Unleashing the Targeted Power of ADCs

Credit Suisse Conference
November 2018

Legal Disclaimer

This presentation contains “forward-looking” statements within the meaning of federal securities laws. These forward-looking statements are not statements of historical facts and are based on management’s beliefs and assumptions and on information currently available to management. Forward-looking statements include information concerning the Company’s business strategy and the design, progression and timing of its clinical trials.

Forward-looking statements generally can be identified by terms such as “expects,” “anticipates,” “believes,” “could,” “seeks,” “estimates,” “intends,” “may,” “plans,” “potential,” “predicts,” “projects,” “should,” “will,” “would” or similar expressions and the negatives of those terms. The Company’s operations involve risks and uncertainties, many of which are outside its control, and any one of which, or combination of which, could materially affect its results of operations and whether the forward-looking statements ultimately prove to be correct. Factors that may materially affect the Company’s results of operations and whether these forward-looking statements prove to be correct include, among other things, that preclinical testing may not be predictive of the results or success of ongoing or later preclinical or clinical trials, that the development of the Company’s product candidates and new platforms will take longer and/or cost more than planned and that the identification of new product candidates will take longer than planned, as well as those listed in our Annual Report on Form 10-K filed on March 28, 2018, with the Securities and Exchange Commission (“SEC”), our Quarterly Report on Form 10-Q filed with the SEC on November 13, 2018, and subsequent SEC filings. Except as required by law, the Company assumes no obligation to update these forward-looking statements publicly, or to update the reasons actual results could differ materially from those anticipated in the forward-looking statements, even if new information becomes available in the future.

Copies of the Company’s Quarterly Report on Form 10-Q and our other SEC filings are available by visiting EDGAR on the SEC website at http://www.sec.gov.

Mersana Company Highlights

Lead Assets in POC Development	• XMT-1522 and XMT-1536 currently being developed in Phase 1 clinical trials poised to achieve proof-of-concept in 2019
Large Market Opportunities	• Lead programs addressing high unmet need in large market opportunities within oncology, including breast, NSCLC, gastric and ovarian
Four Differentiated ADC Platforms	• Focused on holistic approach to ADC development — four differentiated, proprietary platforms addressing cytotoxic and immuno-stimulatory approaches • Platforms provide opportunities to efficiently produce new medicines addressing high unmet needs
Wholly Owned Assets and Validating Partnerships	• Wholly owned assets: XMT-1536 and Dolasythen, Alkymer and Immunosynthen platforms • Validating partnerships with Takeda and Merck KGaA to develop novel ADCs • Strong Cash Position, $86M at Q3 2018

Leadership Team

Highly Experienced in Oncology and Business

Management Team

	Anna Protopapas	Eva Jack	Michael Kaufman Ph.D.	Timothy Lowinger, Ph.D.	David Spellman
Key Executive					
	Chief Executive Officer	*Chief Business Officer*	*Senior Vice President, CMC*	*Chief Scientific Officer*	*Chief Financial Officer*
Prior Affiliations	Takeda MILLENNIUM THE TAKEDA ONCOLOGY COMPANY	pulmatrix, MedImmune, AstraZeneca	MERCK Be well, Takeda MILLENNIUM THE TAKEDA ONCOLOGY COMPANY, Biogen	BAYER Bayer	VERTEX, Takeda MILLENNIUM THE TAKEDA ONCOLOGY COMPANY

Board of Directors

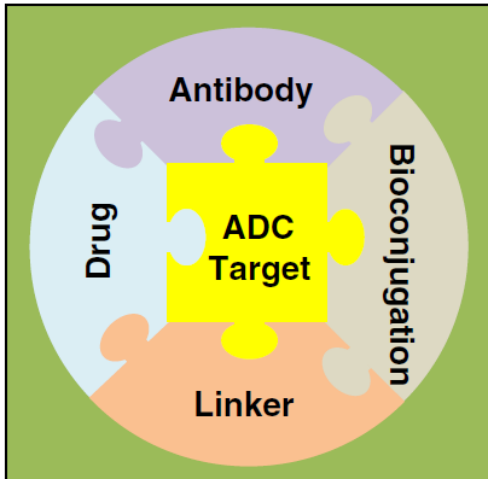
David Mott	Lawrence Alleva	Willard Dere, M.D., FACP	Andrew Hack, M.D, Ph.D.	Kristen Hege, M.D.	Anna Protopapas
Chairman	*Director*	*Director*	*Director*	*Director*	*Director*
NEA	pwc	AMGEN, Lilly, THE UNIVERSITY OF UTAH	editas MEDICINE	Celgene	Takeda MILLENNIUM THE TAKEDA ONCOLOGY COMPANY

Mersana takes a holistic approach to ADC innovation

We are building on 20+ years of industry ADC development

Industry Has Produced to date:

- **4 Marketed ADCs**
  - *Brentuximab vedotin; Trastuzumab emtansine;*
  - *Inotuzumab ozogamicin; Gemtuzumab ozogamicin*
- **78 ADCs in Clinical Development**
- **5 ADCs with Breakthrough Therapy Designation**
- **>70% of clinical stage ADCs were built on the Seattle Genetics and Immunogen platforms as of 2015**



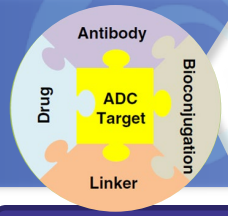
Damelin *et al.* 2015

Mersana takes a holistic approach to ADC research and development

Data from Hansen Wade Beacon database

Leadership Across All Aspects of an ADC

Demonstrated Expertise and Proprietary Technology



Mersana THERAPEUTICS

Payloads & Linkers

Controlled Bystander

Rx — Dolalock, an auristatin α-tubulin agent

Rx — DNA alkylators

Immune Modulators

mAb — Drug

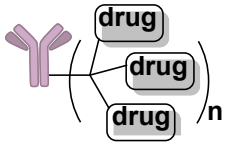
mAb — Drug

Cleavable vs. non-cleavable linker to match target & payload

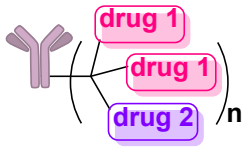
Scaffold

Fleximer: High DAR

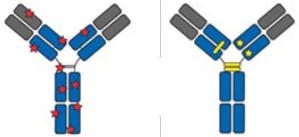
Synthemer: Precise DAR Ranging



Dual-Payload ADC



Bioconjugation



Lysine Cysteine

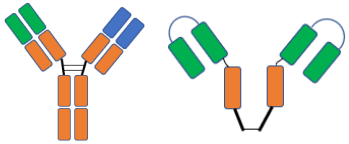
Site-Specific

- Thiomabs
- Non-natural amino acids
- Enzymatic approaches

Antibody

Experience & Platform Compatibility

- Proven capabilities to optimize mAb
- Bioconjugation to various isotypes



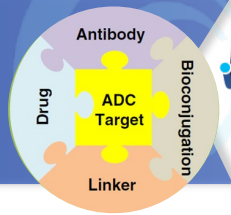
Bispecific Alternative Scaffold

Bispecifics & Alternative Scaffolds

- In-house experience
- Additional target opportunities

Building a Broad and Diverse ADC Portfolio

Addressing Unmet Medical Needs in More Patient Populations



Mersana THERAPEUTICS

	Clinical Problem	Mersana's Approach		
Lead Platform	Limited efficacy and tolerability of many first-gen ADCs	**Dolaflexin with DolaLock** designed to increase efficacy and tolerability	*2 ADCs in Phase 1 (XMT-1522, XMT-1536)*	Fleximer
New Platforms	ADC targets in different tumor types have distinct optimal drug loading (DAR)	**Dolasynthen** precisely optimizes DAR and bioconjugation site for a specific target	*Candidate selection*	Synethmer
	Anti-tubulins are not appropriate for certain tumors	**Alkymer (DNA alkylator)** designed to inhibit tumors (e.g. CRC) that are refractory to auristatin	*Discovery*	
	Potent immunomodulators cause systemic toxicity	**Immunosynthen** targeted delivery of immuno-modulatory molecules	*Discovery*	

Platforms

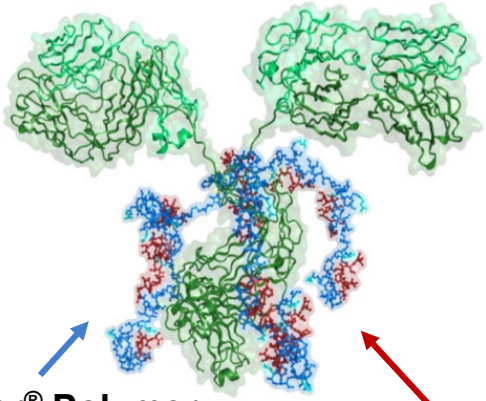
Our ADC Platforms Are Designed to Expand Therapeutic Index Across Classes of Medicines

Mersana THERAPEUTICS

Novel Dolaflexin Platform Technology

Backbone of XMT-1522 and XMT-1536 is Designed to Expand Therapeutic Index

High DAR and Controlled Bystander Effect (DolaLock) Designed to Enhance Efficacy and Tolerability

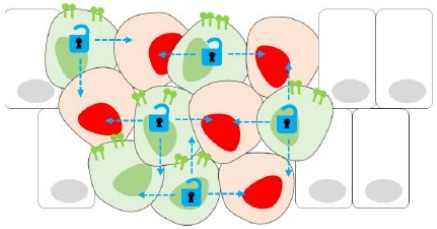


Fleximer® Polymer

- High DAR
- Optimal PK and drug-like properties
- Efficacy against low antigen expressing tumors

DolaLock Payload

- Controlled bystander effect for **greater efficacy and tolerability**

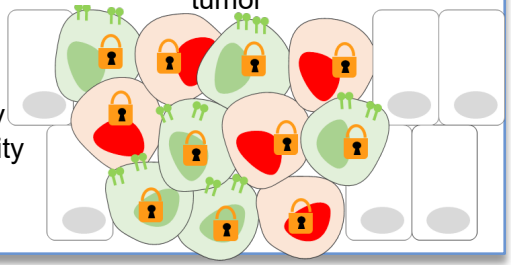


Benefit of bystander effect for greater efficacy

AF-HPA:
Initial release product highly potent and freely cell permeable

Intra-tumor metabolism

AF: Non cell permeable metabolite – highly potent and trapped in tumor

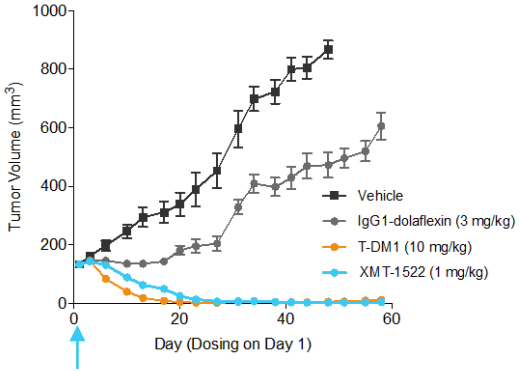


Locked in tumor
High intracellular potency with high systemic tolerability

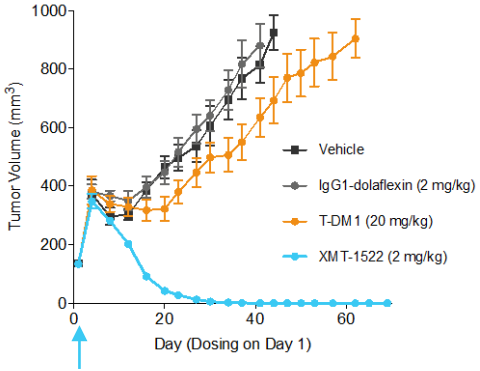
High DAR Expands Efficacy to Low Expressing Antigens
Preclinical Proof of Concept

- Durable Complete Regressions Across Models with Range of HER2 Expression Levels
- XMT-1522 outperforms Kadcyla (T-DM1) in vitro and in vivo in preclinical models of breast, gastric and lung cancer.

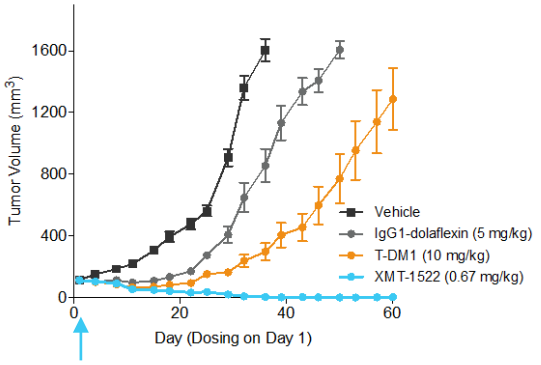
High Her2 (HER2 3+)
800,000 HER2/cell
N87 Gastric Cancer



Medium Her2 (HER2 2+)
80,000 HER2/cell
JIMT-1 Breast Cancer



Low Her2 (HER2 0/1+)
22,000 HER2/cell
SNU5 Gastric Cancer



Decreasing Her2 Expression Levels; Maintaining Efficacy Profile

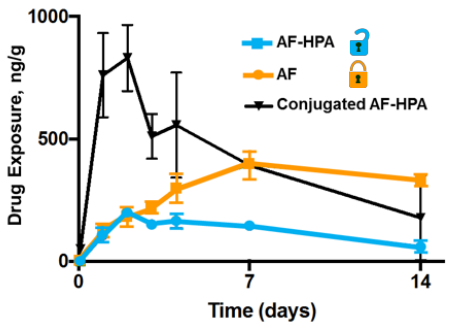
Dolalock Improves Tolerability

Preclinical Proof of Concept

Tumor Exposure

after single dose to tumor-bearing mice

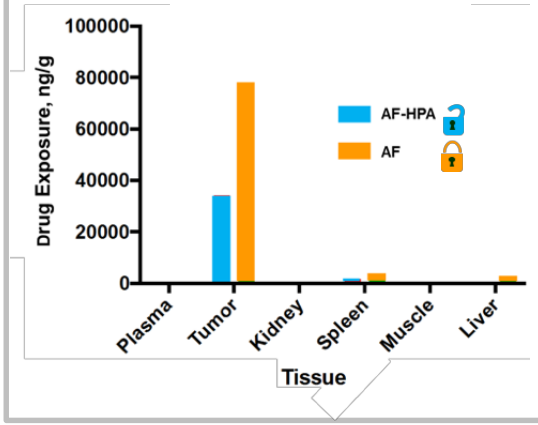
Intra-tumor processing and accumulation of locked payload



Tissue Exposure (AUC)

after single dose to tumor-bearing mice

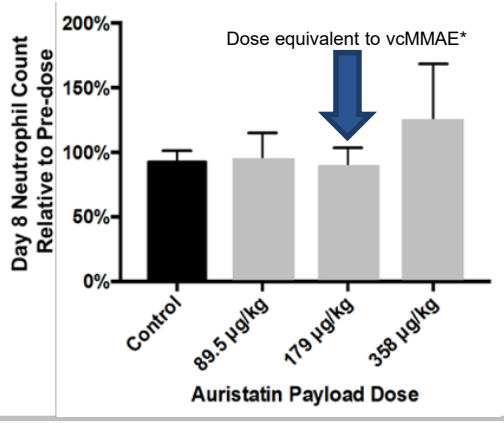
High tumor exposure with minimal normal tissue exposure



Neutrophil Count

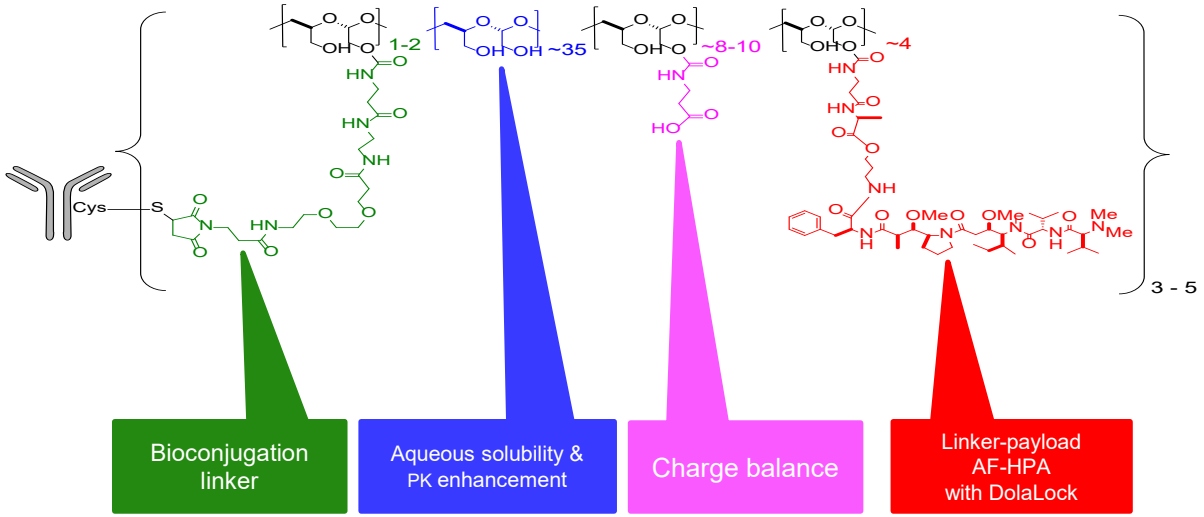
after single dose to non-human primates

*No neutropenia even at doses twice that at which vcMMAE causes fatal neutropenia and sepsis**

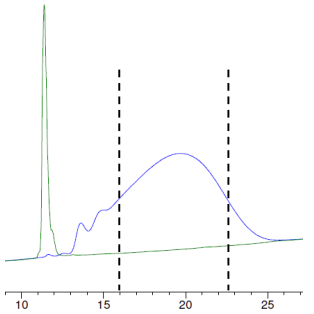


Dolaflexin: Fleximer provides a Balance of Key Components

Allows for High DAR while maintaining Optimal Drug Like Properties



Controlled Heterogeneity

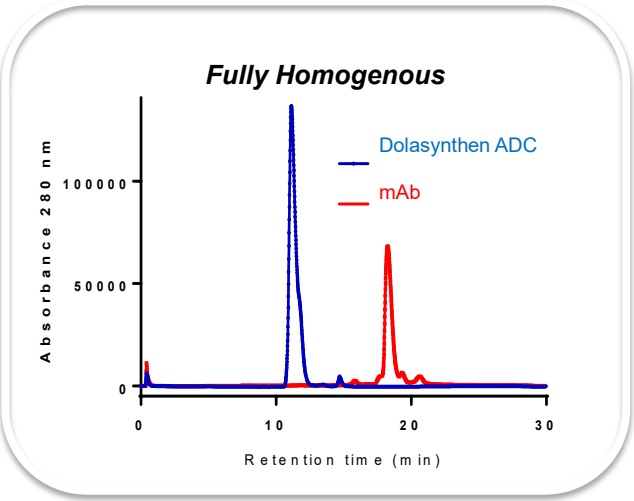


The Synthemer Approach

A precise, fully synthetic, customizable and homogeneous approach

Antibody → Bioconjugation → Aqueous solubility → Charge balance → Drug load per scaffold → Payload Molecule

Precisely Optimized for a given target, DAR and payload



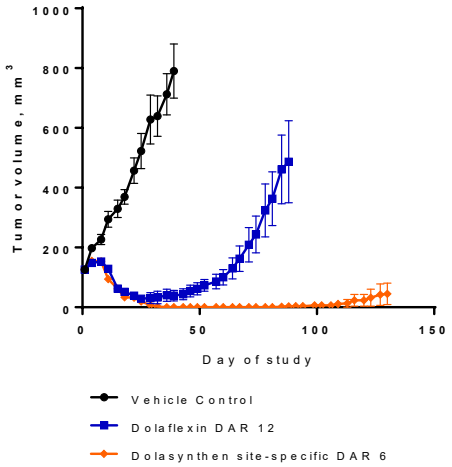
A modular approach allowing for precise control of:

- **DAR – matched to target**
- **solubility and charge – matched to payload**
- **bioconjugation – matched to antibody**

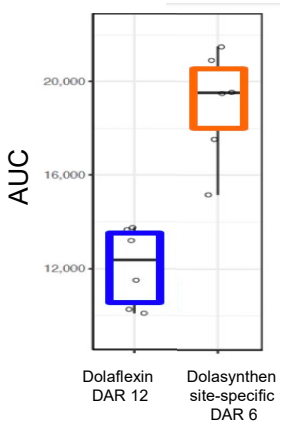
Dolasynthen Allows for Precise DAR
Optimal DAR for a given Target

Antibody → Site-specific Bioconjugation → Aqueous solubility → Charge balance → Drug load per scaffold = 3 → DolaLock AF-HPA

Efficacy



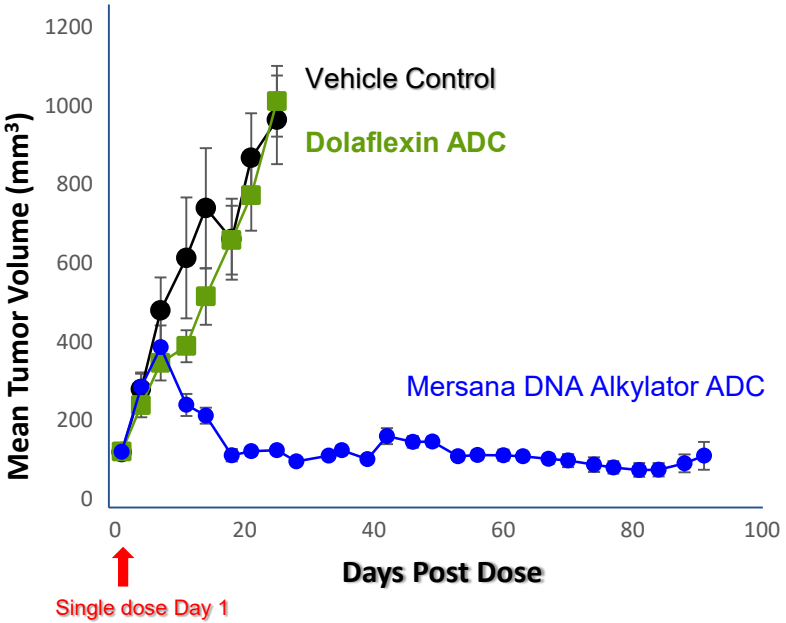
Exposure



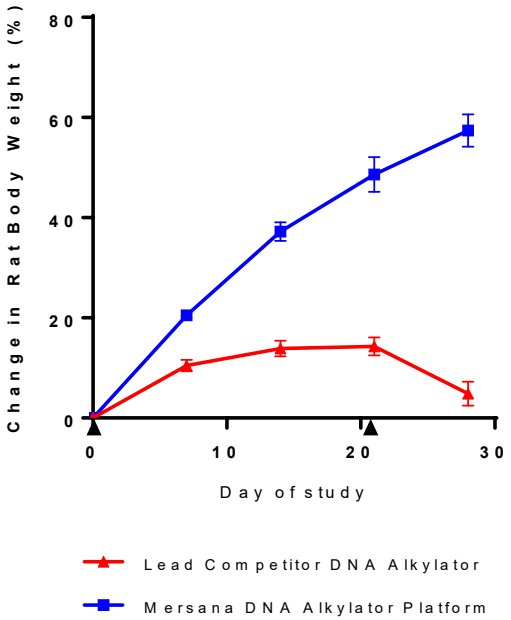
Alkymer Expands Into New Indications

A Modular, Customized DNA Alkylating ADC Platform

Anti-tubulin resistant Colorectal Cancer Model



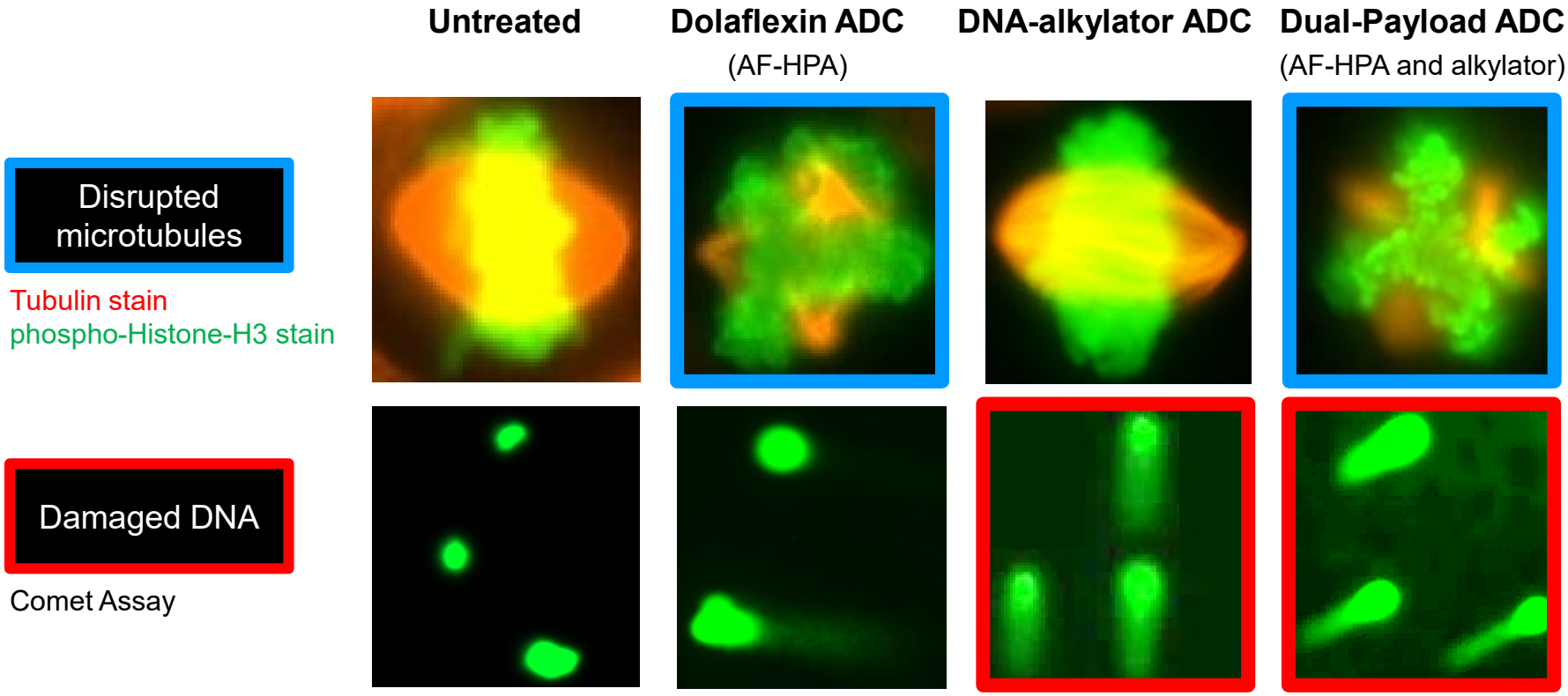
Tolerability



The Synthemer Approach Also Enables Dual-Payload ADCs

Exert Two Simultaneous Attacks on Cancer Cells

Mersana THERAPEUTICS



Non-binding control ADCs had no effect.

Immunosynthen: Immunotherapy ADC Platform

Expands Application of Mersana's Proprietary Platforms to I/O

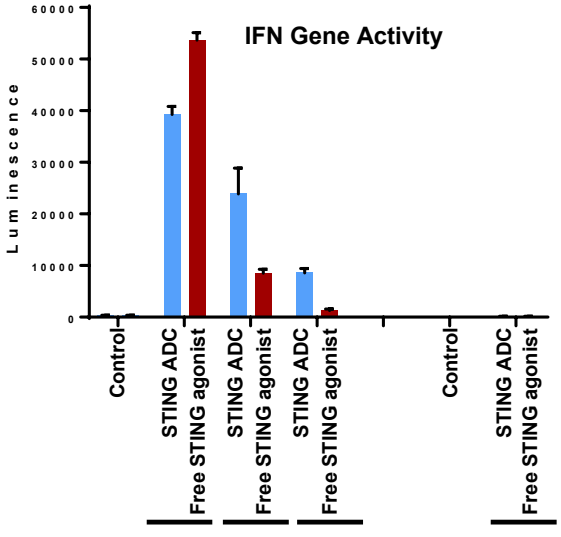
Therapeutic Hypothesis

- I/O ADCs will enable systemic delivery, better efficacy, and broader clinical opportunities
- Opens STING and other I/O pathways to a broader set of cancers
- I/O ADCs can synergize with checkpoint inhibitors
- I/O ADCs have the potential to turn "cold" tumors to "hot"

In Vitro Proof of Concept

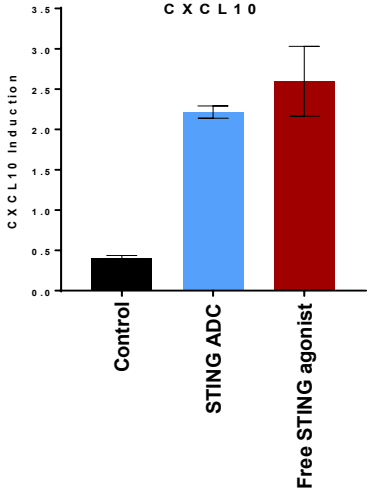
Targeted delivery to immune cells

STING ADC1



Targeted delivery to tumor cells

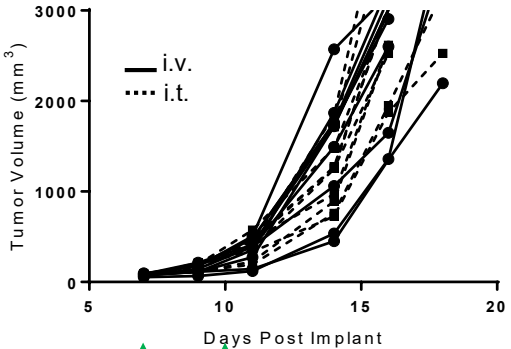
STING ADC2

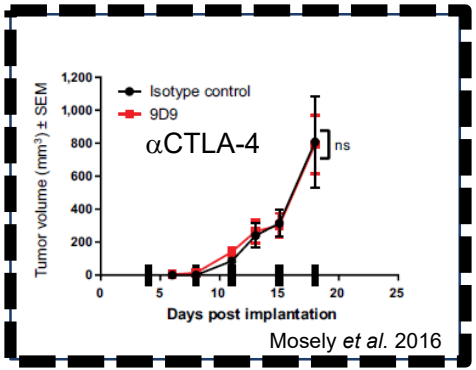


In Vivo Proof of Concept of a Mersana STING ADC

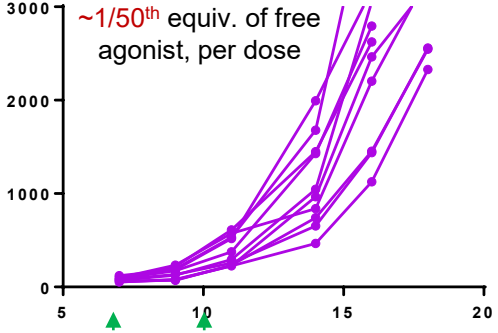
More Active than Free Agonist at 120x the Dose in Highly Aggressive Murine Model

Vehicle Groups

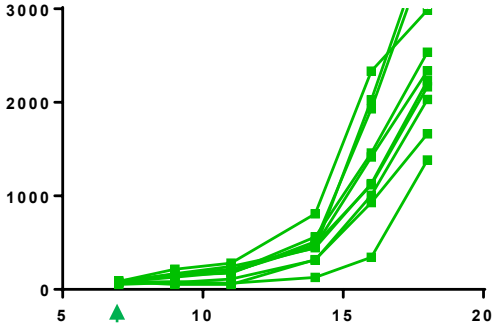




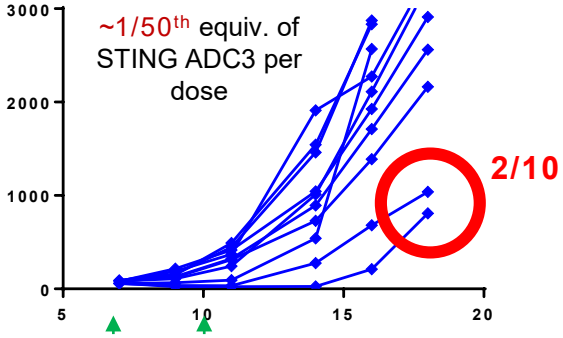
Control ADC, i.v.



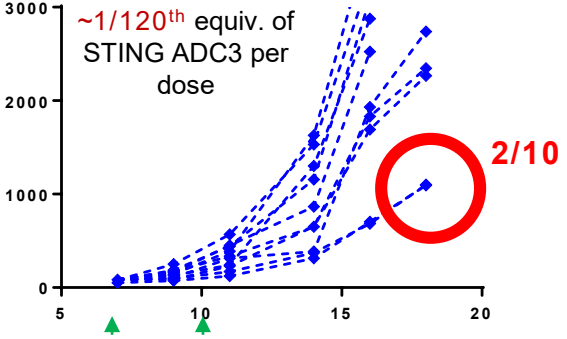
Free STING Agonist, i.t.



STING ADC3, i.v.



STING ADC3, i.v.



Pre Clinical Data on XMT1522 and XMT1536

Mersana THERAPEUTICS

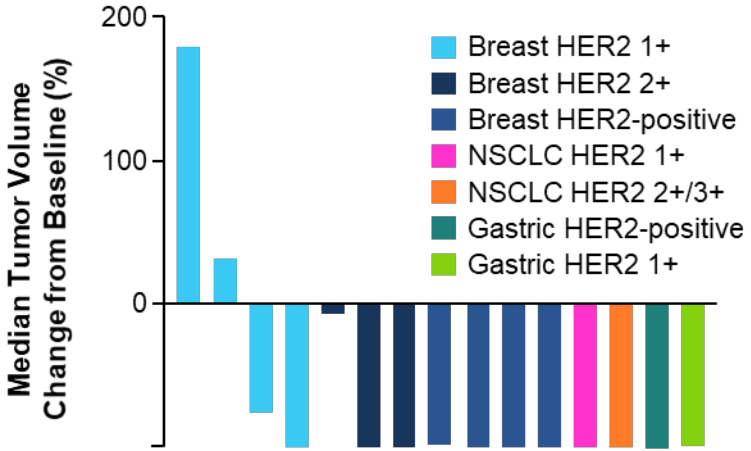
XMT1522: Deep and Durable Responses across Tumor Types and HER 2 Expression Levels

XMT1522:

- **Dolaflexin Platform**
  - High DAR
  - Dolalock Controlled Bystander Payload
  - MOA selectively toxic to dividing cells
- **Novel Her2 Antibody**
  - Optimized specifically for use as an ADC
  - Provides better efficacy than trastuzumab
  - Novel epitope – not cross reactive with either trastuzumab or pertuzumab

Deep Tumor Regression

Complete or Near-Complete Regression: **11/15** models
Seen at **All** HER2 Expression Levels
Seen in **All** Indications

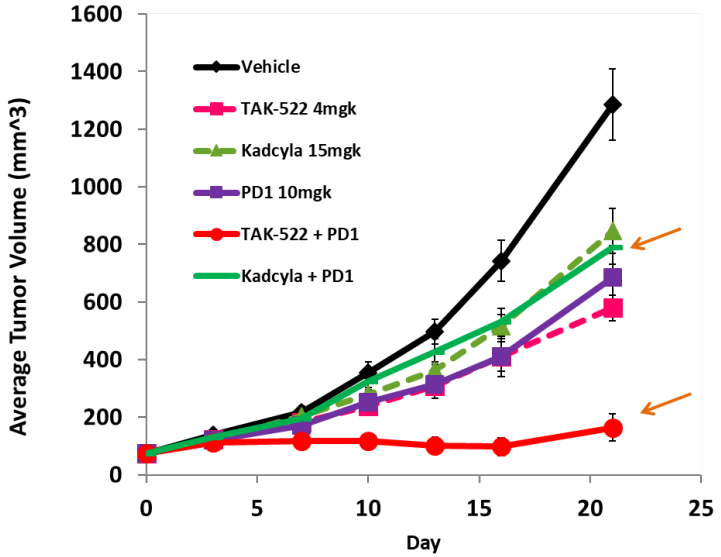


All mouse models treated at 3 mg/kg or below
Single dose (Day 0) or weekly doses for 3 weeks (Days 0, 7, 14)
Day 60 = end-of-study

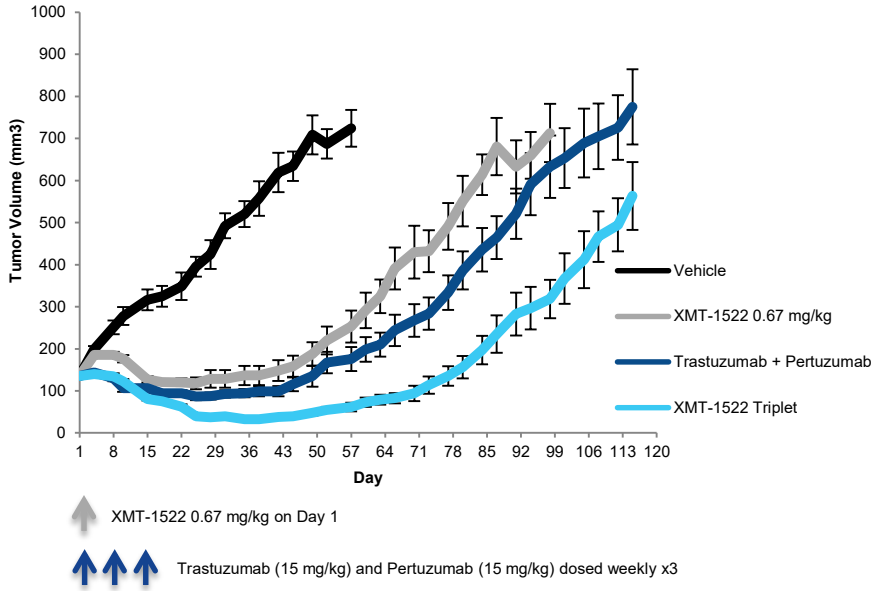
Key Combination Studies Beyond Single Agent Activity

Supported by Strong Preclinical Proof of Concept

XMT-1522 + PD1 Shows Additional Activity When Combined



XMT-1522 Uniquely Able to Combine with Trastuzumab and Pertuzumab



XMT-1536: A Dolaflexin ADC Targeting NaPi2b

Clinically Validated Target Expressed in Numerous Cancer Types

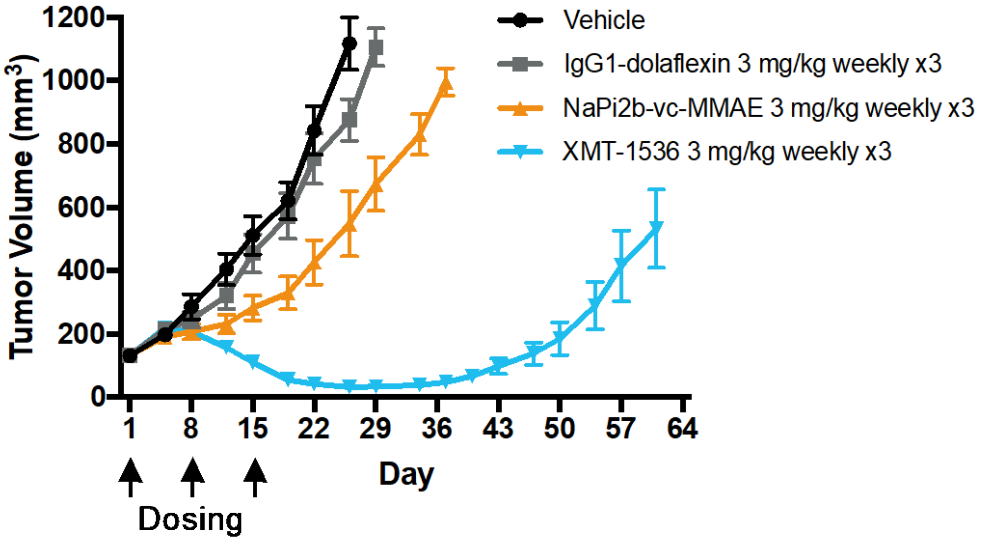
Validated ADC Target

- Transmembrane sodium-phosphate transporter
- Expressed in 87% of NSCLC adenocarcinoma, 96% of serous ovarian adenocarcinoma, 91% of papillary thyroid carcinoma[1]
- Normal tissue expression restricted primarily to lung, fallopian tube, thyroid
- Target clinically validated by Genentech

XMT-1535: Novel anti-NaPi2b Antibody

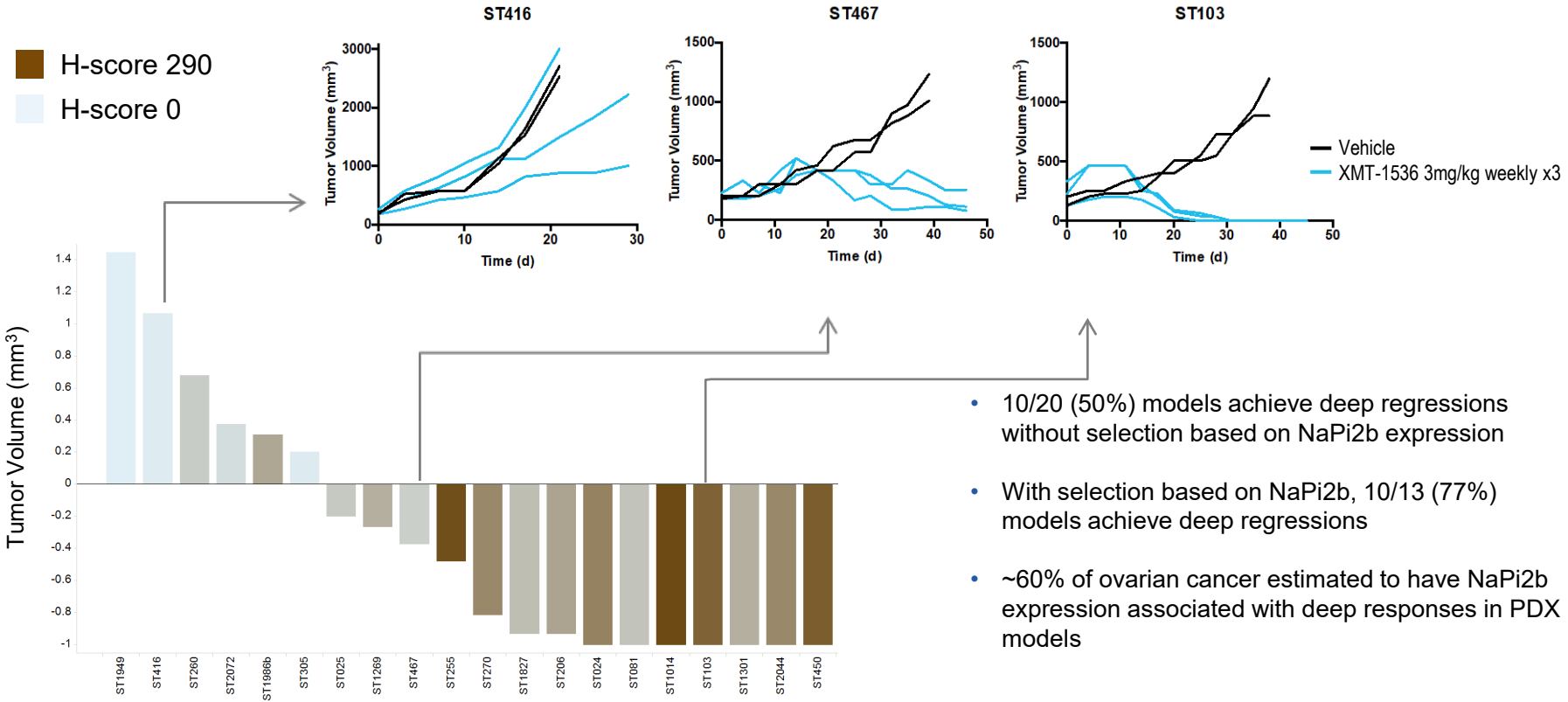
- Mersana in-licensed
- Demonstrated in preclinical models to have superior properties for ADC development

XMT-1536 is Superior to MMAE-based NaPi2b ADC



[1] Lin *et al, Clin Cancer Res* 2015, 21:5139-5150;

Response to XMT-1536 in Ovarian PDX Models Associated with NaPi2b Expression

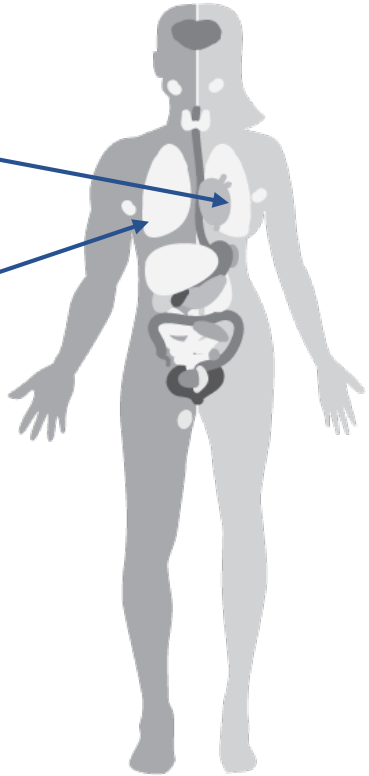


- 10/20 (50%) models achieve deep regressions without selection based on NaPi2b expression
- With selection based on NaPi2b, 10/13 (77%) models achieve deep regressions
- ~60% of ovarian cancer estimated to have NaPi2b expression associated with deep responses in PDX models

Non-clinical Findings Common For XMT-1522 and XMT-1536

NO evidence of cardiotoxicity
- Electrocardiography
- Cardiac Enzymes
- Histopathology

- NO evidence of pulmonary toxicity



- NO neutropenia
- Stable in circulation
- Predictable pharmacokinetics

- Transient elevations of AST at higher doses, without concomitant increases in ALT or total bilirubin
- Elevations of AST did not correlate with hepatic necrosis or muscle damage based on histopathology
- Hypertrophy of Kupffer cells in liver was observed – Kupfer cells are the clearance mechanism for AST

Clinical Development

XMT-1522 and XMT1536

Mersana THERAPEUTICS

XMT-1522 Dose Ranging and Escalation Studies Will Define Expansion Plans

- Patients with HER2-expressing (by local assessment) breast, gastric, or lung cancers
- XMT-1522 dosed IV every 4 weeks in 28-day cycles until disease progression or unacceptable toxicity
- Dose escalation: “3 + 3” design with option for 4th patient at each dose level
- Planning to compare 3 week data vs 4 week data. Perform dose ranging in Phase 1 dose escalation

Dose Escalation: 3 week dosing		
	Dose,mg / m^2	Dose,mg / kg
DL5	16.0	0.43
DL6	21.3	0.58
DL7	28.3	0.76
DL8	37.0	1.0

Dose Escalation: 4 week dosing		
Start: DL6	21.3	0.53
Dose Escalate		

Other dosing schedules under consideration

Establish Recommended Ph2 Dose and Regimen

Potential Expansion Populations

- Breast Cancer, HER2+, post T-DM1 (N=30)
- Breast Cancer, HER2-low (IHC 1+/2+, non-amplified) (N=30)
- Gastric Cancer, HER2+ post-trastuzumab (N=30)
- NSCLC, HER2 IHC 2+/3+ (N=30)
- NSCLC, HER2 IHC 1+ (N=30)

Expansion Data

- Phase 2 Monotherapy Studies
- Combo Tx POC Studies

Heavily pretreated patients typical of Ph1 studies representing HER2 low as well as HER2 positive

Patient Characteristics, DL 1-6 (N = 22) as per ASCO

Age (years)	Median (range)	65 (31-79)
Sex – N (%)	Female Male	20 (91) 2 (9)
ECOG performance status – N (%)	0 1	8 (36) 14 (64)
Tumor type – N (%) HER2 status by local assessment	Breast cancer • HER2-positive • HER2-low • Prior trastuzumab • Prior T-DM1 Gastric cancer • Prior trastuzumab Gallbladder cancer	18 (82) • 8 of 18 (44) • 10 of 18 (56) • 10 of 18 (56) • 9 of 18 (50) 3 (14) • 2 of 3 (67) 1 (5)
Prior lines of therapy for metastatic disease	Median (range)	4 (0-10)

ASCO2018 Abstract #: 2546 Study design

Safety Data through DL6 suggests treatment was generally well-tolerated; most AEs were Grade 1-2

- Treatment was generally well-tolerated; most AEs were Grade 1-2
- The most common treatment-related AEs (>10%) were fatigue, nausea, vomiting, anemia and transient AST elevations
- Limited evidence to date of toxicities often seen with other ADCs or microtubule-targeting agents such as neutropenia, ocular toxicities, peripheral neuropathy, or pneumonitis
- No cardiac AEs or reductions in LVEF requiring dose modification or discontinuation

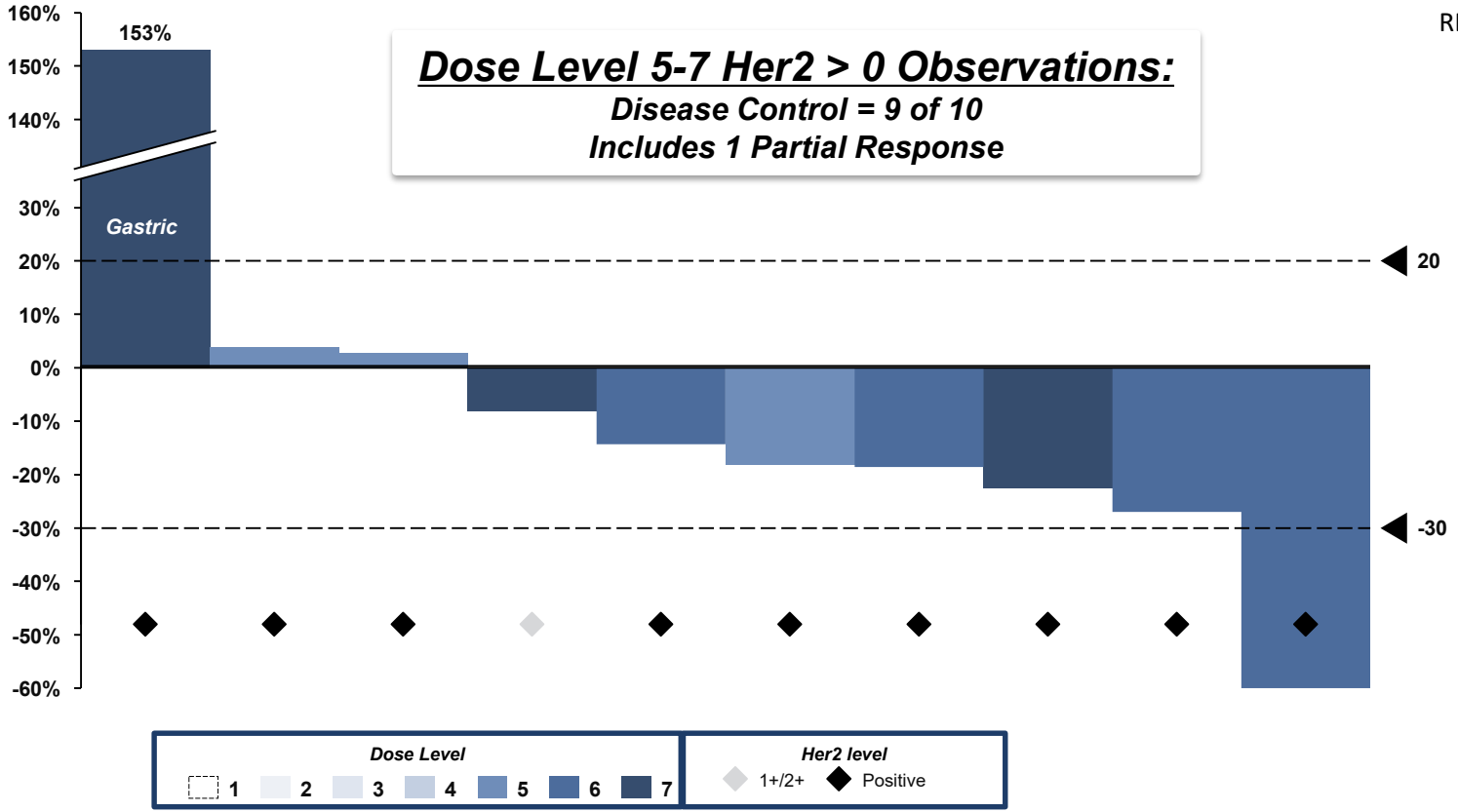
	Dose Level 1	Dose Level 2	Dose Level 3	Dose Level 4	Dose Level 5	Dose Level 6
Dose, mg/m^2	2.0	4.0	8.0	12.0	16.0	21.3
N	3	3	3	3	4[a]	6[b]
Tumor Type	Breast	Breast	Breast	Breast	3 Breast 1 Gastric	3 Breast 1 Gallbladder 2 Gastric
DLT	0	0	0	0	0	0

[a] Optional 4th patient enrolled.
[b] Gallbladder cancer patient (DL6) developed Grade 3 anemia, which was initially assessed as possibly related to study drug, leading to expansion of cohort. Subsequently the investigator determined the event was not considered a DLT.

ASCO2018 Abstract #: 2546 Study design

Best Percent Change in Sum of Target Lesions, Through DL7[1]

Dose Levels 5-7, Her2 1+/2+, Positive Only



Dose Level 5-7 Her2 > 0 Observations:

Disease Control = 9 of 10

Includes 1 Partial Response

RECIST 1.1

TUMOR TYPES:
- Breast Cancer

Remainder are:
- Gastric &
- *Gallbladder
- Prior TDM1 Therapy

HER2 IHC CENTRAL READS:
- 0: HER2 Negative
- 1+/2+: HER2, 1+ HER2, 2+ non-amplified
- Positive: HER2 Positive

Assessed using Ventana HER2/neu ™

[1]Includes 3 patients in DL7 (28.3 mg/m^2) who have had one restaging scan; efficacy results pending from 3 additional patients

ASCO2018 Abstract #: 2546 Study design

XMT-1536 Phase 1 Trial; Dose escalation ongoing

A Dolaflexin ADC Targeting NaPi2b

- Patients (by local assessment) ovarian, lung and other rare cancers, NaPi2b expression tested locally after the treatment
- XMT-1536 dosed IV every 4 weeks in 28-day cycles until disease progression or unacceptable toxicity
- Dose escalation: "3 + 3" design with option for 4th patient at each dose level
- Planning to compare 3 week data vs 4 week data. Perform dose ranging in Phase 1 dose escalation

Dose Escalation: 3 week dosing		
	Dose,mg/ m^2	Dose,mg/ kg
DL4	20.0	*0.54*
DL5	30.0	*0.81*
DL6	40.0	*1.08*

Dose Escalation: 4 week dosing		
DL4-A	20	0.54
DL5-A	30	0.81
Dose Escalate		

Other dosing schedules under consideration

Establish Recommended Ph2 Dose and Regimen

Potential Expansion Populations

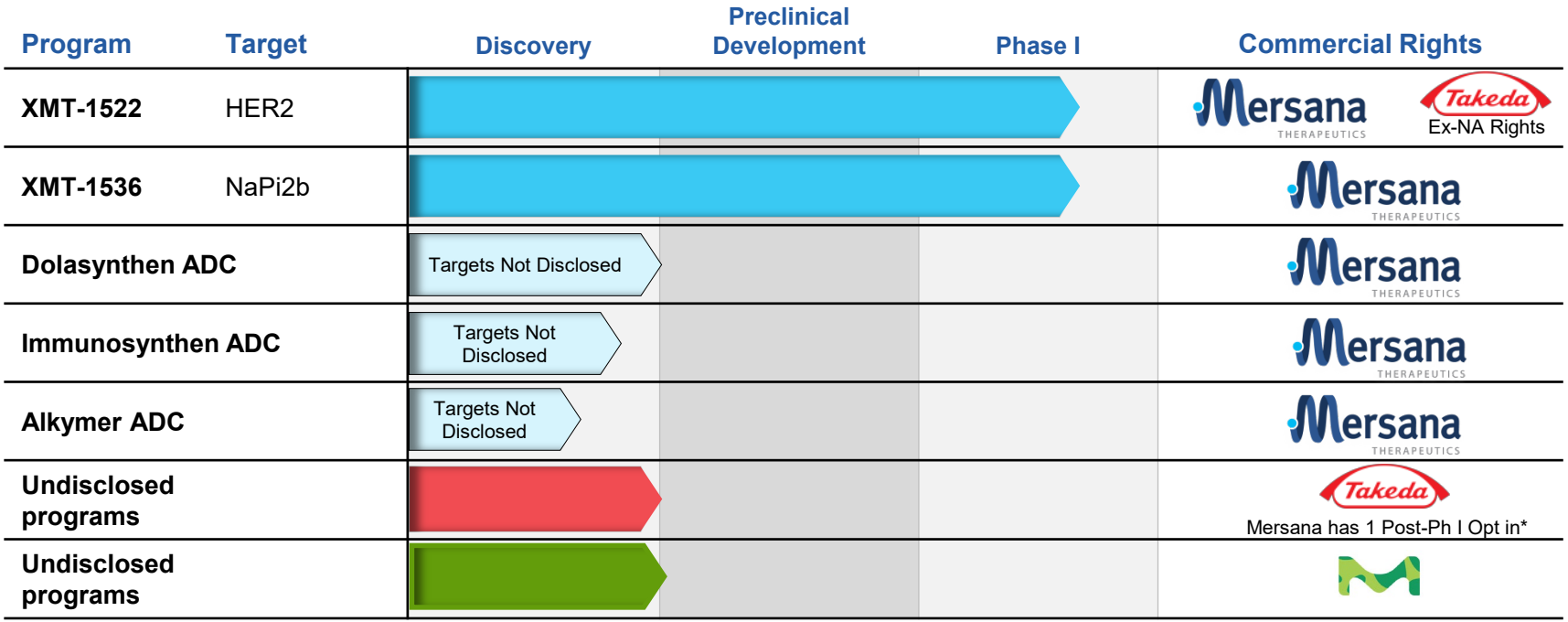
- Platinum-resistant ovarian cancer (N=30)
- Non-squamous NSCLC Adenocarcenoma Post-platinum and PD-1 Tx (N=30)
- Other NaPi2b expressing tumors (papillary thyroid, papillary renal, endometrial, salivary duct, etc) (N=30)

Expansion Data

- Phase 2 Monotherapy Studies
- Combo Tx POC Studies

**NaPi2b expression levels will not be a screening criteria; however, expression level will be evaluated retrospectively*

Robust Pipeline Focused on Clinically Meaningful Cancer Therapies



$86M in cash** as of Q3 2018 allows for significant investment in value creating assets

* US rights, 50/50 co-development, co-commercialization

** Cash, cash equivalents and marketable securities as of September 30, 2018