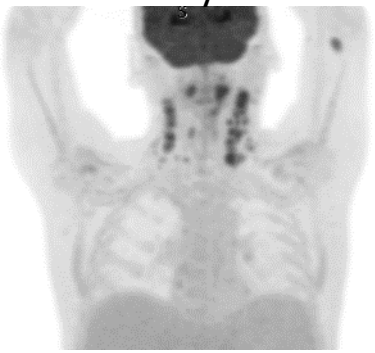
- Phase 2a QWx3 cohort accrual complete; TIWx1 cohort ongoing
  - QWx3: 21% ORR + 36% DCR (14 eval. pts)
- Pseudoprogression shows immune effects of p53 reactivation. 3 pts continued treatment to achieve response

Scans from PTCL pt achieving PR:

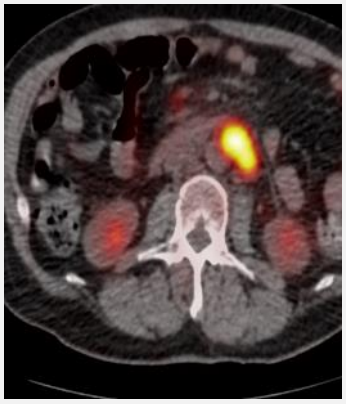
Baseline

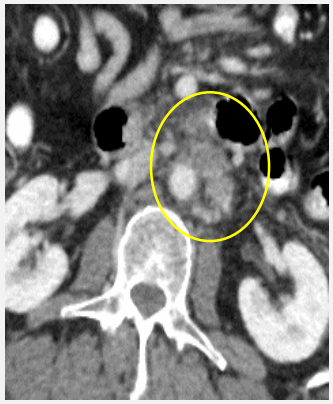


Post Cycle 6



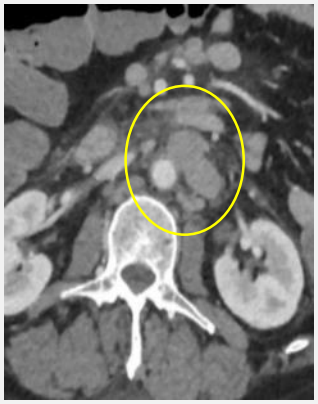
Baseline PET-CT





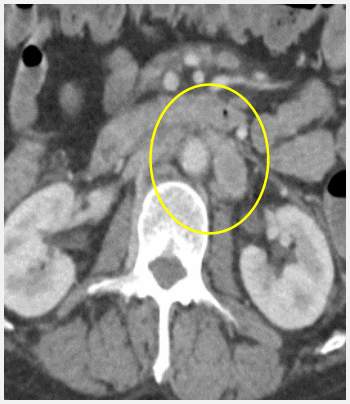
33 x 17 mm = 561 mm^2

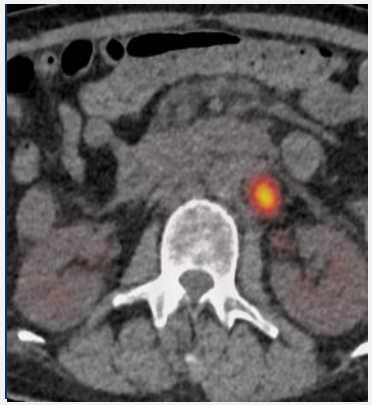
Day 11 CT-only



39 x 21 mm = 819 mm2

Post Cycle 3 PET-CT



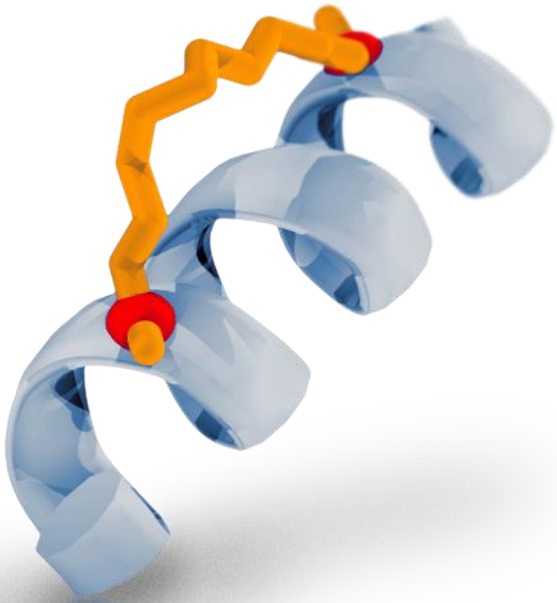


25 x17 mm = 425 mm2

(Data as of July 13, 2018)

AILERON THERAPEUTICS

ALRN-6924 Phase 1/1b for relapsed/refractory AML or advanced MDS



AILERON THERAPEUTICS

AML/MDS: Significant Unmet Need in 25K+ Elderly Patients

Market Opportunity

- ≈ 33,000 new cases of AML and MDS (U.S.) annually, vast majority are elderly patients (ACS & NIH SEER database)
- Elderly AML: 5-year survival is 6%
- MDS relapsed/refractory to hypomethylating agents: 4 months median overall survival

Rationale for Pursuing AML/MDS

- Unmet medical need
  - Limited Options for elderly pts
- Third party clinical data
  - Several MDM2-only inhibitors show efficacy
- Aileron preclinical & clinical data

(Data as of July 13, 2018)

AILERON THERAPEUTICS

ALRN-6924 for relapsed/refractory AML or advanced MDS

Monotherapy	• Completed accrual up to 5.8 mg/kg, 1x/week for 3 weeks (QWx3), every 28 d
	  • *2 pts with ≈50% bone marrow blast reduction*
	  • *No DLTs*
	• Ongoing: 3x/week for 2 weeks (TIWx2), every 21 d
	  • *At 3.8 mg/kg, TIWx2, one of 3 patients died from tumor lysis syndrome, which was related to ALRN-6924*
	  • *Trial continues: 3 add'l pts treated at 2.7 mg/kg*

Combination with AraC, 100-200 mg/m^2	• Completed accrual in dose escalation:
	  • *2 marrow CRs out of 4 MDS pts in QWx3 every 28 d 4.4 mg/kg ALRN-6924 + 200 mg/m^2 AraC cohort*
	  • *No DLTs*
	• Ongoing: expansion of '4.4 + 200' cohort in MDS

(Data as of July 13, 2018)

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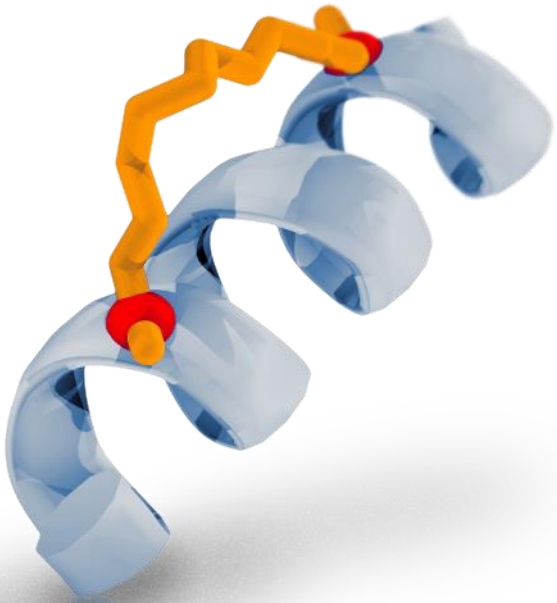
Combination Therapies with ALRN-6924



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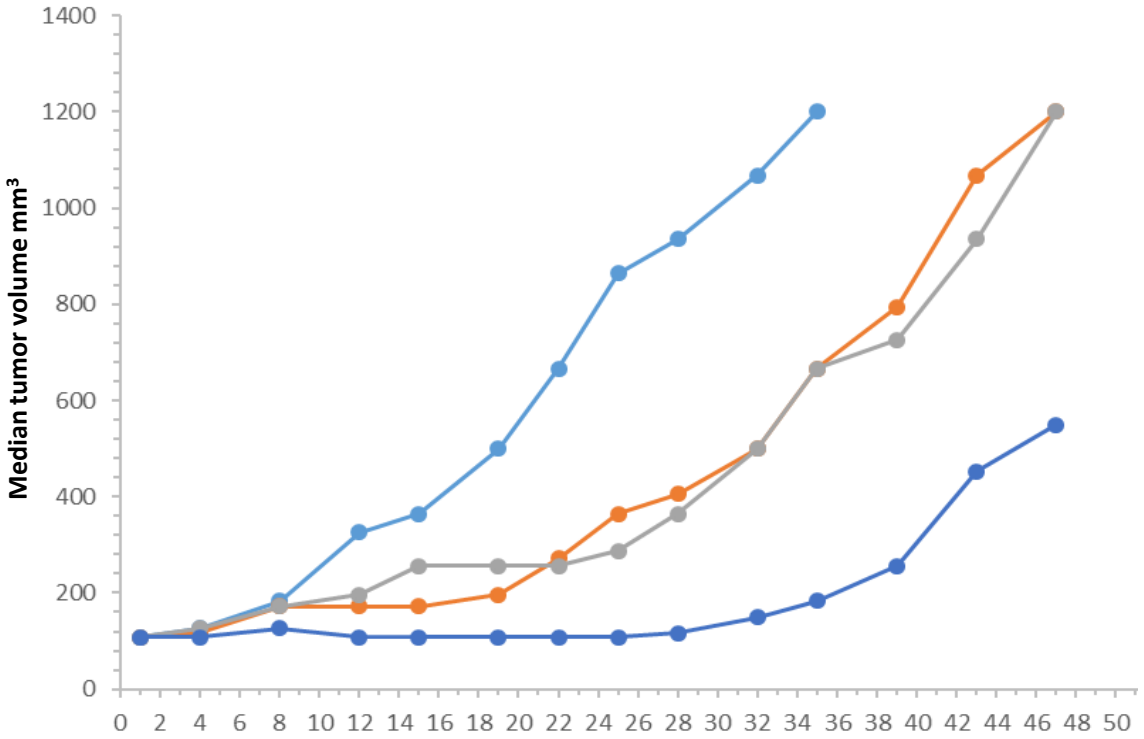
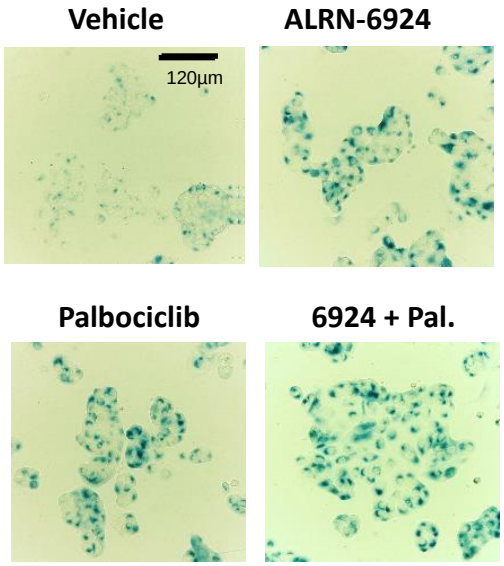
Combining a CDK4/6 inhibitor with ALRN-6924 yielded superior anti-tumor activity vs. either single agent alone in preclinical models

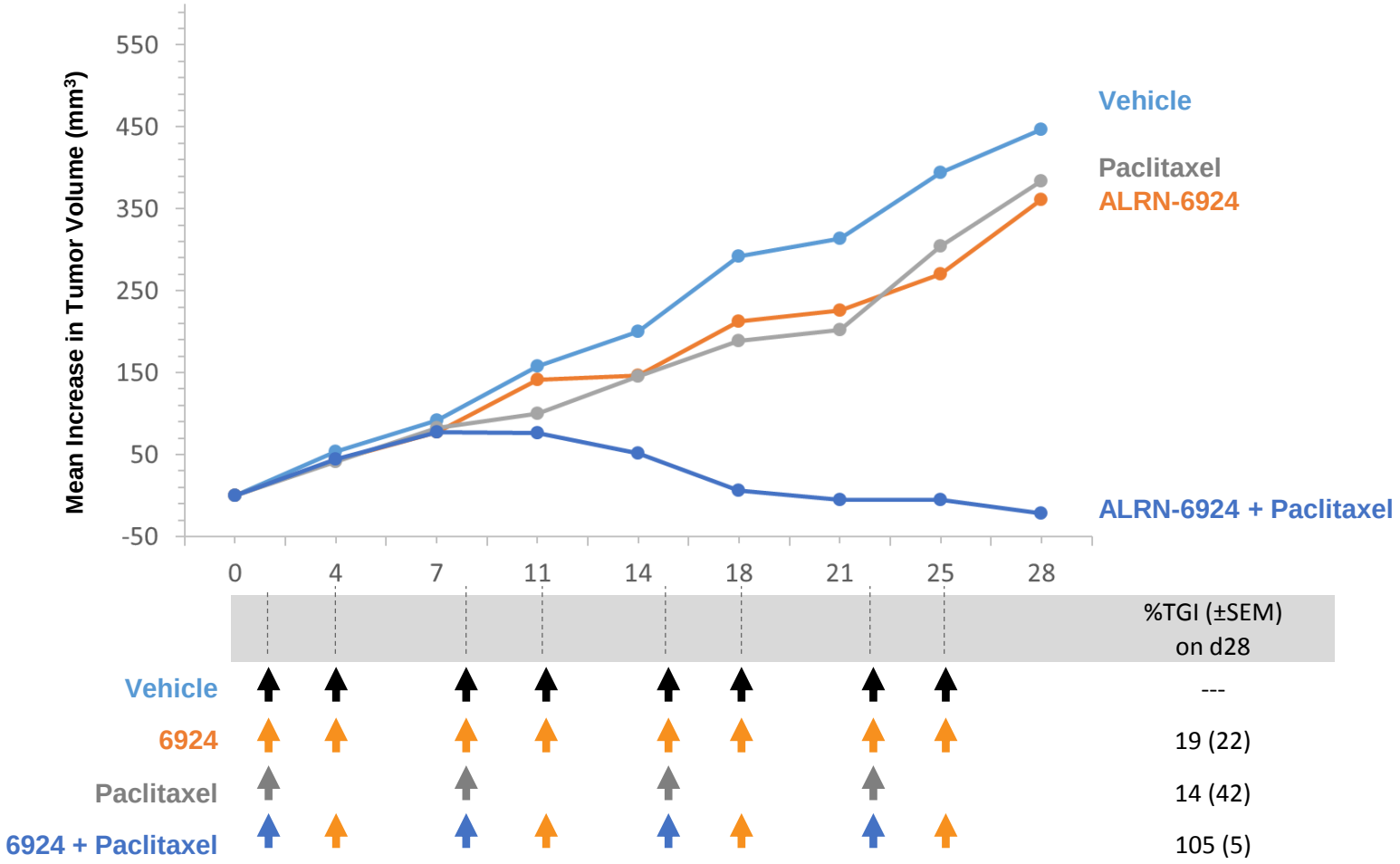


	%TGI (±SEM) on d22	Median days to >500 mm³	Median days to >1000 mm³
Vehicle	---	20	29
6924	65 (5)	31	44
Palbo	80 (3)	32	45
6924 + Palbo	94 (2)	42	*Not reached*

Senescence in MCF-7 breast cancer cells visualized with ß-galactosidase:

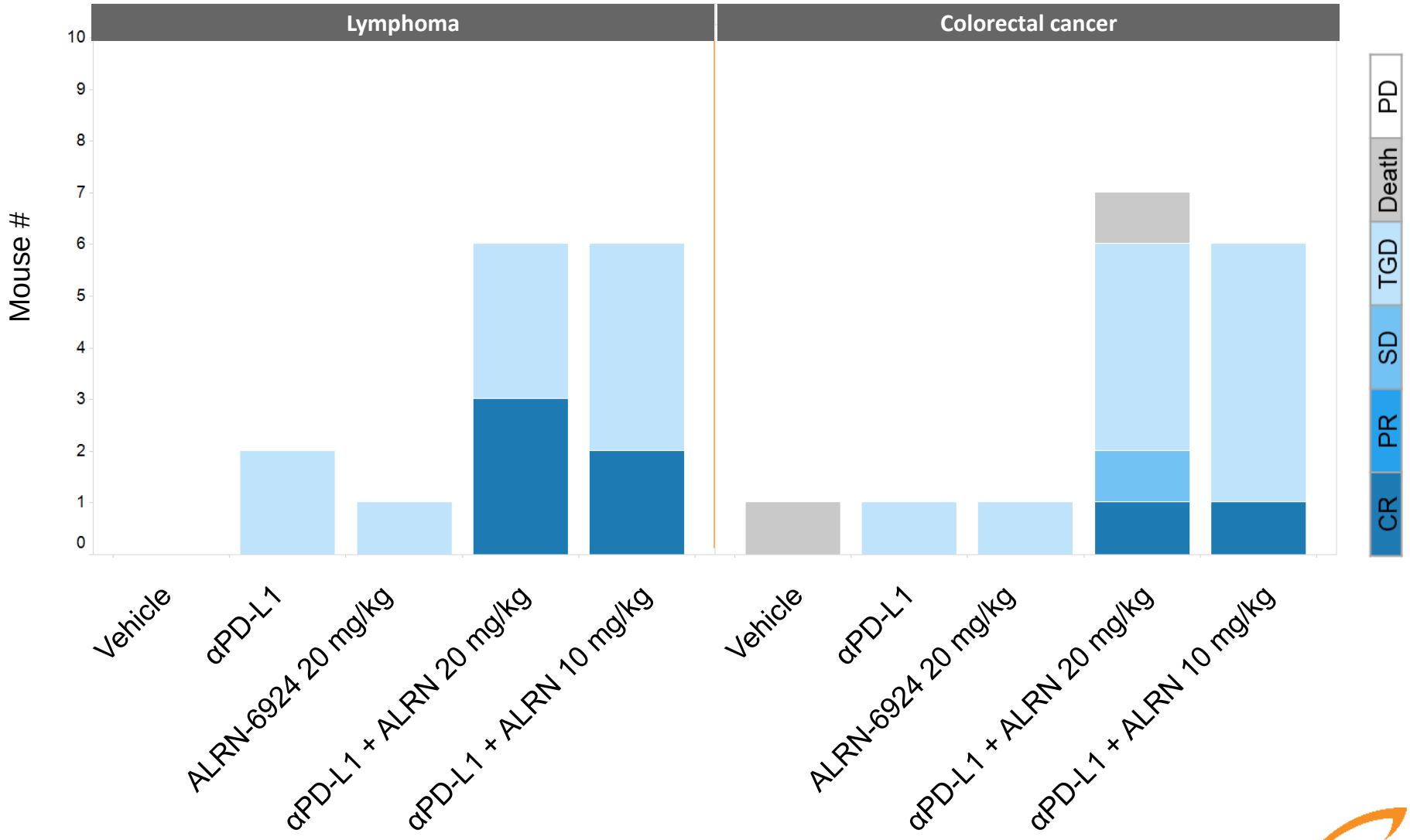


Combining paclitaxel with ALRN-6924 yields superior anti-tumor activity vs. either single agent alone in preclinical models



Data courtesy of Dr. Funda Meric-Bernstam, MD Anderson Cancer Center

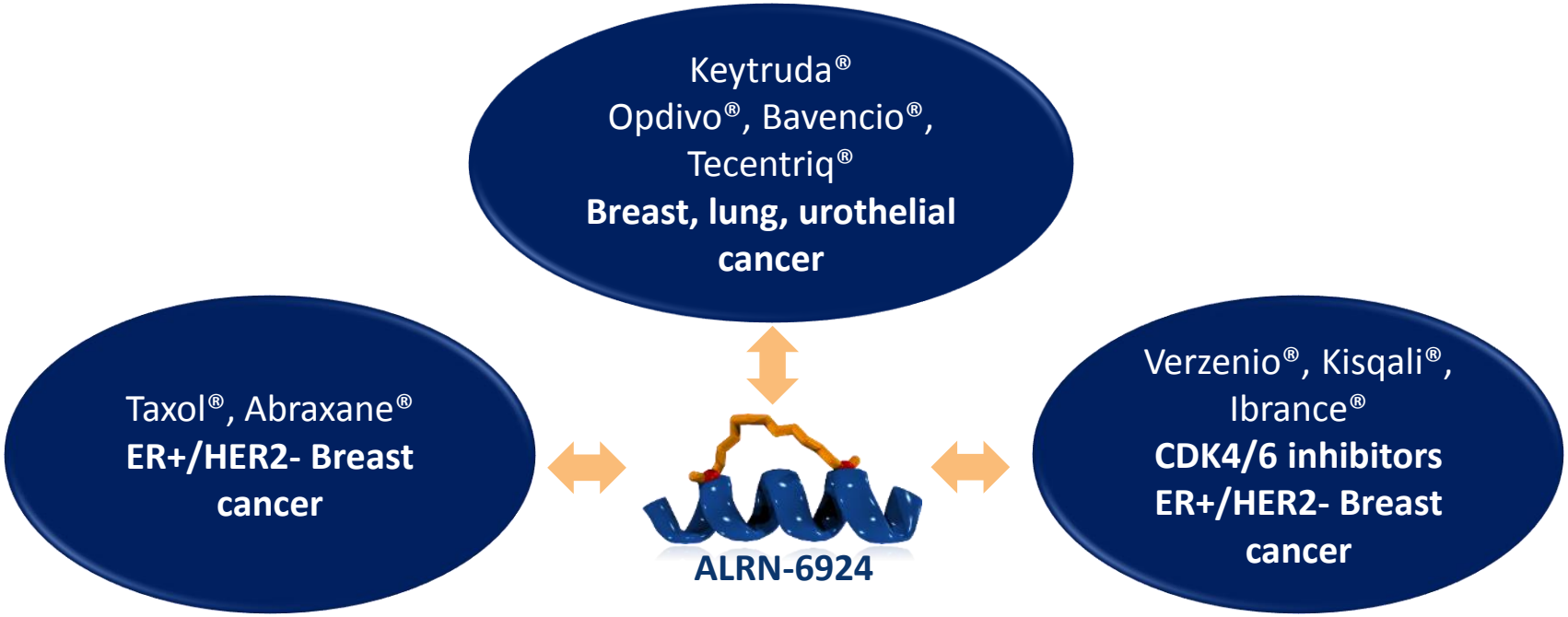
Combining anti-PD-L1 with ALRN-6924 yielded superior anti-tumor activity vs. either single agent alone in preclinical models



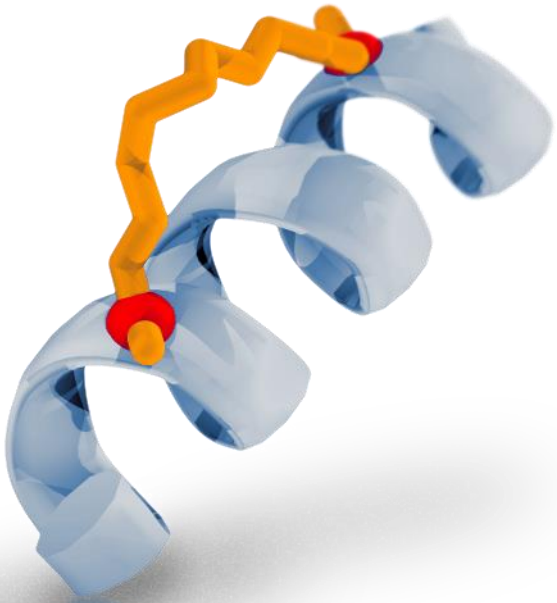
Combination Therapy Opportunities for Solid Tumors

Rationale:

- p53 is part of the mechanism of action of many anti-cancer drugs
- ALRN-6924 activates p53, thus strengthening the mechanism of action of other anticancer drugs
- Favorable safety profile of ALRN-6924 facilitates combination with other drugs
- Strong preclinical combination therapy results



Outlook



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New ALRN-6924 Combination trials to be initiated in next 6-12 mos

Phase 1b combination with paclitaxel	• Advanced or Metastatic Solid Tumors including Estrogen-Receptor Positive Breast Cancer • Investigator-initiated trial at MD Anderson Cancer Center
Phase 1/1b dose-escalation in pediatric cancers	• Investigator-initiated, multi-center trial at Dana Farber, UPenn, Baylor, and UCSF • Protocol cleared FDA review
Phase 1b/2a combination with CDK4/6 inhibitor	• MDM2-amplified or MDM2/CDK4 co-amplified solid tumors • Protocol under review • Partnering discussions ongoing
Contingent on financing/partnership:	
Phase 1b/2a combination with immuno-oncology agent	• Protocol synopsis drafted • Partnering discussions ongoing

Pipeline

Expansion of facilities and research staff	• New built-to-suit facility, occupancy expected 3Q-2018 • 18,600 ft^2 lab + office in Watertown, MA • Expanded research staff
New oncology targets	• BIM/BH3-family Stapled Peptides for Mcl-1, Bcl-2, Bcl-x_L • Beta-Catenin/Wnt pathway Stapled Peptides
Non-oncology targets	• Stapled Anti-Microbial Peptides (StAMPs) • Broad activity against Gram-negative, multi-drug-resistant strains

AILERON THERAPEUTICS

Aileron - Corporate Summary

- **Proof-of-concept with multiple complete and partial remissions** in both our First-in-Human and PTCL Phase 2 trials, showing that stapled peptides successfully engage with intracellular targets and provide clinical benefit

- **Advance trials** in PTCL, AML, and MDS as driven by data from ongoing trials

- Preclinical data and clinical safety profile support clinical evaluation of **combination therapies with anti-PD-L1, CDK4/6 inhibitors, and paclitaxel** addressing large oncology markets

- In discussions with potential corporate partners & academic collaborators to **expand clinical trials of ALRN-6924** in combination with a variety of therapeutic agents in the next 6-12 months

- **Presentations** at several major scientific conferences planned in 4Q-2018