

Aptose Corporate Presentation

August 19, 2022



PRECISION ONCOLOGY FOR
THERAPIES OF TOMORROW

NASDAQ: APTO
TSX: APS

Disclosure

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Aptose Biosciences Investor Highlights (NASDAQ: APTO)

- **Publicly-traded, clinical-stage** biotech company developing **oral kinase inhibitors** to treat cancer patients with life-threatening **hematologic malignancies**
- **HM43239** lead agent and primary value driver
 - **Clinically de-risked** (>50 patients in US and S. Korea) once daily, oral, myeloid kinase inhibitor
 - **Safely** achieved single agent Complete Remissions (**CRs**) in **diverse R/R AML patient populations**
 - **Strong enough** to deliver single agent CRs yet **gentle enough** for safety in R/R AML patients
 - **Intense support** from clinical investigators in single agent and drug combination trials
 - Efficacy & safety profile position as a **preferred agent for combination therapy and broad commercial use**
 - **Multiple genetically-defined AML target populations** as potential indications for **>\$1bn commercial market**
 - **Targets more genetically-defined AML target populations** than SYK inhibitors, IRAK4 inhibitors, or Menin inhibitors
 - **Response rates** in AML populations of unmet needs that may support **single agent Phase 2 accelerated approvals**
 - **Strong intellectual property** estate
- **Experienced leadership team** with deep expertise in kinase inhibitors & orphan hematologic diseases
- **Meaningful near-term upside** with value-driving clinical updates and milestones through 2022 and 2023



Aptose Leadership Team: Multifaceted Expertise in Therapeutic Development



William G. Rice, PhD

Chairman, President & Chief Executive Officer



Rafael Bejar, MD, PhD

Sr. VP & Chief Medical Officer



Fletcher Payne

Sr. VP & Chief Financial Officer



CELL GENESYS



Philippe Ledru

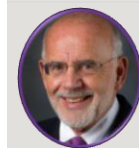
Sr. VP & Chief Commercial Officer



Brian J. Druker, MD

Chair, Scientific Advisory Board

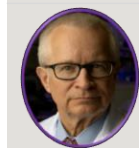
- Pioneer in the field of precision medicine, Key Role in the development of Gleevec - the first targeted kinase inhibitor for cancer
- Member, National Academy of Medicine, National Academy of Sciences & American Academy of Arts & Sciences
- Winner of Karnofsky Award, Lasker Award, Japan Prize in Healthcare and Medical Technology, Tang Prize in Biopharmaceutical Science, Sjöberg Prize
- Leader of Inter-institutional Beat AML Initiative



Michael Andreeff, MD, PhD

Scientific Advisory Board

- Renowned hematology specialist, Expert in AML and other hematologic malignancies
- Expert in drug resistance and drug mechanisms
- Professor of Medicine, Paul and Mary Haas Chair in Genetics
- Chief, Section of Molecular Hematology and Therapy, MD Anderson Cancer Center



Daniel Von Hoff, MD, FACP

Scientific Advisory Board

- Former President of AACR, Board Member of ASCO, Former Presidential Cancer Advisory Board
- Physician in Chief, Tgen, Medical Director of Research for McKesson Specialty Health
- Chief Scientific Officer for US Oncology Research, Professor of Medicine, Mayo Clinic Scottsdale

Aptose Biosciences: Clinical Stage Pipeline of Differentiated Myeloid Kinase Inhibitors

HM43239 oral myeloid kinase inhibitor clinically validated for R/R AML patients

- Clinically Safe & Effective** | **25-44% ORR** in Phase 1/2 Trial with **CRs in multiple genetically-defined AML target populations**
- Near-term Value Creation** | Expansion Trials begin 2022 as passage into Registrational Studies planned for 2023
- Orphan and Fast Track** | Designations earned with impressive clinical responses across AML populations
- Clinical Need** | Across R/R and front line, fit and unfit, induction and maintenance therapies
- Commercial Opportunity** | Single agent and combination therapy commercial opportunity in excess of \$1B

LUXEPTINIB (CG-806) dual lymphoid and myeloid kinase inhibitor

- High Value Targets** | B-cell cancers, AML/MDS and inflammation: BTK, FLT3, LCK, LYN, Others
- Activity in Ill Patients** | Difficult to treat R/R B-cell lymphoma/CLL and R/R AML patients
- Improved Formulation** | G3 formulation being explored to reduce drug substance and increase plasma exposure







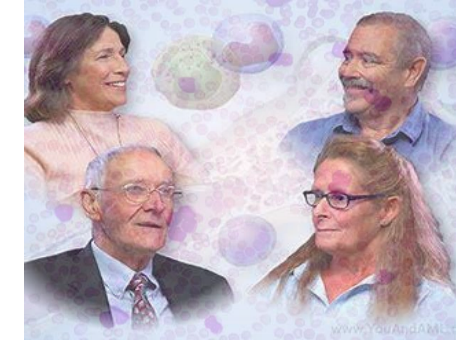
HM43239 “239”

Oral, Daily, Myeloid Kinase Inhibitor for
Genetically-Defined AML Target Populations

AML in the US: Estimated 20,240 new cases and 11,400 deaths in 2021

Continued Unmet Need for More Effective and Safe Therapies

Epidemiology	 US (2021)	 EU5 (2020)	 Japan (2021)	 China (2020)
Leukemia Incidence ³	61,090 ¹	51,820 ³	14,600 ⁷	85,400
AML Incidence	20,240²	16,580 ^{3a}	6,570 ^{7c}	31,430 ^{3b}
5-Year Prevalence (Leukemia) (2020) ³	187,560	152,230	41,280	241,750
Mortality (Leukemia)	11,400 (AML)²	31,690	8,700 ⁷	61,690



Deadly and heterogeneous cancer with 5-year survival rate at diagnosis of approx. 29%

Relapsed AML patients have a median life expectancy of < 6 months* with approved therapies

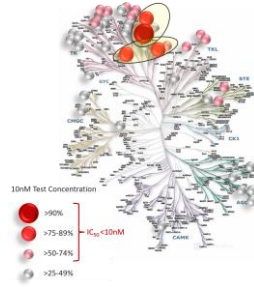
Need more effective & better tolerated targeted agents

- **DURABILITY** to achieve **lasting remissions** and **extend meaningful/quality life**
- **SAFETY** for **maintenance / MRD+ therapy** and for **drug combination therapy**
- **BREADTH** to **better treat R/R AML patients** and **overcome resistance** to current agents

Safe and effective agents expected to expand AML market and command significant market share

HM43239 Effective and Well Tolerated Targeted Agent

Proven Broad Clinical Activity in AML Patients to Treat Significant Unmet Needs



Validated AML Targets
SYK, JAK1/2, FLT3^{WT/MUT}, cKIT^{MUT}

Single Agent CRs

CRs and No DLT at 3 dose levels

ORR 25% in TP53^{MUT} R/R AML
Harboring adverse mutations

**Accelerated Paths to Market
in R/R Disease**

HM43239
*AML Kinase
Inhibitor*

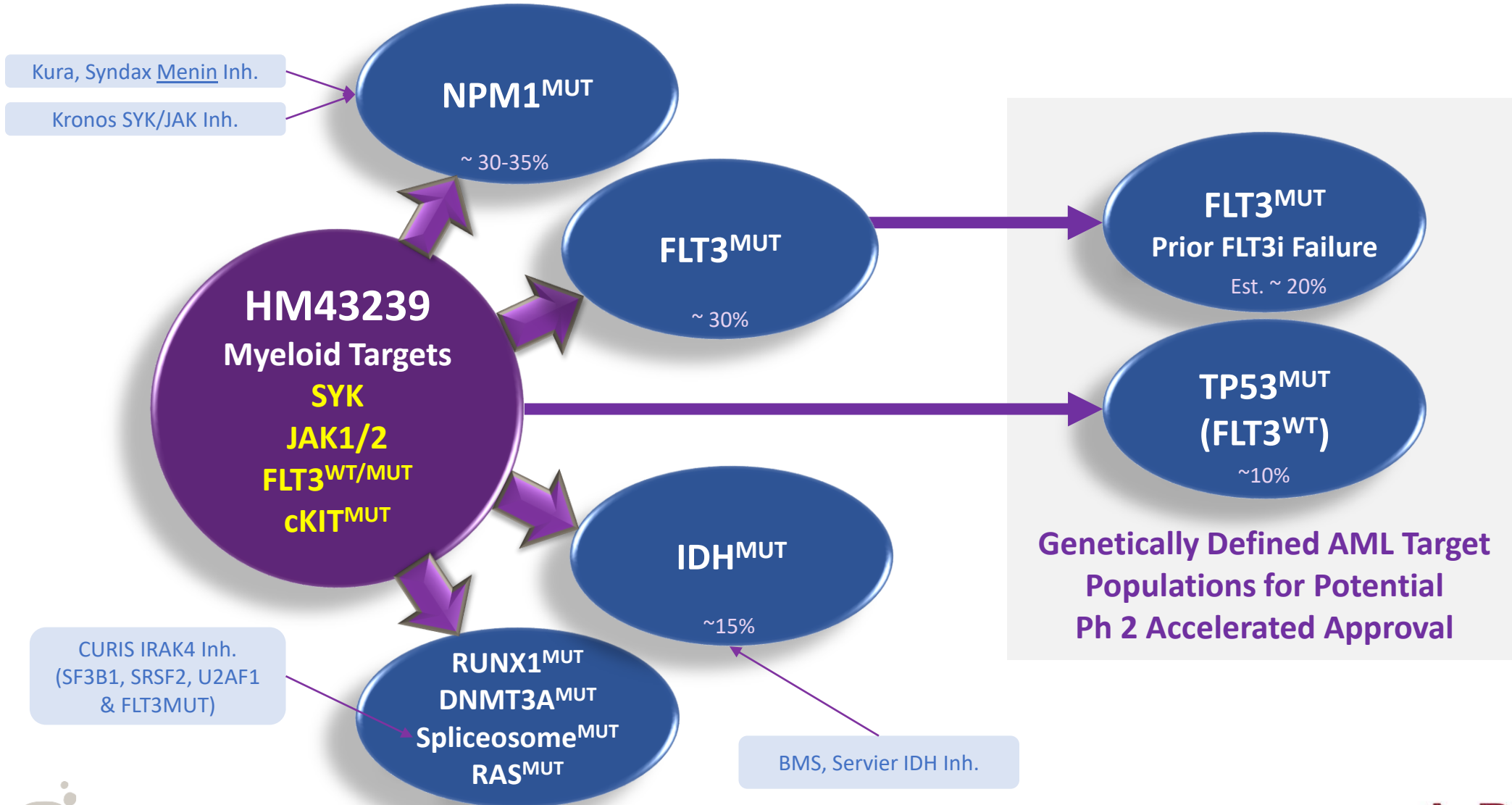
Broad Therapeutic Window

No drug-related SAE, QTc
toxicities, or CK increases

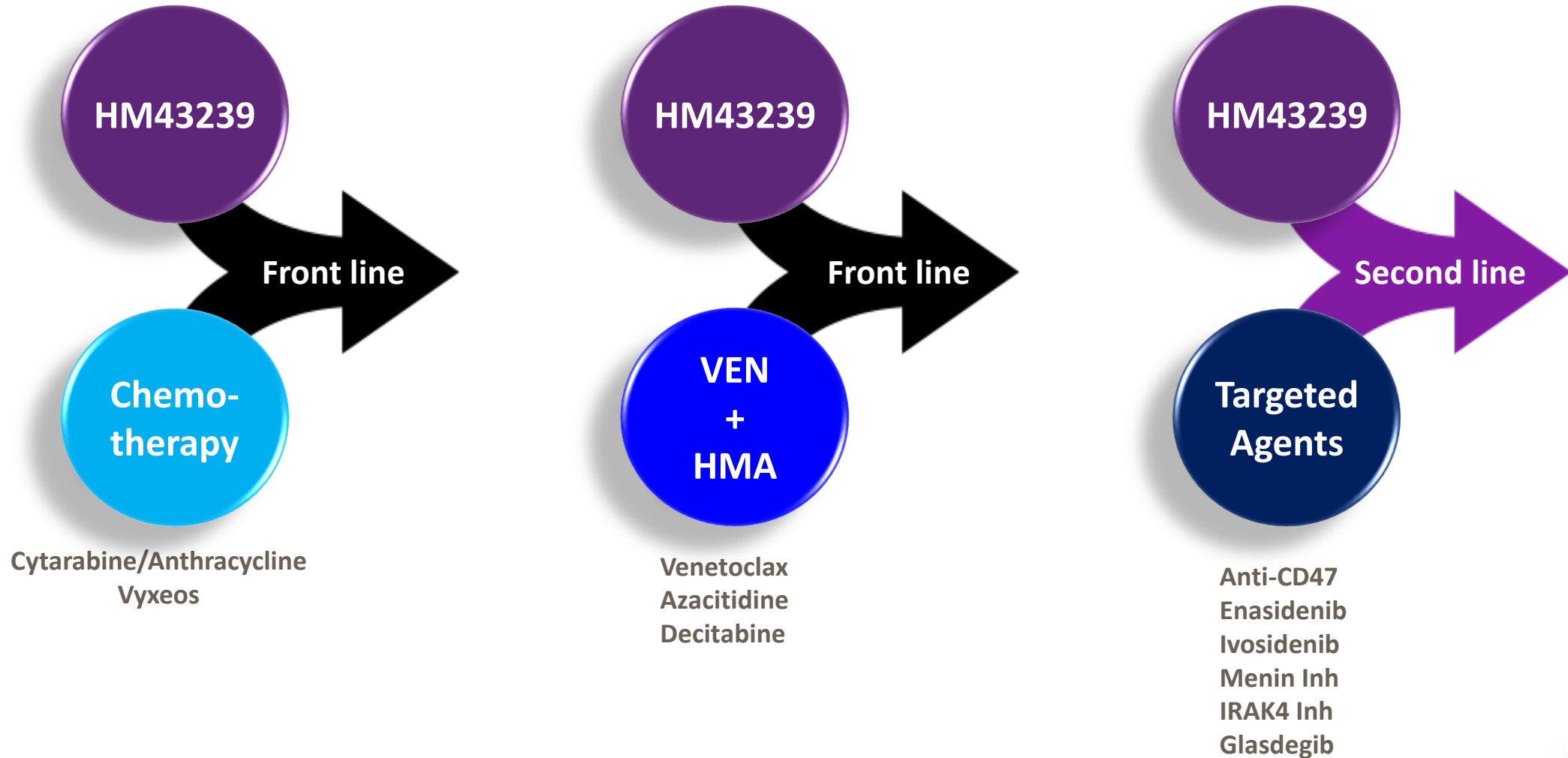
ORR 43% in FLT3^{MUT} R/R AML
CRs in patients failed prior FLT3i

Broad Market Potential
R/R, 1L, Maintenance/MRD+/Combination

HM43239: Unlike Any Other Targeted Agent for AML Safely Delivers CRs in Multiple Genetically Defined AML Target Patients

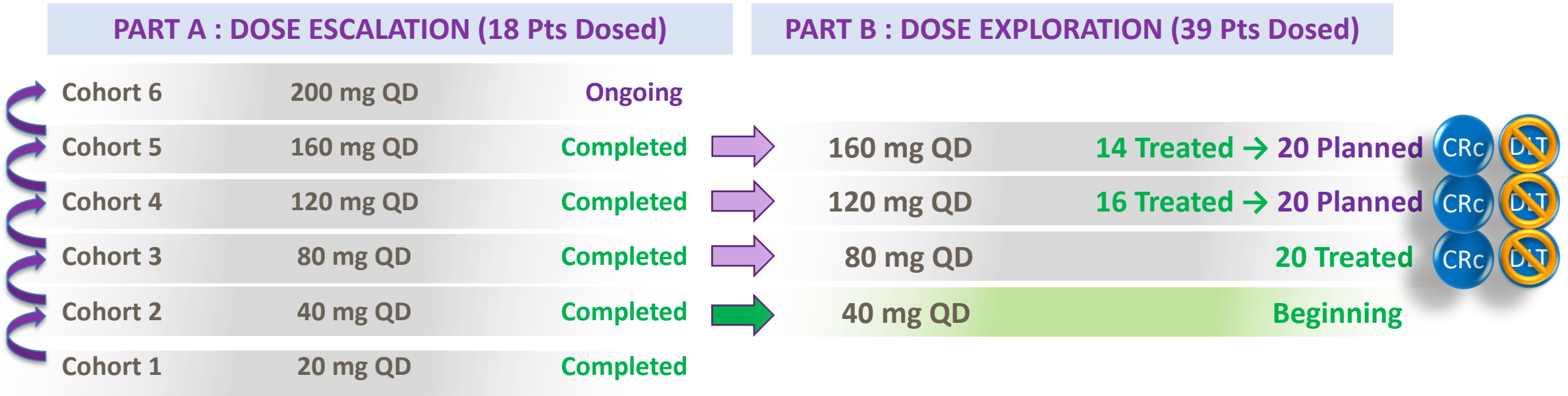


HM43239 Effective and Well Tolerated Targeted Agent Potential as Preferred Agent of Choice for Combination Therapy



Emerging Clinical Data Support HM43239 as Potential Superior Therapy

HM43239 Phase 1/2 Study in R/R AML: Ongoing Dose Escalation & Dose Exploration



HM43239 Safety and Efficacy Data

Broad Therapeutic Window as a Single Agent in R/R AML Patients

- **Safety Profile Favorable to Date**

- No drug related SAE, deaths, or AE of elevated CK (creatinine kinase)
- No drug related AE of QT prolongation – No observed relation between Δ QTc and dose
- No DLT up to 160 mg and one DLT of muscle weakness (not rhabdomyolysis) at 200 mg

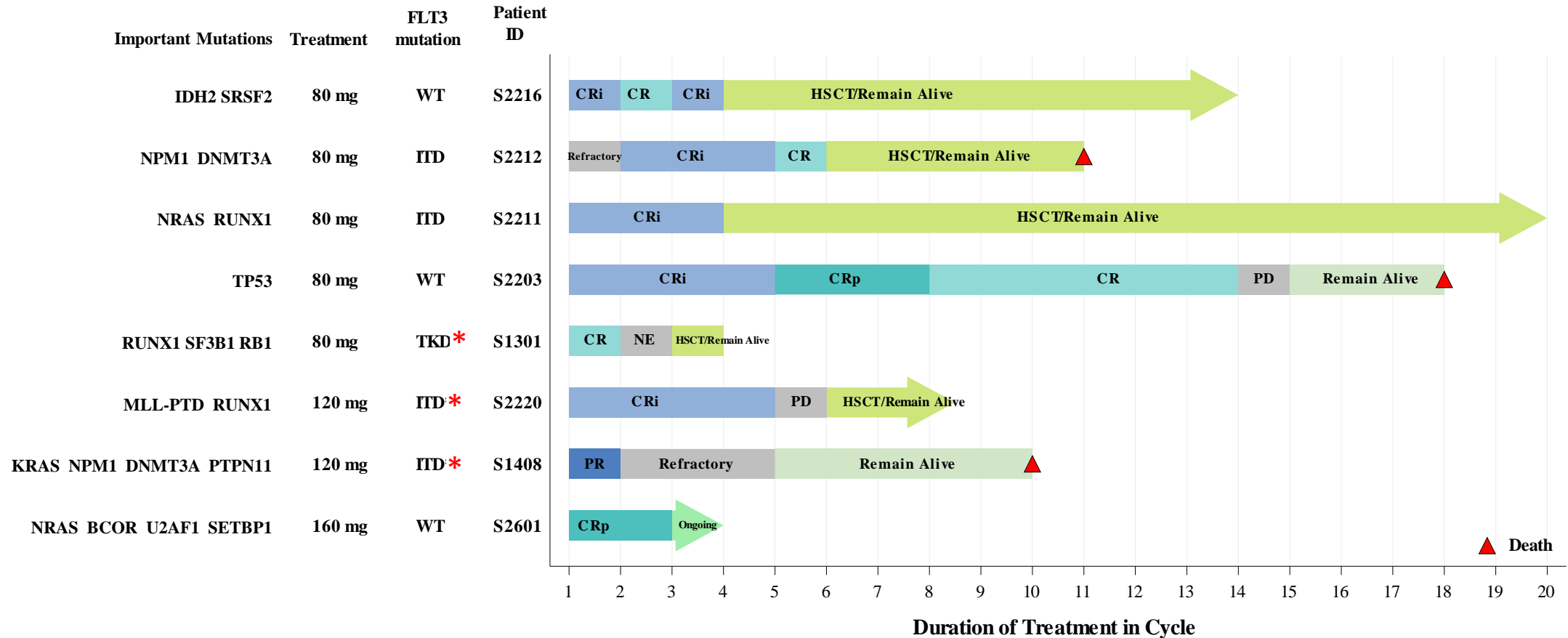
- **Demonstrated Efficacy Across a Diverse Set of R/R AML Patients**

- **CRc in AML with adverse mutations (FLT3^{WT})** incl. TP53-mutant and complex karyotype
- **CRc in FLT3-mutant AML (Fast Track)** incl. prior failure of other FLT3 inhibitors

- **Identified a Broad Therapeutic Window**

- **Safely achieved efficacy at 3 separate dose levels** (80 mg, 120 mg, 160 mg) with no DLT
- Demonstrated **broad therapeutic range** across safe dose levels
- Safety profile supports **combination therapy with other agents**

HM43239 Diversity of Genetically-Defined R/R AML Patients Who Achieved a Clinical Response to Date in Phase 1/2 Study



Abbreviation: CR, complete response; CRi, complete response with incomplete hematologic recovery; CRp, complete response with incomplete platelet recovery; HSCT, hematopoietic stem cell transplantation; NE, not evaluable; PD, progressive disease; PR, partial remission.
 Note: 'Ongoing' means treatment is still ongoing; 'Remain Alive' indicates patients' status in follow-up after treatment termination; The right arrow at the end of horizontal bar indicates patients are still on study, whereas without the right arrow indicates patients discontinued from study.
 Note: Each response assessed at a regular visit is considered to have started 1 cycle before the assessment; however the start of the response is considered the integer part of (study day/28) if the response occurred at the End of Treatment visit.

*Indicates patients who received prior FLT3 inhibitors, including gilteritinib and/or midostaurin.

Data as of July 14, 2022

HM43239 Diversity of Genetically-Defined R/R AML Patients Who Achieved a Clinical Response to Date in Phase 1/2 Study

<u>Important Mutations</u>	<u>FLT3 Status</u>	<u>Dosage</u>	<u>Best Response</u>	<u>HSCT</u>
IDH2 SRSF2	Wild Type	80 mg	CR	Yes
TP53	Wild Type	80 mg	CR	Ineligible
NRAS BCOR U2AF1 SETBP1	Wild Type	160 mg	CRp	In Process
NPM1 DNMT3A	ITD	80 mg	CR	Yes
NRAS RUNX1	ITD	80 mg	CRi	Yes
RUNX1 SF3B1 RB1	TKD ^{Prior FLT3i}	80 mg	CR	Yes
MLL-PTD RUNX1	ITD ^{Prior FLT3i}	120 mg	CRi	Yes
KRAS NPM1 DNMT3A PTPN11	ITD ^{Prior FLT3i}	120 mg	PR	Ineligible

Abbreviation: CR, complete response; CRi, complete response with incomplete hematologic recovery; CRp, complete response with incomplete platelet recovery; HSCT, hematopoietic stem cell transplantation; NE, not evaluable; PD, progressive disease; PR, partial remission.
 Note: 'Ongoing' means treatment is still ongoing; 'Remain Alive' indicates patients' status in follow-up after treatment termination; The right arrow at the end of horizontal bar indicates patients are still on study, whereas without the right arrow indicates patients discontinued from study.
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Data as of July 14, 2022

HM43239 Overall Response Rate (CRc + PR)

7 CRc and 1 PR to Date in Phase 1 as a Single Agent in R/R AML Patients

Mutation Status	All Patients			Evaluable Patients		
	N = 45 Patients	Number Responders	Response Rate	N = 41 Patients	Number Responders	Response Rate
FLT3+	20	4CRc 1PR	25%	19	4CRc 1PR	26.3%
FLT3+/prior FLT3i	7	3	42.9% (CRc + PR) 28.6% (CRc only)	7	3	42.9% (CRc + PR) 28.6% (CRc only)
FLT3-WT	25	3	12%	22	3	13.6%
TP53+	4	1	25%	3	1	33.3%

Overall Response Rate for "All Patients" and "Evaluable Patients" Receiving ≥ 80mg HM43239

- Findings represent a snapshot in time: The reported safety, tolerability, PK, PD and efficacy findings reported herein represent the data available may change as additional patients are assessed and more data are collected.
- "Evaluable Patients" removes those non-evaluable patients who did not have a response evaluation and had no other evidence indicating refractory disease in the peripheral blood.
- Most CRc patients went to HSCT and cannot be evaluated for transfusion independence assessment.

Abbreviation: CR, complete remission; CRc, composite complete remission; CRp, complete remission with incomplete platelet recovery; CRi, complete remission with incomplete hematological recovery; PR, partial remission.
Note: efficacy evaluable patients include all patients with at least 80% drug compliance during Cycle 1 or who had reported a DLT during Cycle 1, and who reported relevant data for efficacy interpretation such as bone marrow assessment, CBC counts, reason for treatment termination.

^[1] Overall response includes CRc and PR.

^[2] CRc includes CR, CRh, CRp and CRi.

^[3] The reported prior FLT3 inhibitors include gilteritinib, midostaurin and sorafenib.

Data as of July 14, 2022

HM43239 Potential for Accelerated Path Supported by Expansion & Registration Trials

Ongoing Dose Escalation/Dose Exploration Phase 1/2 Trial in R/R AML Patients

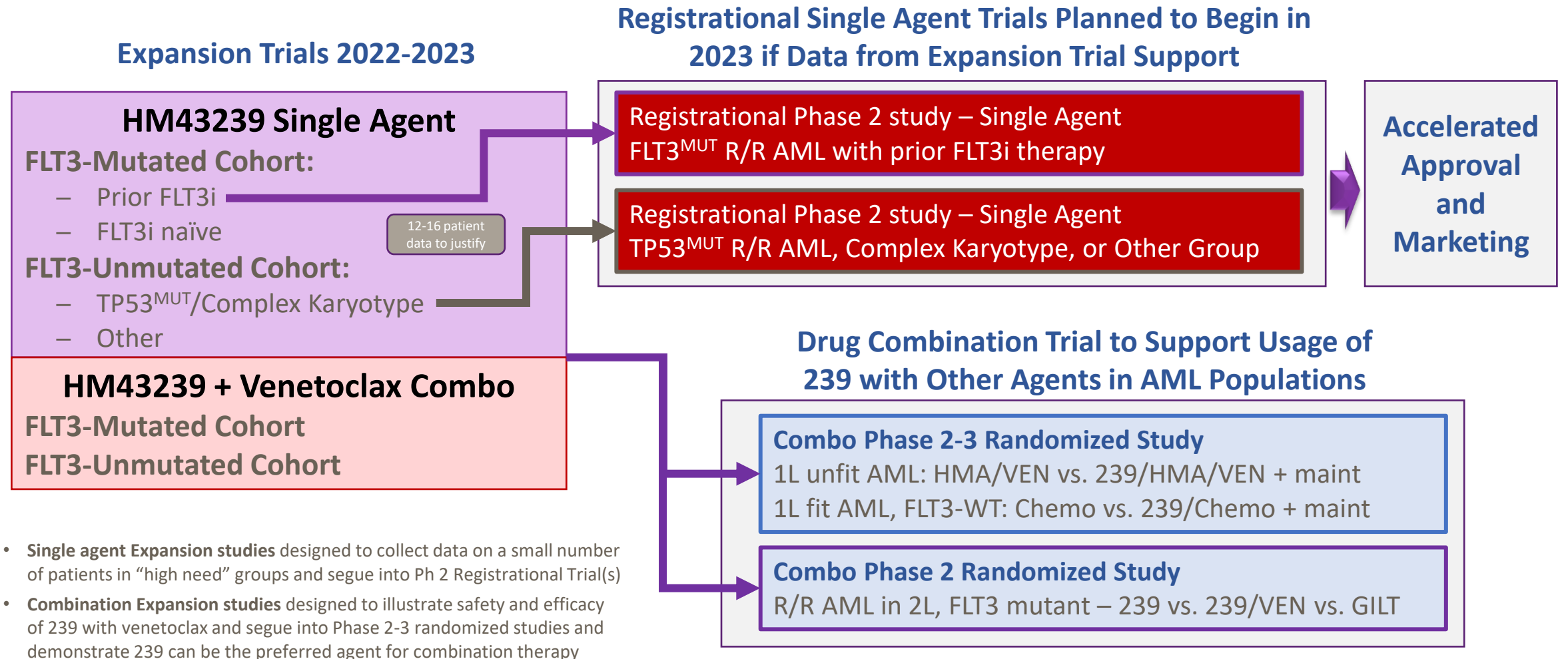
- Continue **Exploration of Highly Adverse Molecular Genotypes** (TP53-Mutated, etc.) for **Potential Fast Track Designations**
- Continue Dose Exploration at 40 mg, 120 mg and 160 mg to **Deliver Response Rate Updates & Rolling News Flow**

Doses and Patient Populations have been Selected for Expansion Trials

- **Three Safe and Efficacious Doses Identified**
 - **120 mg** planned as **Primary** Single Agent Expansion Dose with **80 mg** and **160 mg** as Bracketing Doses
- **Expansion with FLT3 Mutated R/R AML Population** (Fast Track Designation)
 - Includes FLT3+/Prior FLT3i Failure target population for potential accelerated approval
 - Includes broader FLT3-mutated population to support full approval trials in FLT3-mutated AML
 - Plan single agent to begin 2H2022 and combination (239+Ven) to begin thereafter
- **Expansion with FLT3-Unmutated R/R AML Population** (with Adverse Mutations)
 - Including TP53-Mutated target population for potential accelerated approval
 - Includes broader population to support full approval trials in NPM1/MLL, RUNX1-DNMT3A-Ras and other populations
 - Plan Single Agent to begin 2H2022 and Combination (239+Ven) to begin thereafter
- **Expansion Includes Broader Populations to support full approval : NPM1/MLL, RUNX1-DNMT3A-RAS, Broad FLT3+ and Others**

Expansion Trials in AML Patients Serve as Segue to Registrational Trials

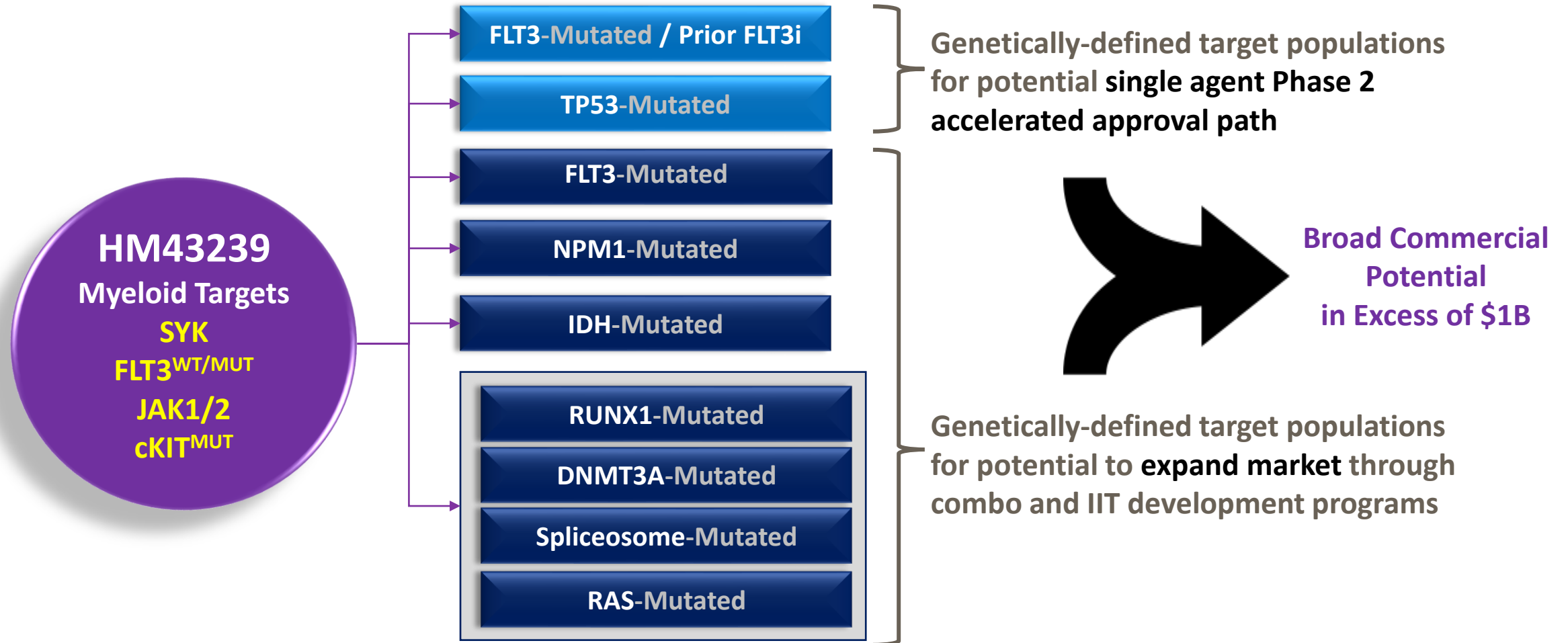
HM43239 Global Dose Expansion Trial Planned to Support Phase 2 Registrational Trials for Accelerated Approval and Drug Combination Trials for Broad Commercialization



Clinical Development Plan Sets the Stage for Broad Commercial Success

HM43239: Positioned for Accelerated Approval & Traditional Development

Broad Commercial Opportunities >\$1 billion in Multiple AML Target Populations



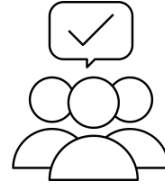
HM43239 Clinically Validated, Once Daily, Oral Myeloid Kinase Inhibitor

Confidence of Clinical Investigators and KOLs



Targets Constellation of Kinases Important in AML

- Potent inhibitor of myeloid kinases SYK, FLT3^{WT/MUT}, JAK1/2 and mutant forms of c-KIT associated with transformation and resistance
- Potential to treat genetically defined AML patients across multiple lines of therapy & populations
- Safety & efficacy foretell significant market potential for R/R, 1L, FLT3-/+, Fit/Unfit AML populations



Clinical Validation Supports Path of Rapid Development for Breadth of AML Patients

- **FLT3-Mutated Patients**
 - CRc in patients who failed prior FLT3 inhibitors
 - CRc in patients with ITD and TKD mutated FLT3
 - FDA Fast Track received for FLT3^{MUT} R/R AML
- **FLT3-Unmutated Patients**
 - CRc in genetically-defined patients with specific mutations: NPM1, MLL, TP53, DNMT3A, N/KRAS, IDH2, U2AF1, RUNX1, Others
- **Broad Therapeutic Window**
 - Well tolerated across three active & safe doses
- **Preferred Agent Profile for Combination Therapy**



Program Goals Supporting Rapid Development

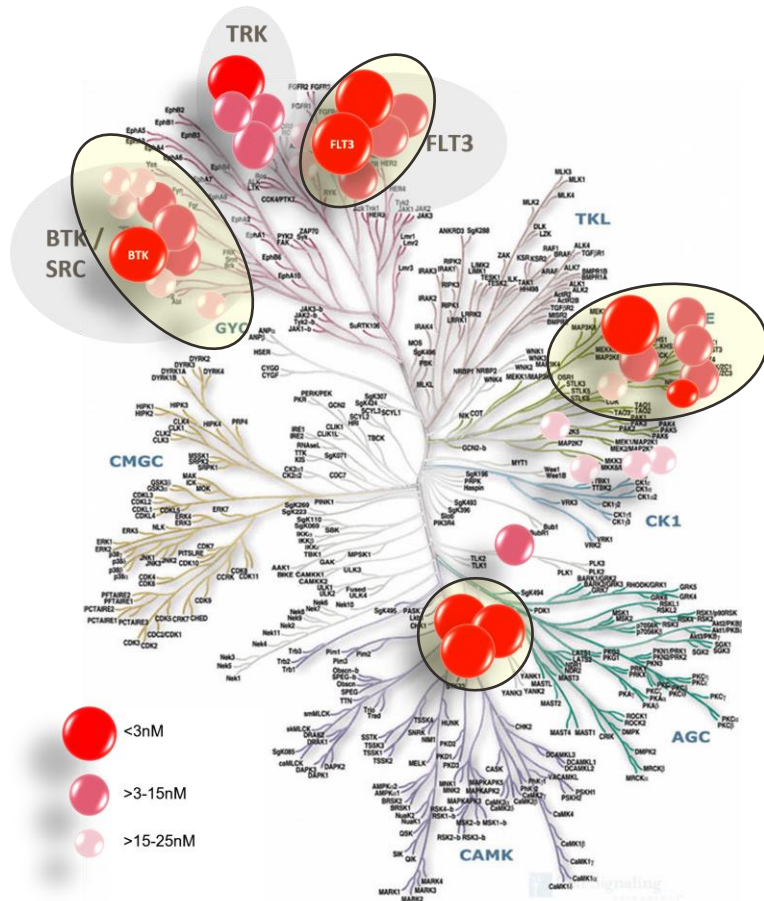
- *Explore Molecular Subgroups* for Potential Fast Track Designations
- *Single Agent Expansion Trial (239)* planned 2H2022
- *Combo Expansion Trial (239+Ven)* planned 2H2022
- *Registrational Ph2 study(ies)* planned 2023 from Expansions
- **Broad commercialization goals** supported by clinical development in diverse patient populations



LUXEPTINIB

Oral Lymphoid & Myeloid Kinase Inhibitor

Luxetpinib: Atypical, Dual Lymphoid and Myeloid Kinome Inhibitor



Unique Kinome Targeting

Mutation Agnostic

Robust Safety Profile

Inhibits high value targets: BTK, FLT3, CSF1R, PDGFR α , TRK, AURK

Only agent to potently inhibit the validated **BTK** and **FLT3**

In development for the treatment of both lymphoid & myeloid hematologic cancers

Inhibits **WT** and **all mutant forms** of BTK

Inhibits **WT** and **all mutant forms** of FLT3

May avoid rapid emergence of drug resistance

Simultaneously suppresses multiple oncogenic signaling pathways

Avoids kinases that negatively impact safety

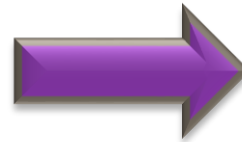
Generally, well tolerated in clinical studies to date

HM43239 Effective and Well Tolerated Targeted Agent

Proven Broad Clinical Activity in AML Patients to Treat Significant Unmet Needs

Phase 1a/b R/R B-cell leukemias/lymphomas

36 Patients dosed

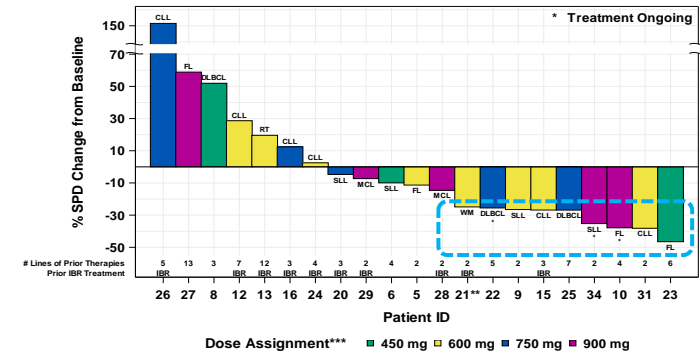


Antitumor activity in diverse B-cell cancers

Multiple patients experienced tumor shrinkage below baseline but none with $\geq 50\%$ reduction

Best Response in Evaluable Patients

Includes all patients who had at least one imaging for tumor measurements or IgM measurement (WM patient) since starting treatment (n=16)



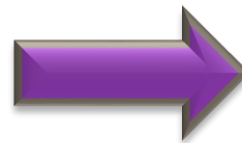
Note: BR = Brutinib
Note: Only patients with post-screening assessments are shown on plot
**WM patient(s) measuring % IgM
***Dose level shown from time of disease assessment, if at least 1 cycle of doses received at this level
Source: Z:\GA\Share\CC-900CC-900-01\Program\Bart_w\external_900_CLL_WM_BR161.sas 27JUL2022 17:22

Targets Key Kinases in Lymphoid and Myeloid Cancers

- Inhibits BTK, FLT3, CSF1R, PDGFR α , TRK, AURK, others
- Current dosing at 900mg BID with original formulation
- Generally well-tolerated
- To date 64 patients dosed

Phase 1a/b R/R AML and MDS

28 Patients dosed



MRD-negative Complete Remission

Observed in one heavily pretreated relapsed AML patient at 450mg BID dose level

Luxeptinib Ongoing Activities

- **Critical Step for Lux Program is the Transition to an Improved Formulation (G3)**
 - Goals to achieve **greater plasma exposures** with administration of **less drug substance** and **fewer number of pills**
- **Lux G3 Formulation is Being Tested Relative to the Original Formulation in Both Phase 1 trials**
- **Following a Single Dose of Lux G3, Patients Continue on Study Using the Original Formulation**
- **13 Patients Enrolled Thus far to Test a Single Dose of Lux G3**
 - 4 at 50mg | 4 at 100mg | 4 at 200mg | 1 so far at 10mg
- **The Single Dose PK Data with G3 are being Evaluated with PK Modeling Under Conditions of Once or Twice Daily Continuous Dosing**

Luxepatinib: Oral Lymphoid and Myeloid Kinome Inhibitor



Targets Kinases Important in Lymphoid *and* Myeloid Cancers

- Inhibits BTK, FLT3, CSF1R, PDGFR α , TRK, AURK, others
- Generally well-tolerated – currently dosing at 900mg BID with original formulation
- Delivered antitumor activity in diverse B-cell cancers
- Delivered **MRD- CR in relapsed AML patient** with high exposure



Findings to Date Identify Needs for Future Development

- Clinical activity and tolerability justify further dose exploration
- Doses of 450-750mg with original formulation provided incremental exposure increases
- Identified **need for consistent and higher exposure levels** in AML & B-cell cancer patients



Next Steps for Luxepatinib in 2022

- Continue exploring improved G3 formulation to increase exposure and to lower pill burden and drug substance manufacture
- G3 early data are encouraging
- PK modeling of continuous dosing with preliminary PK data has been initiated
- Plan continuous dosing with G3 if the data from single dose and modeling are supportive

Aptose Biosciences (APTO)

Key Financial Highlights Q2/2022

Q2 Financials:

- The company's cash balance at June 2022 was \$62.4M
- Cash burn during Q2 was \$7.1M
- Cash runway into Q1 of 2024
- The company is pre-revenue
- The net loss for the second quarter was \$10.6M,
 - Which is down from \$13.5M in the same quarter last-year
- The net loss YTD was \$22.1M
 - Which is down from \$29.7M in YTD last-year
- Net loss per share Q2 (\$0.11) and YTD (\$0.24)

Upcoming Investor Conferences:

- Boston: Canaccord
- NYC: HCW 9/13, Cantor 9/28: Piper 11/29; & Others
- Oppenheimer Oncology Summit at MD Anderson
- ASH Early December

Capitalization:

- The market capitalization is approximately \$80 million
- The recent market capitalization high was \$294M 6/2021
 - Before the acquisition of HM43239, which we acquired for \$12.5M
- Common stock outstanding 92 million as of June 2022
- No debt or warrants

Trading Statistics:

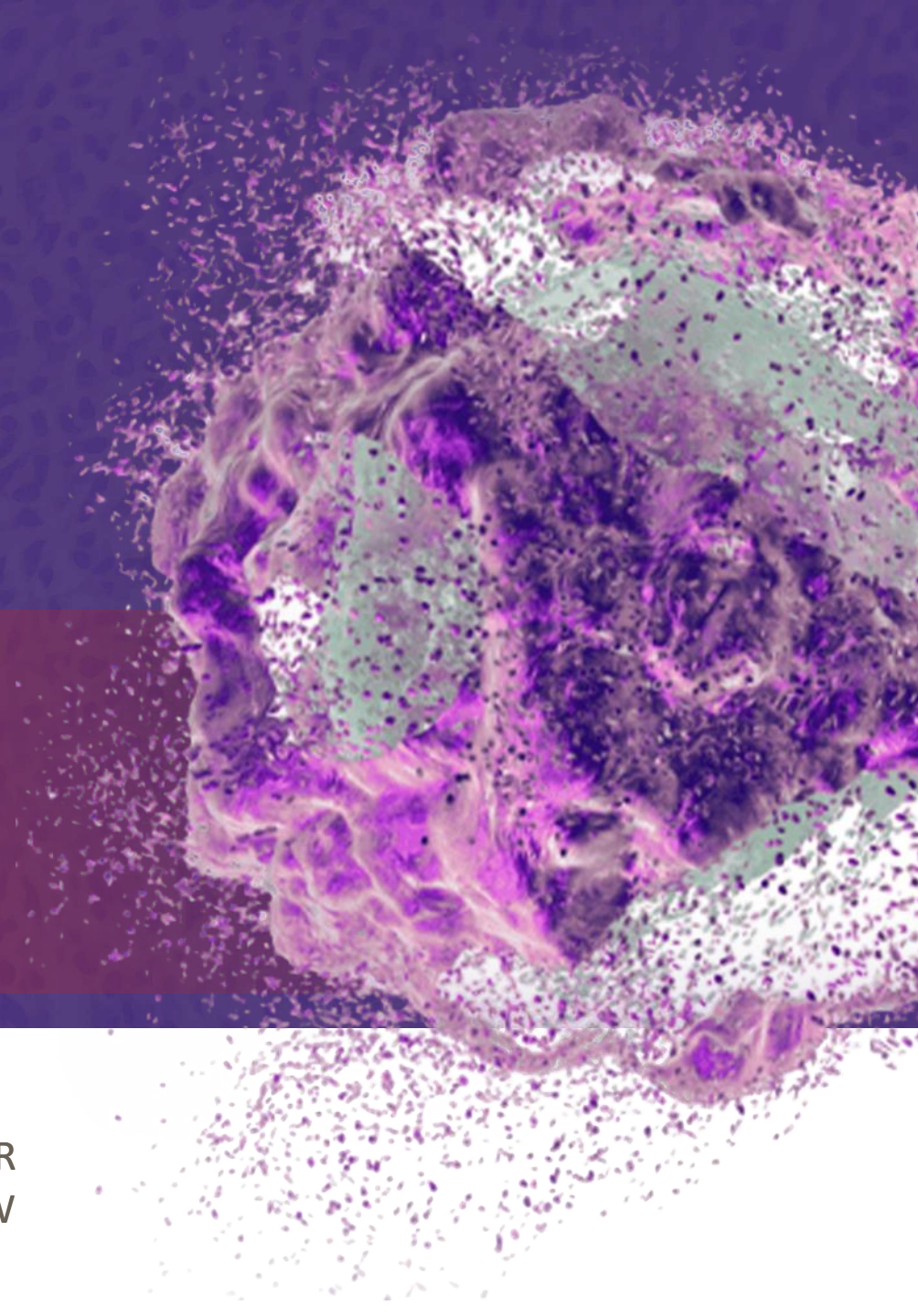
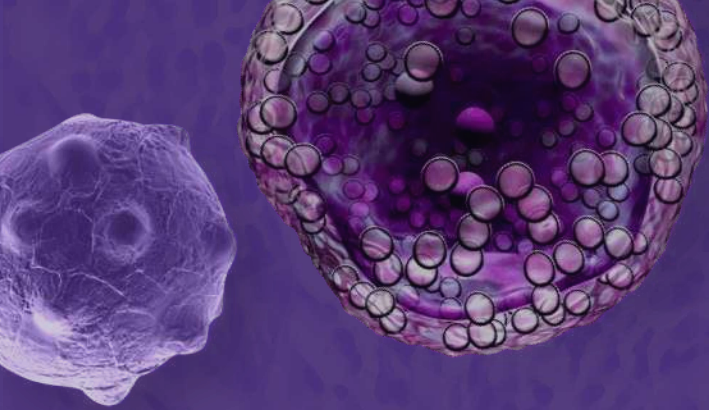
- The 52-week trading range: **high of \$3.13 & low of \$0.73**

ATM Program:

- Piper & Canaccord as Co-Agents

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 - **Multiple genetically-defined AML target populations** as potential indications for **>\$1bn commercial market**
 - **Targets more genetically-defined AML target populations** than SYK inhibitors, IRAK4 inhibitors, or Menin inhibitors
 - **Response rates** in AML populations of unmet needs that may support **single agent Phase 2 accelerated approvals**
 - **Strong intellectual property** estate
- **Experienced leadership team** with deep expertise in kinase inhibitors & orphan hematologic diseases
- **Meaningful near-term upside** with value-driving clinical updates and milestones through 2022 and 2023



We thank our partners, investigators, and investors for helping us bring novel drugs to patients with the greatest need.

A P T O S E
BIOSCIENCES

PRECISION ONCOLOGY FOR
THERAPIES OF TOMORROW