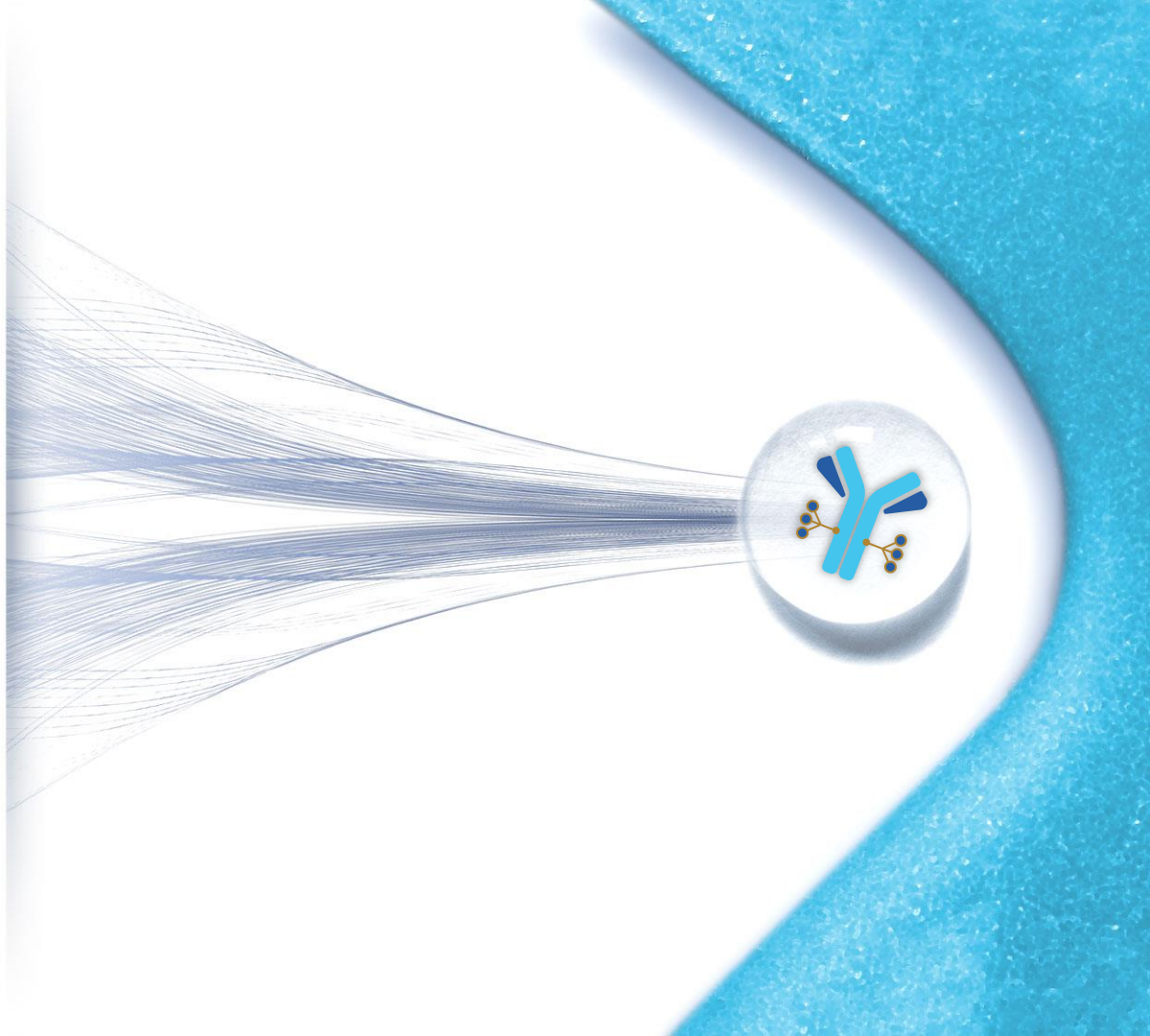
Mersana THERAPEUTICS

Corporate Presentation

February 28, 2024



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While today's ADCs provide substantial benefits to some patients, significant platform and payload limitations remain.

Mersana THERAPEUTICS

Mersana is focused on developing novel platforms and payloads that enable ADCs with meaningfully improved safety and efficacy.

ADCs, antibody-drug conjugates

Innovating to Overcome Today's ADC Limitations

ADCs TODAY	THE MERSANA OPPORTUNITY
First-Generation ADC Limited by Safety First wave of anti-tubulins dose limited by platform toxicities (neuropathy, neutropenia, ocular toxicity, etc.)	**Leverage Our Next-Generation Cytotoxic Platform** Designed to overcome dose-limiting ADC platform toxicities to drive greater efficacy and enable combinations with standards of care
Newer Topo ADC Barriers Emerging Hematologic toxicities, ILD, and topo-after-topo resistance are limiting this class	**Provide Effective Alternatives to Topo ADCs** Allow for ADCs that avoid resistance mechanisms, severe hematologic toxicities and ILD
Lack of Platform and Payload Innovation Cytotoxic ADCs remain predominant with few novel mechanisms	**Establish a New Class of IO ADCs** Advance ADCs beyond cytotoxics using STING-agonism to achieve tumor-specific activation of the innate immune system

ADC, antibody-drug conjugate; ILD, interstitial lung disease; IO, immuno-oncology; STING, STimulator of INterferon Genes; topo, topoisomerase 1

Mersana Therapeutics Overview and Milestones

Two Innovative ADC Platforms	Dolasynthen and Immunosynthen fueling pipelines for Mersana and its collaborators
Differentiated B7-H4 ADC in Clinic	Dose escalation and optimization continuing in Phase 1 clinical trial of XMT-1660; expect to initiate expansion in Q2 and report initial clinical data in mid-2024
First-in-Class IO ADC in Clinic	Phase 1 clinical trial of XMT-2056 restarting; expect to advance dose escalation in 2024
Validating Collaborations	Johnson & Johnson, GSK, Merck KGaA collaborations contributed $170 million in upfront payments; initial milestone payments received in 2023

$209.1 million in cash, cash equivalents and marketable securities as of year end 2023; capital resources expected to support current operating plan commitments into 2026

ADC, antibody-drug conjugate; IO, immuno-oncology

Advancing a Robust ADC Pipeline

Platform	ADC Program	Target	Indication	Discovery	Preclinical	P1 Dose Escalation	P1 Dose Expansion
Dolasynthen	**XMT-1660**	B7-H4	Multiple Solid Tumors				
Immunosynthen	**XMT-2056**	Novel HER2 Epitope	Multiple Solid Tumors			GSK*	
	XMT-2068	Undisclosed	Undisclosed				
	XMT-2175	Undisclosed	Undisclosed				
	Collaborators						
Dolasynthen	J&J	Multiple	Undisclosed				
Immunosynthen	Merck KGaA Darmstadt, Germany	Multiple	Undisclosed				

* XMT-2056 is wholly owned by Mersana. GSK has an exclusive global license option to co-develop and commercialize the candidate

ADC, antibody-drug conjugate; HER2, human epidermal growth factor receptor 2

Mersana's Next-Generation ADC Platforms

Two distinct and proprietary ADC product engines

Dolasynthen

- Next-generation cytotoxic platform with customizable DAR designed for enhanced PK and tumor delivery
- Equipped with a proprietary anti-tubulin payload with controlled bystander effect
- Designed to reduce dose-limiting platform toxicities (severe neuropathy, neutropenia, ocular toxicity, transaminases, thrombocytopenia, etc.)
- Potential to develop product candidates for monotherapy and combination use

Dolasynthen Product Candidates:

- XMT-1660
- Mersana proprietary pipeline
- Up to three targets with Johnson & Johnson

Immunosynthen

- Observed to be a potent stimulator of the innate immune system in the clinic
- Equipped with a proprietary payload intended to activate STING in tumor-resident immune cells and antigen-expressing tumor cells ("one-two punch")
- Potential to develop product candidates for monotherapy and combination use

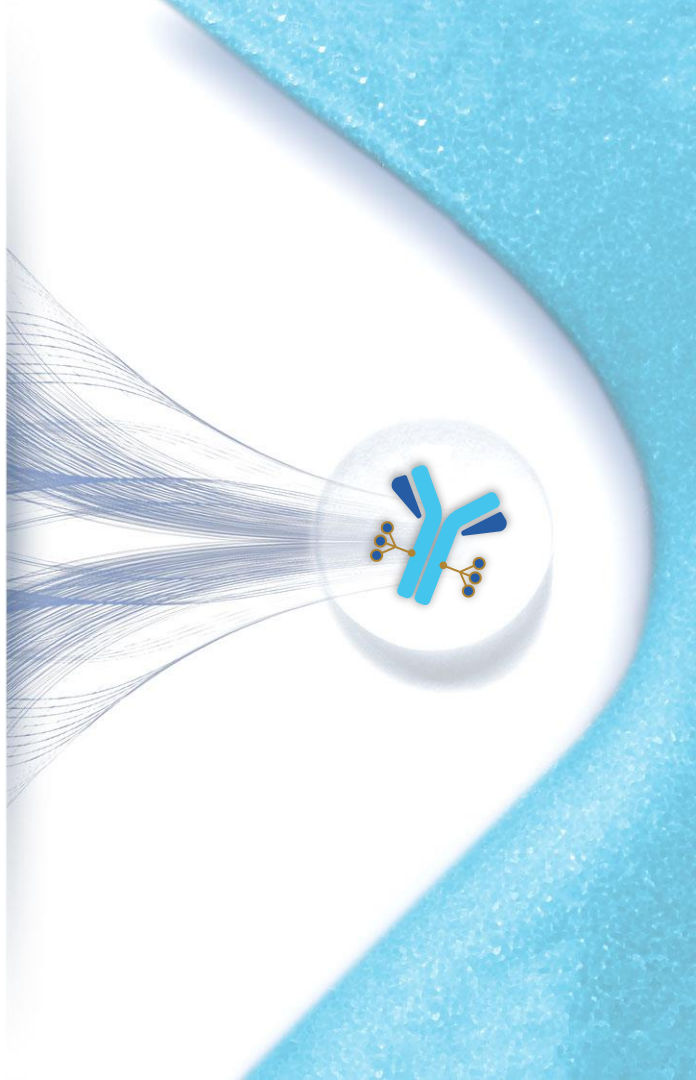
Immunosynthen Product Candidates:

- XMT-2056 (GSK option)
- Mersana proprietary pipeline
- Up to two targets with Merck KGaA, Darmstadt, Germany

ADC, antibody-drug conjugate; DAR, drug-to-antibody ratio; PK, pharmacokinetics; STING, STimulator of INterferon Genes

Dolasynthen

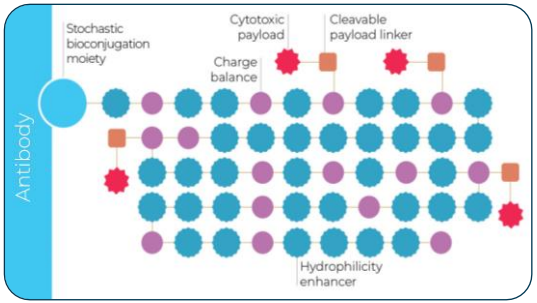
Mersana’s Next-Generation Cytotoxic ADC Platform



ADC, antibody-drug conjugate

Leveraging Learnings to Develop an Improved Cytotoxic ADC Platform

Dolaflexin: Mersana's First-Generation ADC Platform



Heterogeneous platform

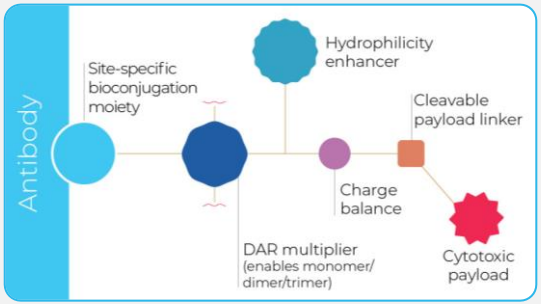
High DAR

Stochastic (random) bioconjugation

Goals for Our Next-Generation Platform

- Allow DAR customization for target
- Allow for antibody-like PK
- Enhance tumor payload delivery
- Increase efficacy
- Reduce platform toxicity
- Expand therapeutic index

The Result: Mersana's Dolasynthen ADC Platform



Homogeneous platform

Customizable, precise DAR

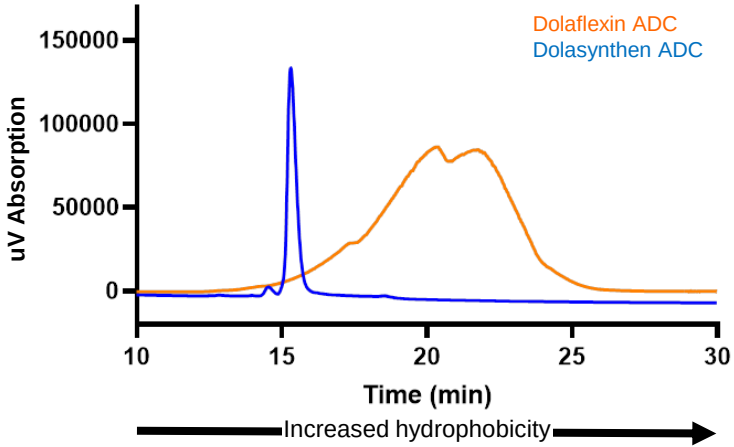
Site-specific bioconjugation

ADC, antibody-drug conjugate; DAR, drug-to-antibody ratio; PK, pharmacokinetics

Dolasynthen Outperforms Dolaflexin at Equal Payload Doses Preclinically

Heterogeneous Population vs. Homogeneous Outperformer

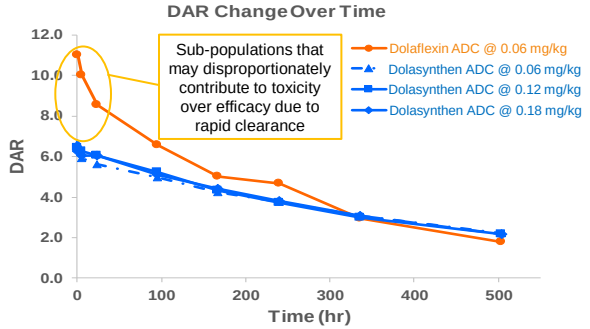
Population Distribution*



Dolasynthen platform enables the creation of single-species outperformers

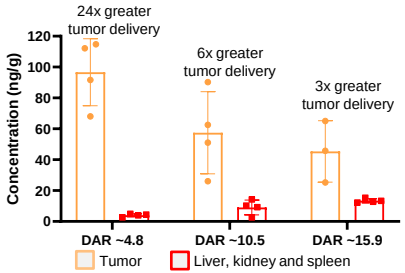
* As measured by hydrophobic interaction chromatography, 280 nanometers

Rapid Clearance of Dolaflexin High-DAR Species



Dolaflexin High-DAR Sub-Populations Show Reduced Tumor-Specific Delivery

Total Payload/DAR

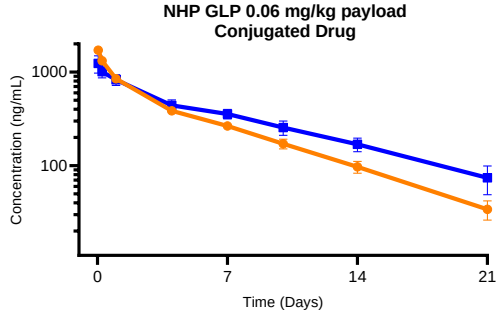


▲ Time of administration

ADC, antibody-drug conjugate; DAR, drug-to-antibody ratio; hr, hour; min, minutes; mg/kg, milligrams per kilogram; mm, millimeter; PDX, patient derived xenograft; SEM, standard error of mean; uV, ultraviolet

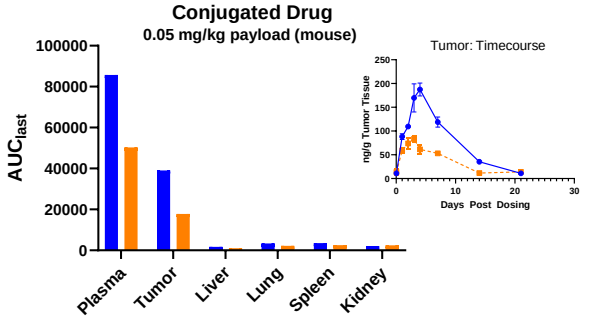
Dolasynthen Outperforms Dolaflexin at Equal Payload Doses Preclinically, cont.

Higher Payload Exposure in Circulation

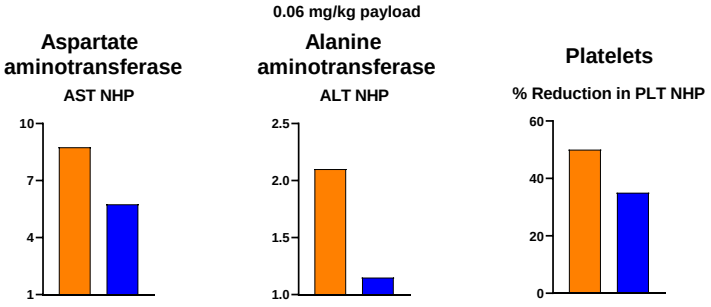


Dolasynthen ADC
Dolaflexin ADC

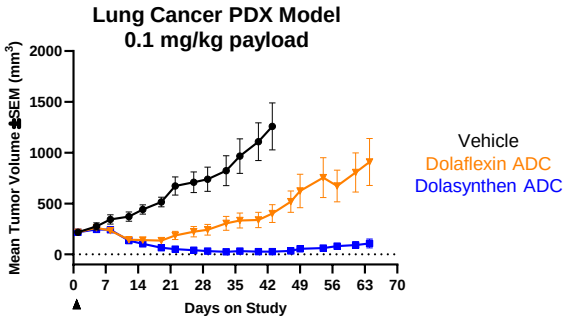
Higher Payload Exposure in Tumor



Lower Platform Toxicity



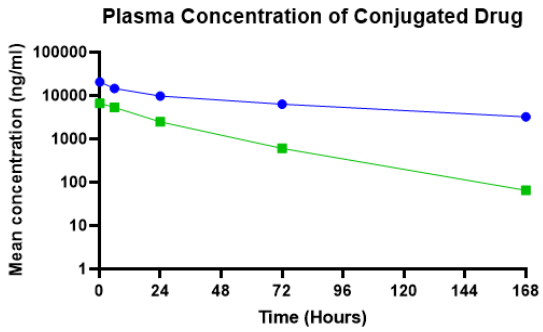
Enhanced Efficacy with Dolasynthen



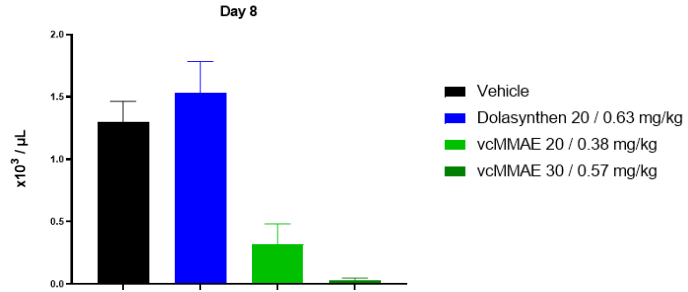
ADC, antibody-drug conjugate; AUC, area under the curve; DAR, drug-to-antibody ratio; GLP, Good Laboratory Practice; mg/kg, milligrams per kilogram; ng/g, nanograms per gram; ng/mL, nanograms per milliliter; PK, pharmacokinetics; NHP, non-human primate

Dolasynthen Outperforms vcMMAE ADC Platform in Multiple Preclinical Models

Increased Exposure Independent of Target

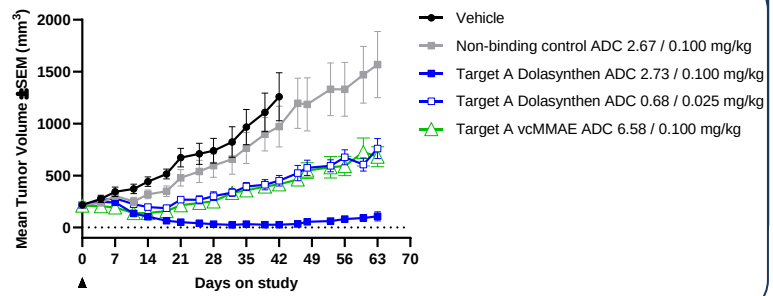


Unlike vcMMAE, No Impact on Neutrophils

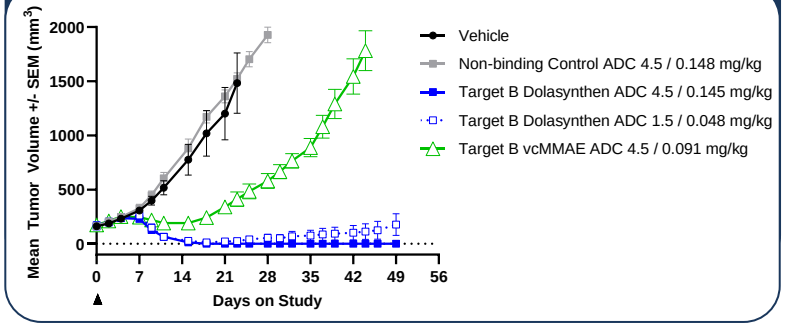


Dolasynthen ADC
vcMMAE ADC

Better Efficacy Against Target A



Better Efficacy Against Target B



▲ Time of administration

Notes: vcMMAE is a platform utilized to develop multiple approved third-party ADCs; Dosing above represented as antibody dose (mg/kg) / payload dose (mg/kg)

ADC, antibody-drug conjugate; mg/kg, milligrams per kilogram; mm, millimeters; ng/mL, nanograms per milliliter; PK, pharmacokinetics; SEM, standard error of mean; vcMMAE, valine-citrulline monomethyl auristatin E; x10³/µL, thousands per microliter

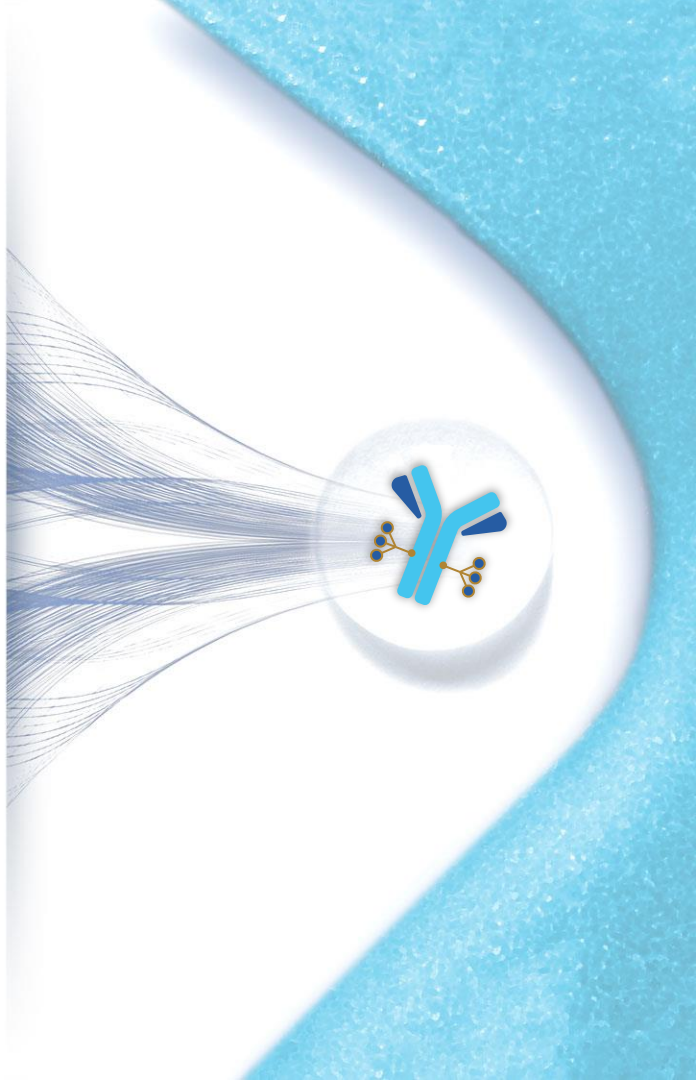
XMT-1660

Platform: Dolasynthen

Target: B7-H4

DAR: 6

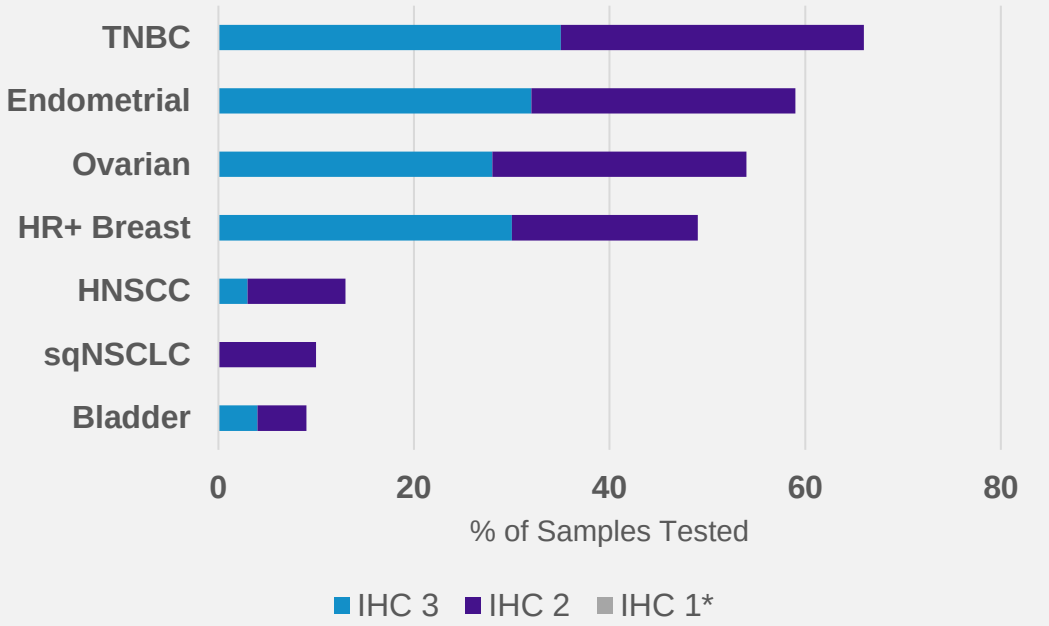
Initial Cancers of Interest Include: Triple negative breast, HR+ breast, endometrial and ovarian cancers



ADC, antibody-drug conjugate; DAR, drug-to-antibody ratio; HR+, hormone-receptor-positive

B7-H4: Highly Expressed in a Range of Solid Tumors with Limited Expression in Healthy Tissue

Reported prevalence of B7-H4 expression across tumor types, measured by IHC[5]



*IHC 1 cut-off = H-score ≥50

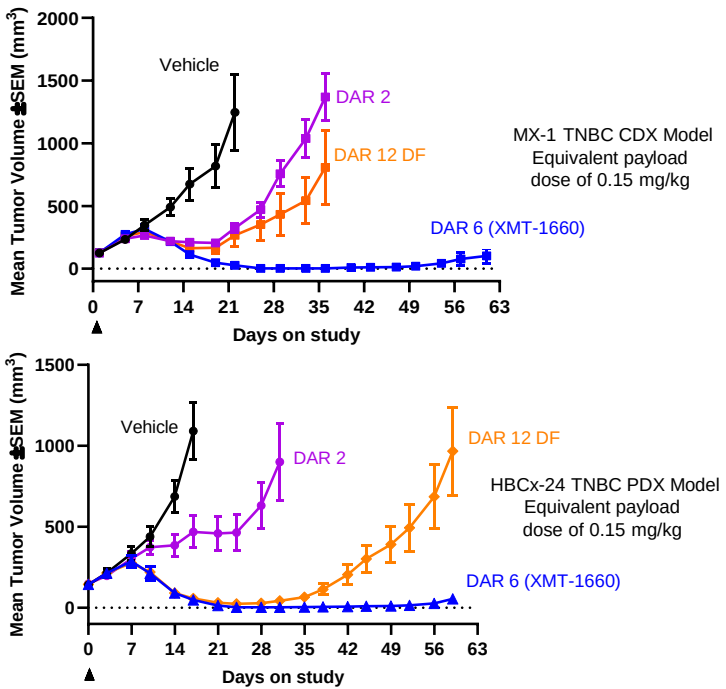
- B7-H4 is a member of the CD28/B7 family of cell surface proteins that promotes tumorigenesis by suppressing anti-tumor immunity and serves as a negative prognostic indicator for multiple tumor types[3]
- Limited expression in normal human tissue but highly expressed on multiple tumor types with high unmet need, including breast, ovarian and endometrial cancers[1,2,3,5]
- PD-L1 expression has been reported as inversely related to B7-H4 expression, suggesting potential utility in cold tumors[4]

1. Rahbar et al. 2015. *Cancer Immunology Research*
2. Leong et al. 2015. *Molecular Pharmaceutics*
3. MacGregor et al. 2017. *Clinical Cancer Research*
4. Altan et al. 2018. *NPJ Breast Cancer*
5. Sachdev et al. *ASCO 2019*

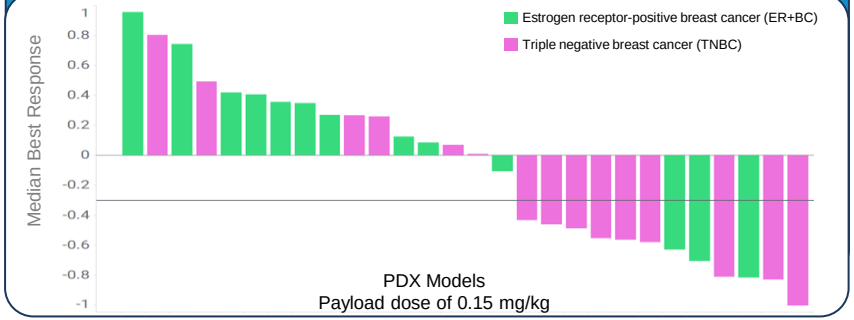
HNSCC, head and neck squamous cell carcinoma; HR+, hormone receptor positive; IHC, immunohistochemistry; sqNSCLC, squamous non–small-cell lung cancer; TNBC, triple negative breast cancer

Encouraging XMT-1660 Preclinical Activity Observed

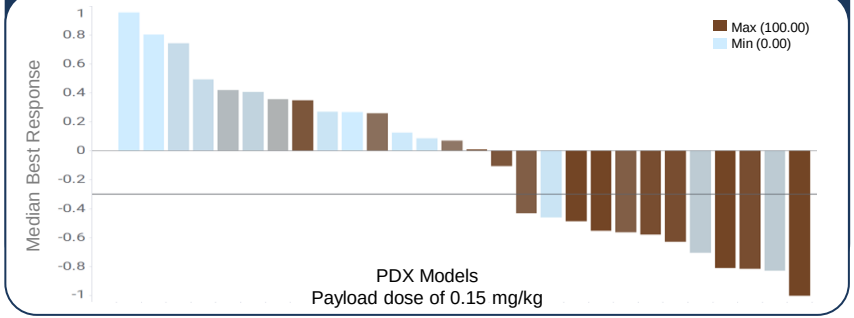
DAR 6 Outperforms Lower and Higher DARs[1,2]



Activity in Both TNBC and ER+BC[2]



Activity Correlates with B7-H4 Expression[2, 3]



▲ Time of administration

1. Lines indicate approximately equivalent dose by payload; Non-binding control antibody-drug conjugates and unconjugated B7-H4 antibodies were all inactive; Certain data omitted for clarity
2. Toader et al. Molecular Cancer Therapeutics. 2023
3. Expression measured by tumor proportion score

CDX, cell line-derived xenograft; DAR, drug-to-antibody ratio; DF, Dolaflexin; mg/kg, milligrams per kilogram; mm, millimeters; PDX, patient-derived xenograft; SEM, standard error of mean; TNBC, triple-negative breast cancer

XMT-1660 Phase 1 Dose Escalation Design

Dose Escalation
Primary Endpoints
MTD, safety and tolerability
Secondary Endpoints
ORR, DOR, DCR, PK, ADA

Indications Being Enrolled Include:

Triple-Negative Breast Cancer

HR+/HER2- Breast Cancer

Endometrial Cancer

Ovarian Cancer

Doses Investigated to Date with XMT-1660 IV:

7.2 – 59.0 mg/m^2 capped for BSA (Q3W or Q4W)

Backfill Cohorts
Primary Endpoint
Safety and tolerability
Secondary Endpoints
ORR, DOR, DCR, PK, ADA

- In parallel with DES, backfill cohorts are enrolling additional participants at multiple dose levels from DES
- Each backfill cohort is enrolling up to 12 patients and may focus on tumor types of particular interest
- Data from both DES and backfill cohorts will be utilized to determine the RP2D
- Backfilling at multiple dose levels to optimize dose and schedule

Information above as of February 28, 2024
ADA, anti-drug antibody; BSA, body surface area DCR, disease control rate; DES, dose escalation; DL, dose level; DOR, duration of response; ER+, estrogen-receptor-positive; IV, intravenous; LoT, line of therapy; mg/m2, milligrams per meter squared; MTD, maximum tolerated dose; N, number of patients; ORR, objective response rate; PK, pharmacokinetics; RP2D, recommended Phase 2 dose; Q3W or Q4W, every three weeks or every four weeks

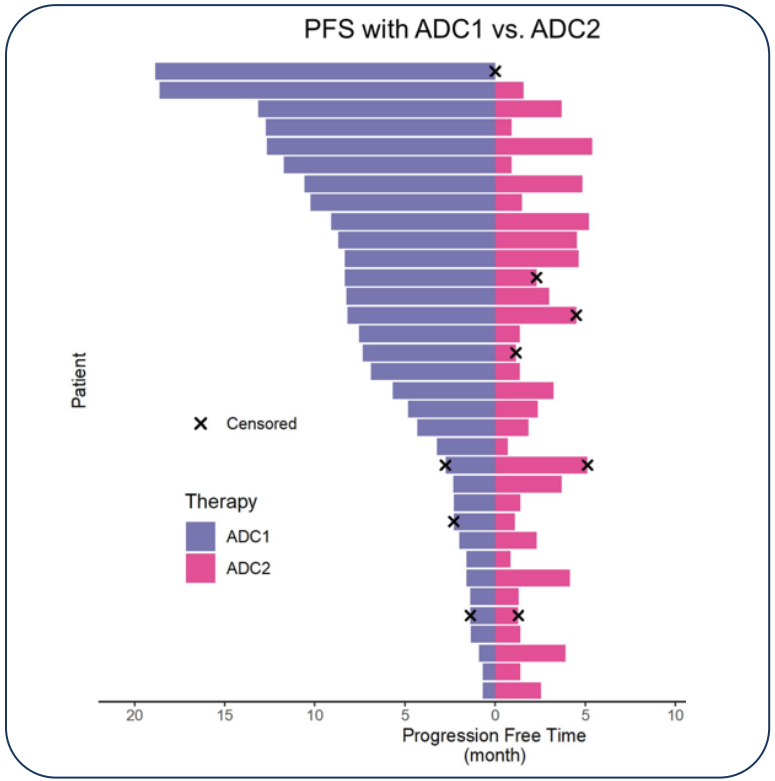
XMT-1660: Well Positioned in the B7-H4 Landscape

Clinical-Stage B7-H4 ADC Candidates

Asset	Company	Linker	Payload	Conjugation	DAR	First Patient Dosed in Phase 1
XMT-1660 *(ADC)*	Mersana	Cleavable (esterase)	AF-HPA (Anti-Tubulin)	Site Specific	DAR 6	Q3 2022
AZD8205 *(ADC)*	AstraZeneca	Cleavable (protease)	AZ'0133 (Topo-1 Inhibitor)	Fully Reduced Cysteine	DAR 8	Q1 2022
SGN-B7H4V *(ADC)*	Pfizer (formerly Seagen)	Cleavable (protease)	MMAE (Anti-Tubulin)	Stochastic Cysteine	DAR 3.5	Q1 2022
HS-20089 *(ADC)*	GSK license from Shanghai Hansoh	Cleavable (protease)	Undisclosed (Topo-1 Inhibitor)	Undisclosed	DAR 6	Q1 2022

ADC, antibody-drug conjugate; AF-HPA, auristatin F-hydroxypropylamide; DAR, drug-to-antibody ratio; MMAE, monomethyl auristatin E; topo-1, topoisomerase 1

Emerging Understanding of ADC Resistance Highlights Need for New Payloads

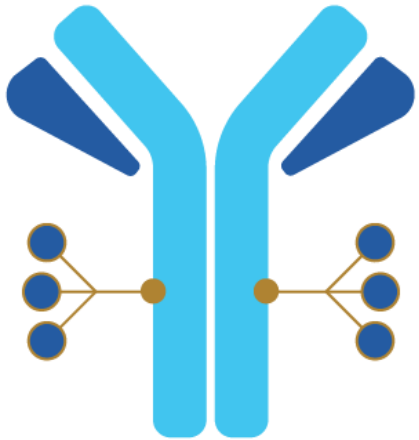


- Real-world data presented on ADC sequencing at ASCO 2023 (Abelman et al.)
- Primary focus on two topoisomerase-delivering agents: ENHERTU® (fam-trastuzumab deruxtecan-nxki) and TRODELVY® (sacituzumab govitecan-hziy)
- Findings suggest both target and payload mechanism (including topoisomerase-1 inhibition) may contribute to resistance

Figure above from Abelman et al. ASCO 2023.
ADC, antibody-drug conjugate; ASCO, American Society of Clinical Oncology; et al., and others; PFS, progression-free survival

XMT-1660: A Differentiated B7-H4 ADC

- B7-H4 is a clinically validated target for a range of solid tumors
- *In vivo* data suggest robust activity with XMT-1660 in multiple cancers
- Dolasynthen platform provides XMT-1660 with the potential to overcome common dose-limiting ADC platform toxicities
- Fast Track Designation granted by the FDA in advanced/metastatic triple-negative breast cancer
- Phase 1 dose escalation and optimization continuing (NCT05377996)



Expected 2024 Milestones

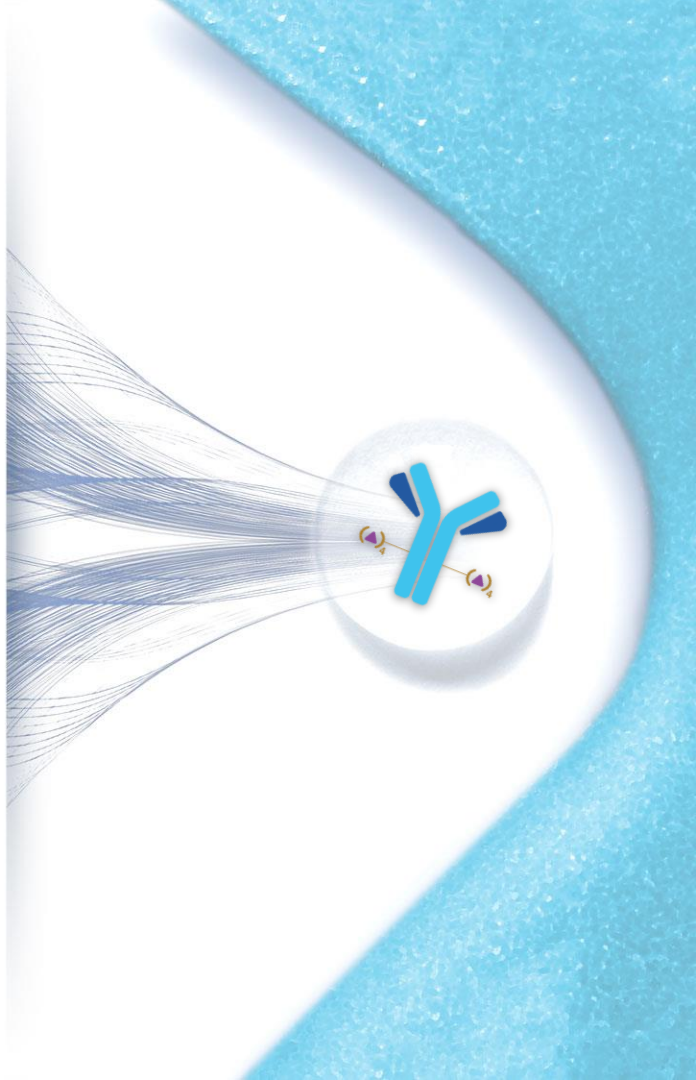
Initiate tumor-specific expansion cohorts in Q2 2024

Report initial Phase 1 dose escalation and backfill cohort data in mid-2024

ADC, antibody-drug conjugate; FDA, U.S. Food & Drug Administration

Immunosynthen

Mersana’s STING-Agonist ADC Platform

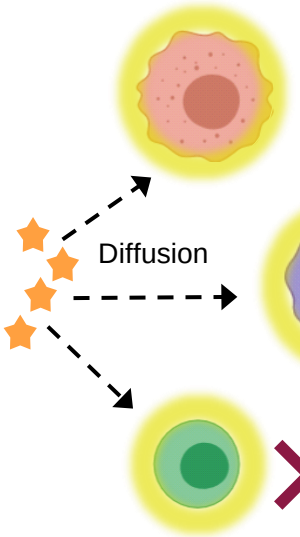


ADC, antibody-drug conjugate; STING, STimulator of INterferon Genes

Immunosynthen: Our Proprietary STING-Agonist ADC Platform

Designed to Localize STING Activation to Increase Potency and Decrease Systemic Toxicity

Free STING Agonist



✗ Passive, indiscriminate diffusion

✗ Less efficient delivery to desired cell types

✗ Proapoptotic activation of T cells (Type I IFN independent)

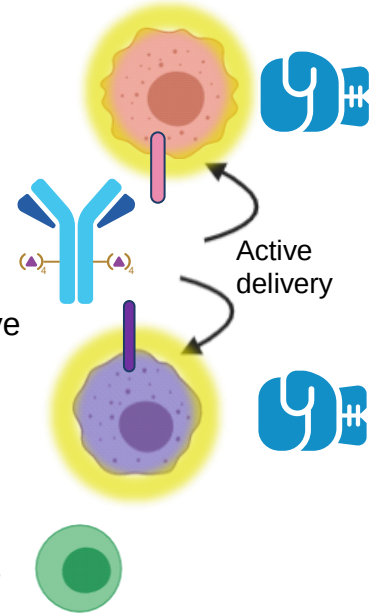
Gulen et al. *Nature Comm*. 2017
Wu et al. *Immunity* 2020

Immunosynthen ADC

✓ Antigen-dependent, active delivery into tumor cells

✓ FcγR-mediated, active delivery into tumor-resident myeloid and dendritic cells

✓ No delivery to T cells



Duvall et al. Journal of Medicinal Chemistry. 2023

ADC, antibody-drug conjugate; FcγR, Fc gamma receptor for immunoglobulin G; IFN, interferon; STING, STimulator of INterferon Genes

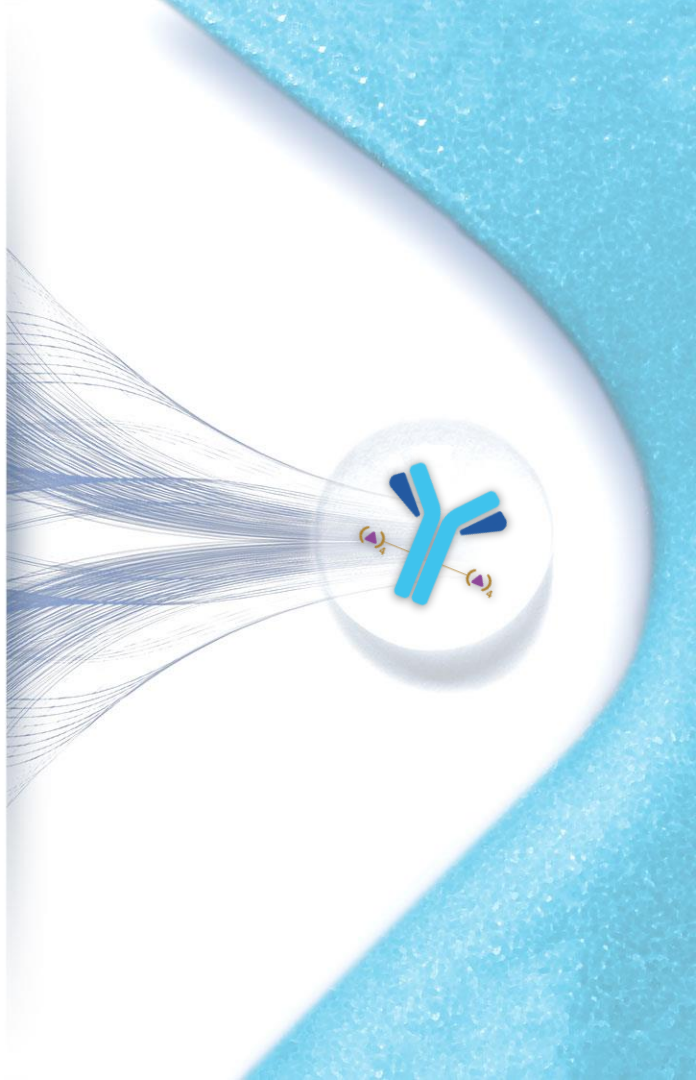
XMT-2056

Platform: Immunosynthen

Target: HER2 (novel epitope)

DAR: 8

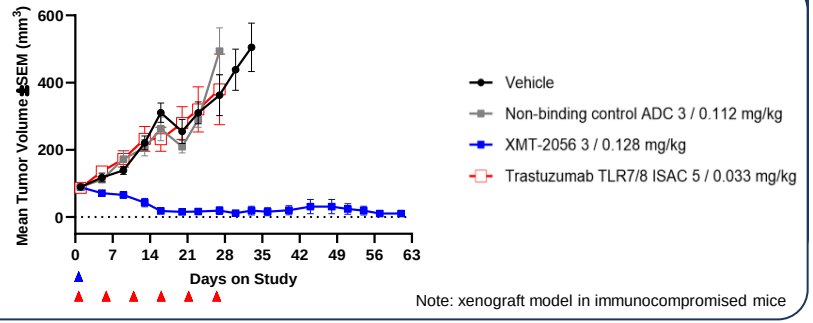
Initial Cancers of Interest: HER2+ breast, gastric, colorectal and non-small-cell lung cancers



DAR, drug-to-antibody ratio; HER2+, human epidermal growth factor receptor 2 positive

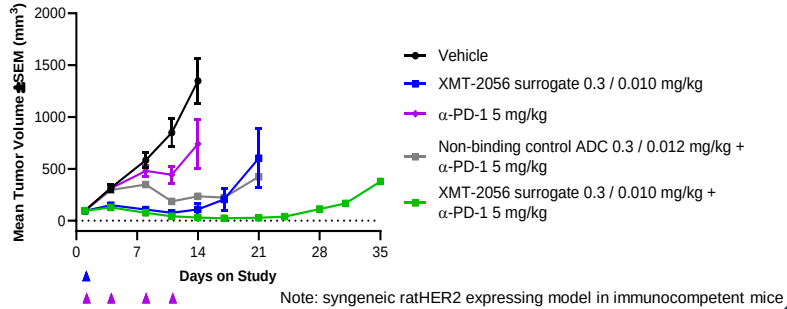
A Single Dose of XMT-2056 Drives Strong Monotherapy and Combination Activity in Multiple Preclinical Models

Strong Activity in HER2 High



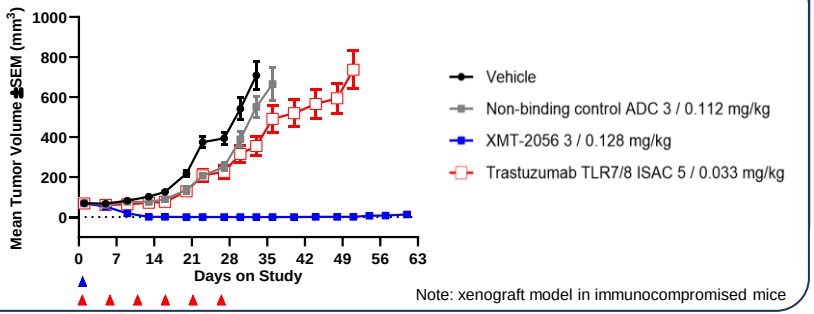
Note: xenograft model in immunocompromised mice

XMT-2056 Enhances Activity of Anti-PD-1



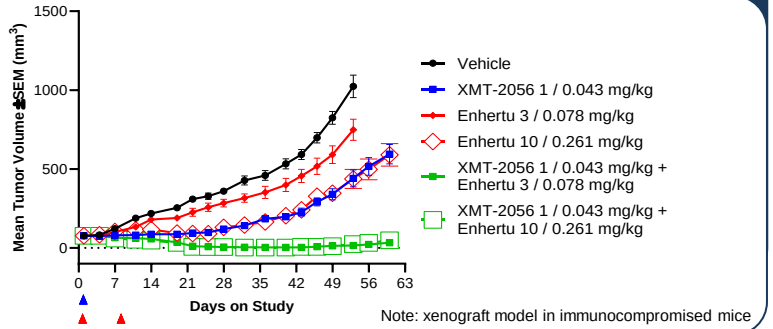
Note: syngeneic ratHER2 expressing model in immunocompetent mice

Strong Activity in HER2 Low



Note: xenograft model in immunocompromised mice

XMT-2056 Enhances Activity of ENHERTU®



Note: xenograft model in immunocompromised mice

▲ Time of administration(s)

ADC, antibody-drug conjugate; HER2, human epidermal growth factor receptor 2; ISAC, immune-stimulating antibody conjugate; mg/kg, milligrams per kilogram; mm, millimeter; PD-1, programmed cell death protein 1; SEM, standard error of mean; TLR, toll-like receptor

XMT-2056 Phase 1 Dose Escalation Design

Dose Escalation
Primary Endpoints
MTD or RP2D, safety and tolerability
Secondary Endpoints
ORR, DOR, DCR, PK, ADA

Indications for DES and Enrichment Cohorts

HER2+ BC

HER2+ GC/GEJC

HER2+ CRC

HER2+ NSCLC

Other HER2+ Cancers

HER2+ defined as IHC 3+ or 2+/ISH+

Bayesian optimal interval design for dose escalation

XMT-2056 via IV q21 days

Tumor assessment every other cycle

Select Enrichment Cohorts (SECs)
Primary Endpoint
Safety and tolerability
Secondary Endpoints
ORR, DOR, DCR, PK, ADA

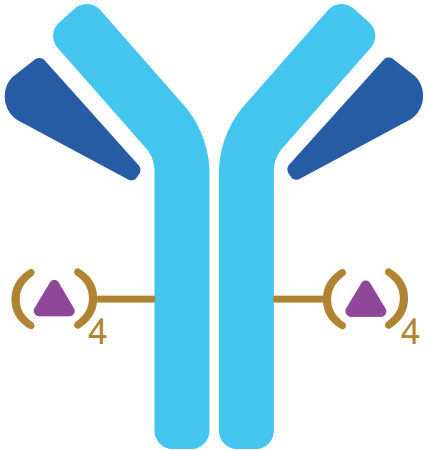
- In parallel with DES, SECs may enroll participants into tumor type-specific cohorts at cleared dose level(s) from DES
- SECs will include 2 BC enrichment cohorts: HER2+ BC and HER2-low BC, and may also include other cohorts of HER2+ cancers
- Data from both DES and SECs will be utilized to determine the RP2D

ADA, anti-drug antibody; BC, breast cancer; CRC, colorectal cancer; DCR, disease control rate; DES, dose escalation; DOR, duration of response; GC, gastric cancer; GEJC, gastroesophageal junction cancer; HER2+, human epidermal growth factor receptor 2 positive; IHC, immunohistochemistry; ISH, in-situ hybridization; IV, intravenous; MTD, maximum tolerated dose; N, number of patients; NSCLC, non-small-cell lung cancer; ORR, objective response rate; PK, pharmacokinetics; q21, every 21; RP2D, recommended Phase 2 dose

XMT-2056: Our Lead Immunosynthen ADC

First-in-class STING-agonist ADC targeting a novel HER2 epitope

- Targets a HER2 epitope distinct from pertuzumab and trastuzumab, providing the potential for both monotherapy and combination activity
- Evidence of strong preclinical activity in both HER2-high and HER2-low tumor models
- Granted Orphan Drug designation from FDA for gastric cancer
- Recently resolved FDA clinical hold; Phase 1 clinical trial restarting (NCT05514717)



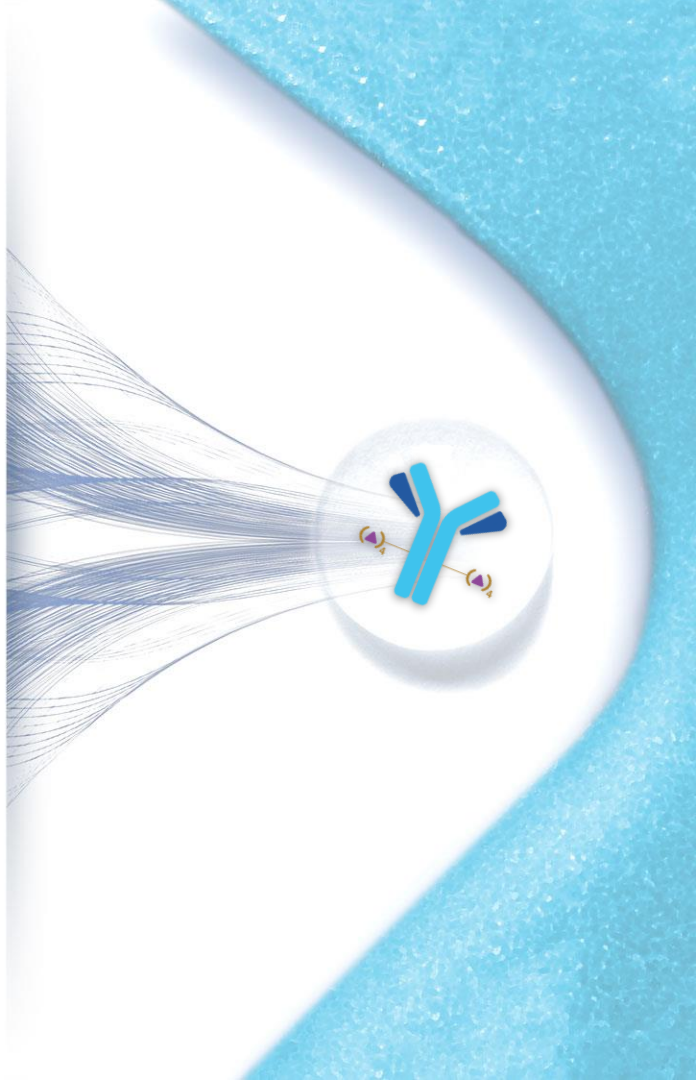
2024 Objective

Advance Phase 1 dose escalation

ADC, antibody-drug conjugate; FDA, U.S. Food and Drug Administration; HER2, human epidermal growth factor receptor 2; STING, STimulator of INterferon Genes

Collaborations

Advancing Next-Generation ADCs
with Strategic Collaborators



ADC, antibody-drug conjugate

$170M Generated in Upfront Capital from Collaborations

More than $3 billion in potential milestones

	J&J	GSK	Merck KGaA Darmstadt, Germany
SCOPE	Up to three targets on Dolasynthen platform	XMT-2056 (option to co-develop/ commercialize)	Up to two targets on Immunosynthen platform
UPFRONT	$40 million	$100 million	$30 million
TOTAL POTENTIAL MILESTONES	>$1 billion	$1.36 billion*	$800 million
POTENTIAL ROYALTIES	Tiered royalties up to low double-digits	Tiered royalties up to mid-20s or U.S. profit share/co-promotion	Tiered royalties up to low double-digits

* Includes option exercise fee and milestones.

Mersana Therapeutics Overview and Milestones

Two Innovative ADC Platforms	Dolasynthen and Immunosynthen fueling pipelines for Mersana and its collaborators
Differentiated B7-H4 ADC in Clinic	Dose escalation and optimization continuing in Phase 1 clinical trial of XMT-1660; expect to initiate expansion in Q2 and report initial clinical data in mid-2024
First-in-Class IO ADC in Clinic	Phase 1 clinical trial of XMT-2056 restarting; expect to advance dose escalation in 2024
Validating Collaborations	Johnson & Johnson, GSK, Merck KGaA collaborations contributed $170 million in upfront payments; initial milestone payments received in 2023

$209.1 million in cash, cash equivalents and marketable securities as of year end 2023; capital resources expected to support current operating plan commitments into 2026

ADC, antibody-drug conjugate; IO, immuno-oncology

Mersana
THERAPEUTICS

Thank You!