Aptose Corporate Update Event

Held in Conjunction with 2021 ASH Annual Meeting

December 13, 2021

17:30 ET

APTOSE BIOSCIENCES

PRECISION ONCOLOGY FOR THERAPIES OF TOMORROW

NASDAQ: **APTO**
TSX: **APS**

Disclosure

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Aptose Biosciences (NASDAQ: APTO)

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Hematology company focused on precision medicines

Experienced leadership with deep expertise in kinase inhibitors

Multiple orphan hematology programs, with broader oncology optionality

Value-driving clinical updates through 1H22, with cash runway to early 2023

HM43239

Clinically validated *Myeloid Kinome Inhibitor (MKI)*

Multiple complete responses (CR) in an ongoing Phase 1/2 study of R/R AML

Meaningful clinical benefit in all responders (stem cell transplant; durable response)

CR in patients with FLT3-ITD/TKD, $NPM1^{MUT}$, $TP53^{MUT}$, RAS^{MUT}, IDH^{MUT} and others

LUXEPTINIB

Dual *Lymphoid and Myeloid Kinome Inhibitor (LKI/MKI)*

Inhibits all forms of FLT3: Ongoing Phase 1a/b dose escalation in AML, MDS

Inhibits all forms of BTK: Ongoing Phase 1a/b dose escalation in B-NHL

Clinically active: anti-tumor activity in high-bar clinical setting of R/R patients

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Aptose Leadership Team: Multifaceted Expertise in Therapeutic Development

Rafael Bejar, MD, PhD

Senior Vice President & Chief Medical Officer

William G. Rice, PhD

Chairman, President & Chief Executive Officer

Jotin Marango, MD, PhD

Chief Financial Officer & Chief Business Officer

UC San Diego Moores Cancer Center

mds Myelodysplastic Syndromes (MDS) Foundation

NIH National Cancer Institute

Emory University School of Medicine

Mount Sinai

Dana-Farber Cancer Institute

BWH Brigham and Women's Hospital

Achillion

Cylene Pharmaceuticals

HCW

Aptose Biosciences

Aptose SAB: Distinguished Opinion Leaders with Deep Oncology Expertise

Daniel Von Hoff, MD, FACP

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

Brian J. Druker, MD

Pioneer in the field of precision medicine

Key Role in 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

Renowned hematology specialist

Professor of Medicine
Paul and Mary Haas Chair in Genetics
Chief, Section of Molecular Hematology and Therapy
MD Anderson Cancer Center

Expert in AML and other hematologic malignancies

Expert in drug resistance and drug mechanisms

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Expanded Pipeline: Oral Kinase Inhibitors that Cover Distinct Constellations of Kinases to Treat a Broad Spectrum of Hematologic Malignancies

Program	*Target*	*Indication*	*Preclinical*	***Phase 1 Proof-of-Concept***	*Phase 2/3 Registrational*
HM43239	*Myeloid Kinome*	*AML*		**Phase 1/2**	
Luxeptinib	*Myeloid Kinome*	*AML, MDS*		**Phase 1a/b**	
Luxeptinib	*Lymphoid Kinome*	*B-cell Cancers*		**Phase 1a/b**	
APTO-253	*MYC Gene*	*AML, MDS*		**Phase 1a/b**	
APL-581 *partnered*	*JAK/BRD4*	*Hem/Onc*			

- Multiple small molecule product candidates designed to treat a disease
- Confirmed anti-leukemic activity in dose-escalation studies, with expansion studies planned
- Orphan hematology programs, with broader optionality into solid tumor indications

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Acquisition of HM43239 Myeloid Kinome Inhibitor

Why license HM43239

Vision to **grow the pipeline** by licensing **kinase inhibitors** for **hematologic cancers**
Expands pipeline with **more advanced drug** to **increase likelihood of pipeline success**
Ideal fit with corporate **vision to complement luxeptinib**

What is HM43239

This is an **active drug**
Clinically proven with **multiple CR in AML patients** with **once daily oral** dosing
Targets a constellation of kinases distinct from luxeptinib and competitor agents
Expands ability to cover **additional genotypes and stages** of AML populations/market

Why execute license now

For two years, observed translation **of kinase inhibitor profile to clinical performance**
Clinical program matured with **multiple single-agent CRs in challenging population**
Wanted to participate in **clinical oversight** and crafting clinical development plan
Closed the deal **prior to public release** of high impact clinical data

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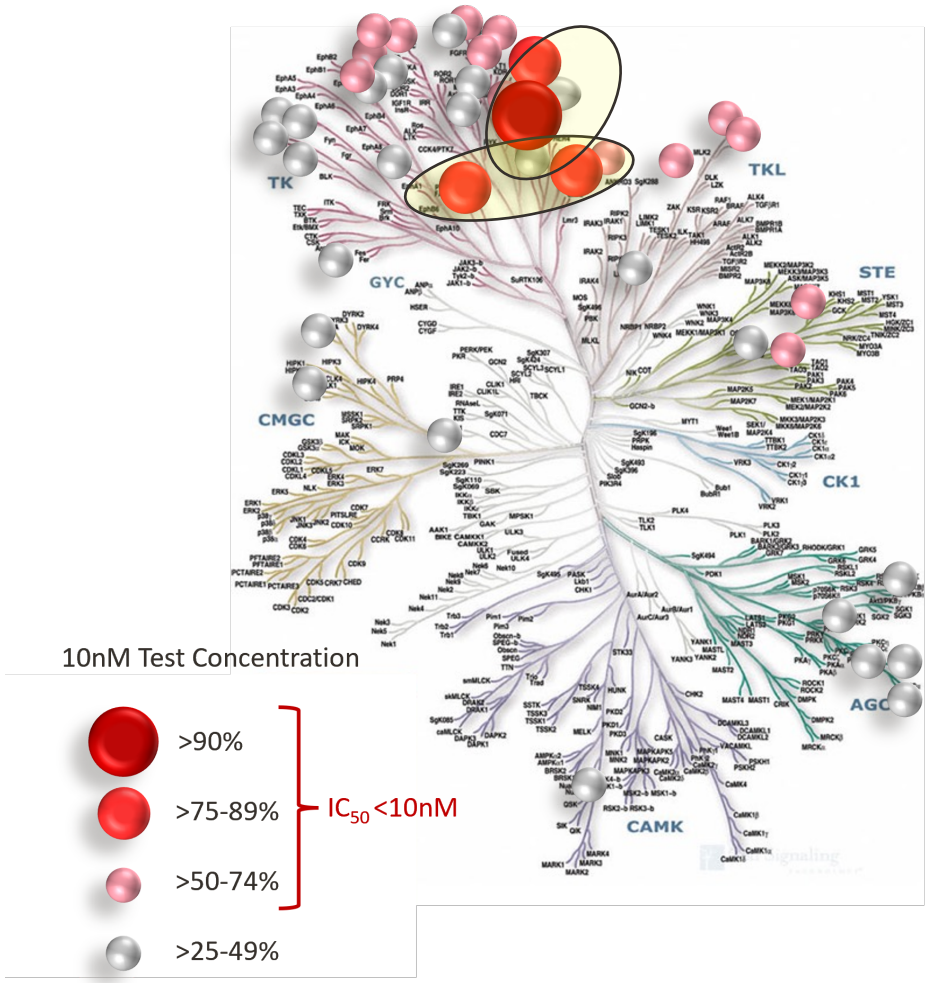
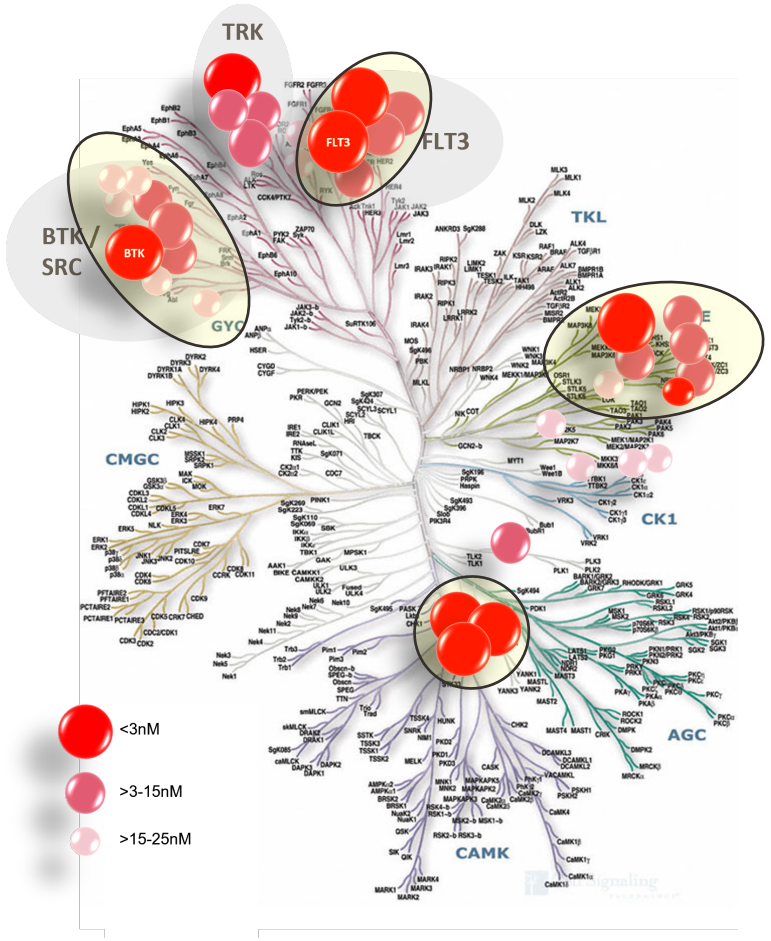
HM43239 and Luxeptinib Kinome Trees

HM43239



Luxeptinib



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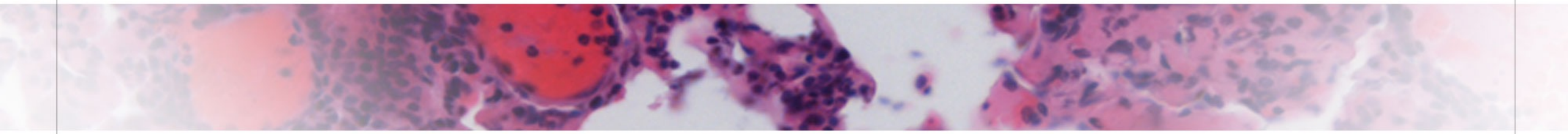
HM43239

Oral Myeloid Kinome Inhibitor

American Society *of* Hematology

Helping hematologists conquer blood diseases worldwide



Abstract #702

First in Human (FIH) FLT3 and SYK Inhibitor HM43239 Shows Single Agent Activity in Patients (pts) with Relapsed or Refractory (R/R) FLT3 Mutated and Wild-Type Acute Myeloid Leukemia (AML)

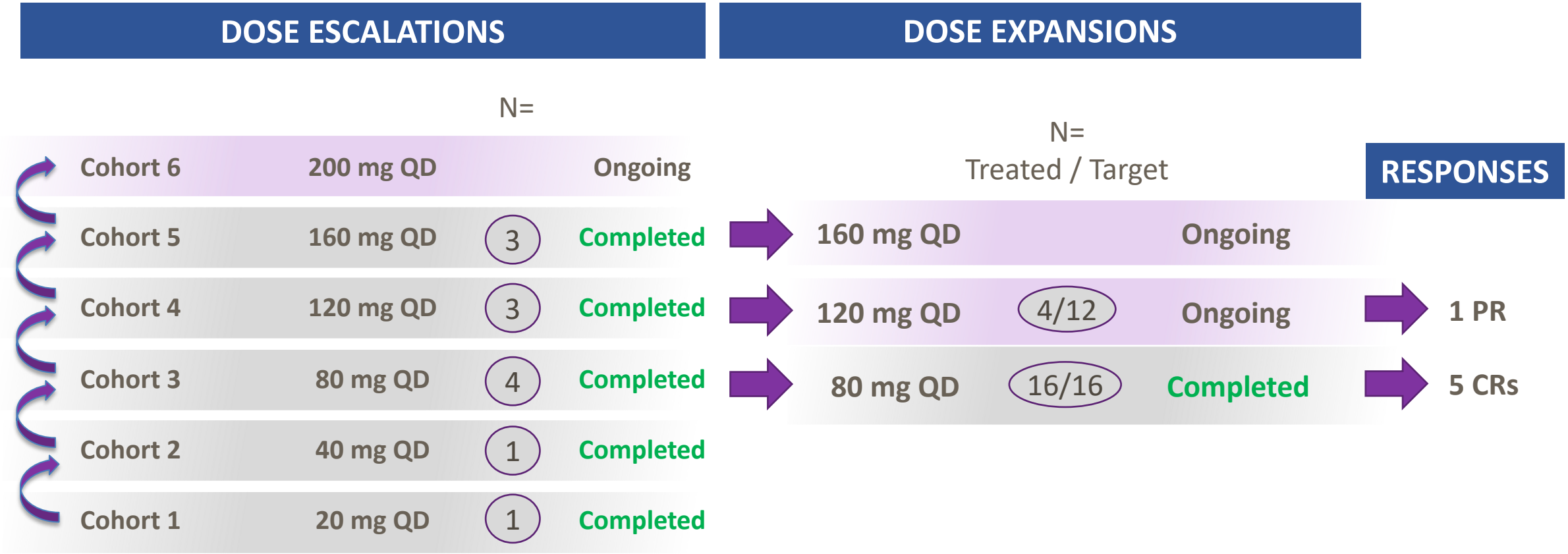
Naval Daver M.D[1], Kyoo Hyung Lee M.D, Ph.D[2], Chul Won Jung M.D, Ph.D[3], Sung-Soo Yoon M.D, Ph.D[4], Martha L. Arellano M.D[5], Jiyeon Yoon Ph.D[6], Nora Lee Ph.D[6], Hyunjin Kim Ph.D[6], Jaeyeon Lee[6], Brian A. Jonas M.D, Ph.D[7], Seungjae Baek M.D, Ph.D[6]

[1]Department of Leukemia, The University of Texas MD Anderson Cancer Center, Houston, TX, USA [2]Department of Internal Medicine, University of Ulsan, College of Medicine and Asan Medical Center, Seoul, Korea [3]Department of Internal Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea [4]Department of Internal Medicine, Seoul National University, College of Medicine, Seoul National University Hospital, Seoul, Korea [5]Winship Cancer Institute of Emory University, Atlanta, USA [6]Hanmi Pharmaceutical Co., Ltd., Seoul, Korea [7]University of California Davis Comprehensive Cancer Center, Sacramento, CA, USA

Dr. Naval Daver, The University of Texas MD Anderson Cancer Center, Houston, TX

Oral Presentation, December 13, 2021

HM43239 Phase 1/2 Study in R/R AML: Now in Cohort 6 (200 mg QD)



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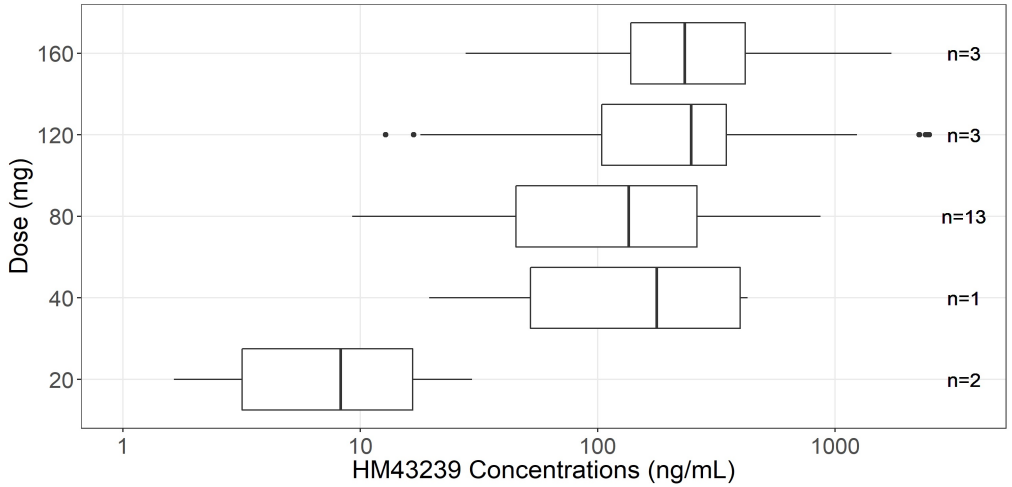
HM43239 Phase 1/2 Study in R/R AML: Now in Cohort 6 (200 mg QD)
%pFLT3 inhibition as a function of plasma concentration as increase dose levels

PLASMA PK

Daily administered oral doses of 20, 40, 80, 120, 160 and 200mg. Plasma samples not available for all patients to date and all timepoints to date.

FINDINGS:

Generally, dose-related increase in plasma exposures

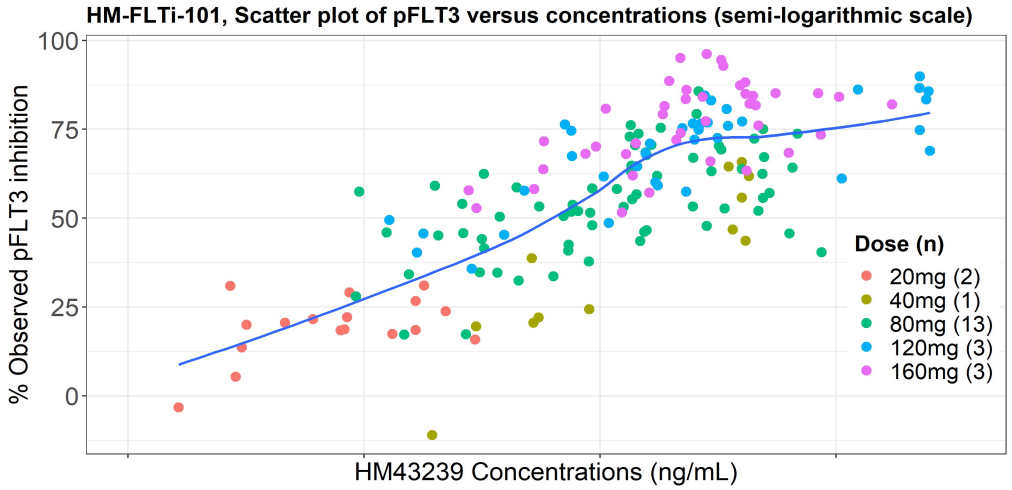


PIA Assay:

Measures the ability of patient plasma to inhibit phospho-FLT3 in MOLM-14 reporter cell line

FINDINGS:

Target engagement demonstrated by dose-related inhibition of P-FLT3



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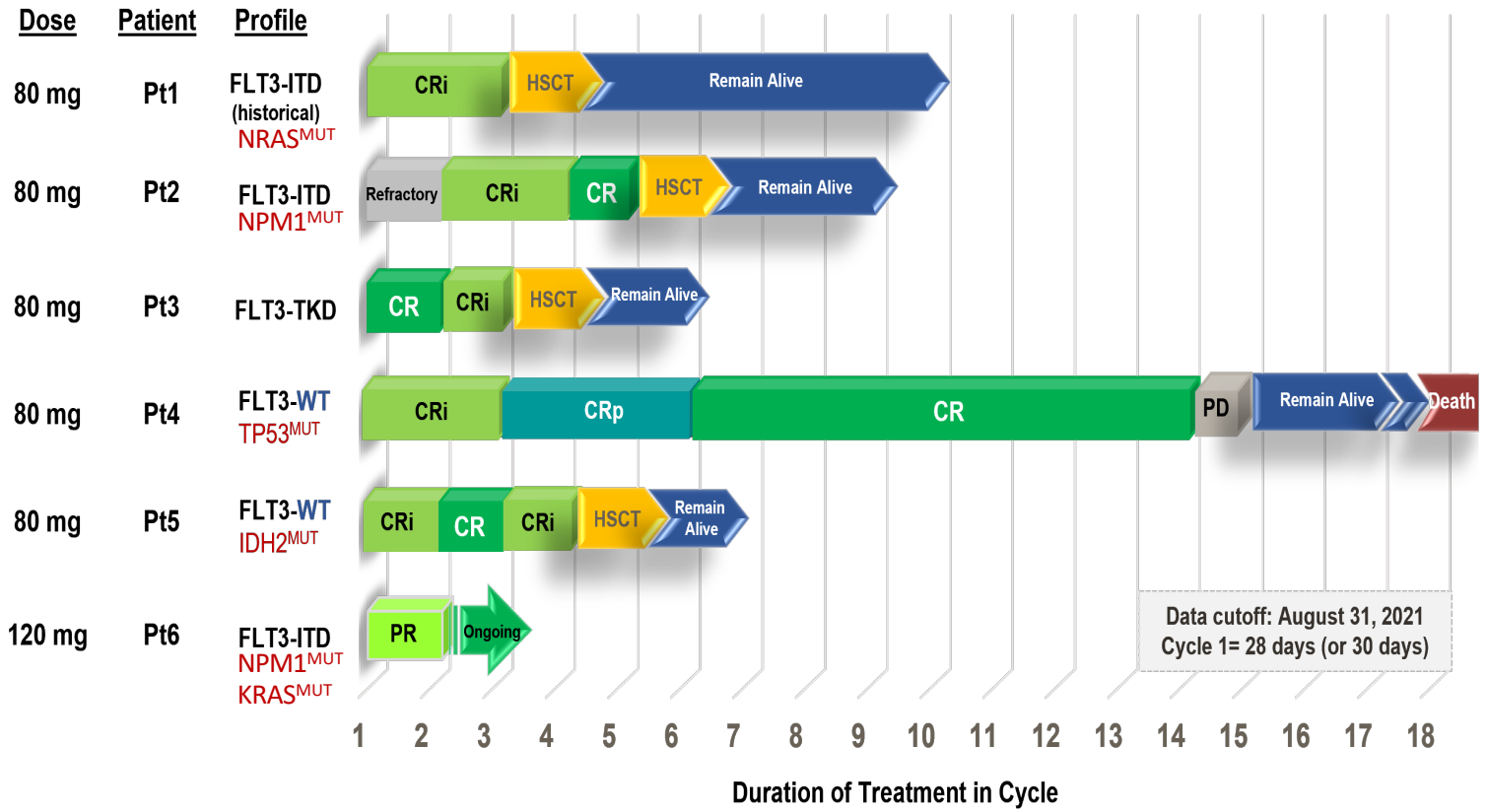
HM43239 Response to Treatment
Clinical Response of Six Patients with 80 mg or 120 mg of HM43239

Response Findings Reported to Date By Dr. Daver at ASH 2021

- **Since Abstract Published**
  - Additional CR moved to HSCT
  - Additional PR at 120mg dose level
  - Active at multiple dose levels
- **4 of 5 Responses Successfully Bridged to Transplant**
- **5th Response Durable Over Time**
  - Relapsed AML FLT3-WT + $TP53^{MUT}$
  - Achieved CR, did not qualify for HSCT, remained on study >1year
- **Clinical Benefit in 100% of Complete Responses**



Note, Pt1, 2, 5 remain alive at the time of long term follow up; Pt 2 remain alive at the time of 30 days follow up; Pt3 is dead at the time of long term follow up.
CR: complete remission, CRp: complete remission with incomplete platelet recovery, CRi: complete remission with incomplete hematologic recovery, PR: partial remission
HSCT: hematopoietic stem cell transplantation, PD: progression of disease

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HM43239 Characteristics of Patients with Responses

Patients	Age/Sex	Dose Level (QD)	AML status	FLT3 mutation* (mt to WT signal ratio)	Other mutation	No. prior therapies	No. prior FLT3i's	Cytogenetics	Best response	Cycles** to first response	Cycles** to best response	Duration on study (weeks)	Reason of discontinuation
Pt1	51/M	80mg	AML NOS	FLT3-ITD† (0.7)	NRAS, RUNX1	3	0	Normal	CRi	1	1	12	HSCT (remains in remission)
Pt2	50/M	80mg	AML NOS	FLT3-ITD (13.5)	NPM1, DNMT3A	1	0	Normal	CR	2	5	20	HSCT (remains in remission)
Pt3	67/F	80mg	AML NOS	FLT3-D835V† (0.11)	RUNX1	2	2# (midostaurin, gilteritinib)	Normal	CR	1	1	7	HSCT (remains in remission)
Pt4	60/M	80mg	AML-MRC	FLT3-WT (0)	TP53	3	0	Abnormal‡	CR	1	8	56	PD → death (remains in remission)
Pt5	63/F	80mg	AML NOS	FLT3-WT† (0)	IDH2	1	0	Abnormal‡	CR	1	2	13	HSCT (remains in remission)
Pt6	54/F	120mg	AML NOS	FLT3-ITD† (23.82)	NPM1, DNMT3A, KRAS, PTPN11	2	2# (midostaurin, gilteritinib)	Normal	PR	1	1	-	Ongoing in PR in C#2

Data cutoff: August 31, 2021

*FLT3 mutation status is based on the results from invivoscribe using the Leukostrat® CDx FLT3 Mutation Assay approved by FDA. **1 Cycle is 28 or 30 days.
†Pt1 mutation status is based on initial diagnosis; Pt3 mutation result was obtained after dosing; Pt5 mutation status at initial diagnosis was FLT3-ITD; Pt6 mutation at initial diagnosis was FLT3-ITD/TKD.
‡Karyotypes for Pt4: Abnormal, Complex, 50~52,XY,del(5)(13q31),-7, dup(8)(q22), dup(9)(q13), +dup(11)(p11.2), -13,-15,+5~7mar[cp14]/46,XY[6]; Karyotypes for Pt5: Abnormal, +8, +13, t(X;9)(q28;p21)
AML NOS: AML not otherwise specified, AML-MRC: AML with myelodysplasia-related changes, HSCT: hematopoietic stem cell transplantation, PD: progression of disease
#Pt3 previously received midostaurin and gilteritinib with no responses; Pt6 previously received midostuarin with CR and gilteritinib with no response.

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HM43239 Summary to Date and Actions Planned for 2022

Demonstrated Clinical Activity for Diverse Set of R/R AML Patients

Dose Escalation

- Diverse R/R AML patient population, including $FLT3^{Wildtype}$ and $FLT3^{MUT}$
- Completed 20, 40, 80, 120, 160mg escalation cohorts
- Escalated to 200mg
- Expansions enrolling at 120mg and 160mg
- Target engagement: Dose-related inhibition of P-FLT3
- Favorable safety profile

International Phase 1/2 Dose Escalation Study Ongoing in R/R AML Patients

- Durable Clinical Benefit in 100% of Responders
- CR on $FLT3^{MUT}$ (ITD & TKD)
  - Including prior gilteritinib and midostaurin failure
- CR on Relapsed $TP53^{MUT}$ >1 year
- $FLT3^{MUT}$ CRc rate 37.5% at 80mg
- All-comer CRc rate 25% at 80mg
- Recent PR at 120mg in another prior midostaurin & gilteritinib failure
- Identified potential Go Forward dose

Planned in 2022

- Present additional clinical findings throughout 2022
- Select patient genotypes for single agent expansion trials, and plan for registrational trials
- Select patient genotypes and approved drugs for combination trials
- Initiate single agent expansions and combination trials, as appropriate

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Luxeptinib

Oral Lymphoid & Myeloid Kinome Inhibitor

Luxeptinib Dual Lymphoid Kinome Inhibitor and Myeloid Kinome Inhibitor Developing Broadly Across Hematologic Malignancies

Lymphoid Kinome Inhibitor

Phase 1a/b Trial Ongoing in R/R B-cell Malignancies

- **Currently at 900mg BID (dose level 6)**
- Observed clinical safety, leading indicators of activity, and **dose-dependent tumor reductions**
- Continuing **escalation to higher doses and longer exposures** to tackle disease in a challenging population

Uniquely and Selectively Inhibits Clusters of Kinases

- Targets clinically validated kinases that are drivers of hematologic malignancies
  - **BTK** lymphoid tumor driver
  - **FLT3** myeloid tumor driver
- Avoids kinases generally associated with toxicity

Myeloid Kinome Inhibitor

Phase 1a/b Trial Ongoing in R/R AML and HR MDS

- **Currently at 900mg BID (dose level 4)**
- Reported anti-leukemic activity, including a **durable MRD-negative complete response in AML**
- Continuing escalation to higher doses, and expanding to include **high risk MDS** patients

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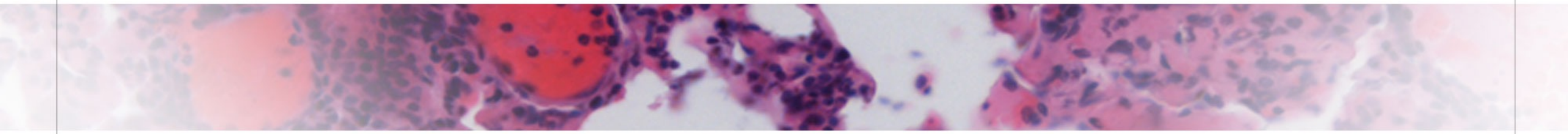

Abstract #1355

A Phase 1a/b Dose Escalation Study of the Mutation Agnostic BTK/FLT3 Inhibitor Luxeptinib (CG-806) in Patients with Relapsed or Refractory B-Cell Malignancies

Felipe Samaniego1, John M. Burke2, Daruka Mahadevan3, Mohamad Cherry4, Ahad Ali Sadiq5, M. Zach Koontz6, Jose C Villasboas7, Erin Reid8, Elizabeth Cull9, Victor Priego10, Lindsey E Roeker11, Patrick Cobb12, Jason M. Melear13, Paul Conkling14, David Cosgrove15, Hongying Zhang16, Nasrin Rastgoo16, Khalid Benbatoul16, Genia Su16, Donna N. Haney16, Yuying Jin16, Jotin Marango16, Stephen Howell8, William Rice16, Rafael Bejar8,16

1Department of Lymphoma and Myeloma, The University of Texas MD Anderson Cancer Center, Houston, TX; 2Rocky Mountain Cancer Centers, Aurora, CO; 3Mays Cancer Center, MD Anderson, UT Health San Antonio, TX; 4Morristown Medical Center, Atlantic Hematology Oncology, Morristown, NJ; 5Fort Wayne Medical Oncology and Hematology, Fort Wayne, IN; 6Pacific Cancer Care, Monterey, CA; 7Division of Hematology, Department of Internal Medicine, Mayo Clinic, Rochester, MN; 8Moores Cancer Center, University of California San Diego Health, San Diego, CA; 9Greenville Health System, Greenville, South Carolina; 10Regional Cancer Care Associates, Hackensack, NJ; 11Memorial Sloan Kettering Cancer Center, New York, NY; 12St. Vincent Healthcare, Billings, MT; 13Texas Oncology-Austin Midtown, Austin, TX; 14Virginia Oncology Associates, Norfolk, Virginia; 15Northwest Cancer Specialists / Compass Oncology, Vancouver, WA; 16Aptose Biosciences Inc, San Diego, CA

Dr. Felipe Samaniego, The University of Texas MD Anderson Cancer Center, Houston, TX

December 11, 2021

Luxeptinib: Phase 1a/b Study in Heavily Pretreated B-cell Malignancies Now in Cohort 6 (900mg BID)

Cohort 6	900 mg Q12H	Ongoing
Cohort 5	750 mg Q12H	Completed
Cohort 4	600 mg Q12H	Completed
Cohort 3	450 mg Q12H	Completed
Cohort 2	300 mg Q12H	Completed
Cohort 1	150 mg Q12H	Completed

Objectives

Ongoing Phase 1 a/b, open-label, single arm, multicenter, 3 + 3 dose-escalation clinical study (NCT03893682).

Primary objectives:

- Assess safety and tolerability of luxeptinib (CG-806)
- Determine recommended Phase 2 dose (RP2D)

Key secondary objectives:

- Assess PK profile and PD activity
- Obtain preliminary evidence of antitumor activity
- Characterize the bioavailability (BA) of an automated filled (G2) vs. the original hand-filled (G1) formulations

Dose Escalation Phase

- Patients administered **oral capsules, twice daily** on a **28-day cycle**
- Plan to perform 7 dose levels
- Planned expansion cohorts
- **Accelerated titration** design
- Additional patients may be enrolled (**back filling**) at dose levels previously declared safe
- **Intra-patient dose escalation** is allowed if higher dose is safe in 3 or more patients

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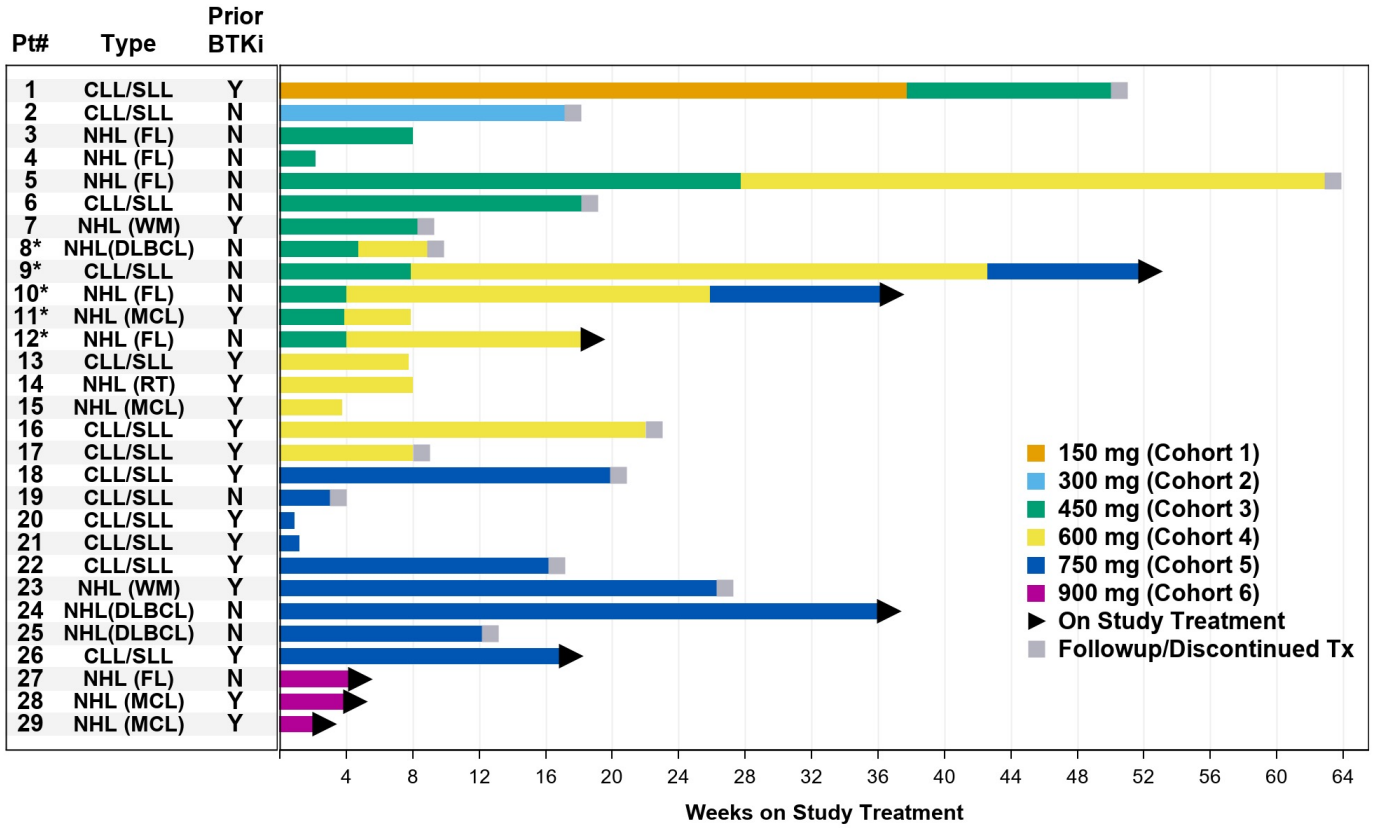
Luxeptinib: Administered to Patients in Cohorts 1-5 Over Multiple Cycles and Now Dosing Cohort 6 (900mg)

As of data-cut on December 06, 2021

- 29 patients, including 6 patients in BA sub-study, were enrolled and treated across 5 cohorts;
- Heavily-pretreated B-cell cancer patients with median 4 lines of prior therapies (range 1-12);
- 14 (53.8%) patients had prior ibrutinib therapy ; two also had other BTKi acalabrutinib or AVL-292



Patient Study Status by Weeks On Study Treatment (Data Cut: 06DEC2021) Prior BTKs: Ibrutinib only: Patients #1, #7, #11, #13, #16, #17, #18, #20, #21, #22, #23, #26, #28 and #29. Ibrutinib + Other BTKi: Patients #14 and #15. Note: * = Patients enrolled for Bioavailability Backfill.

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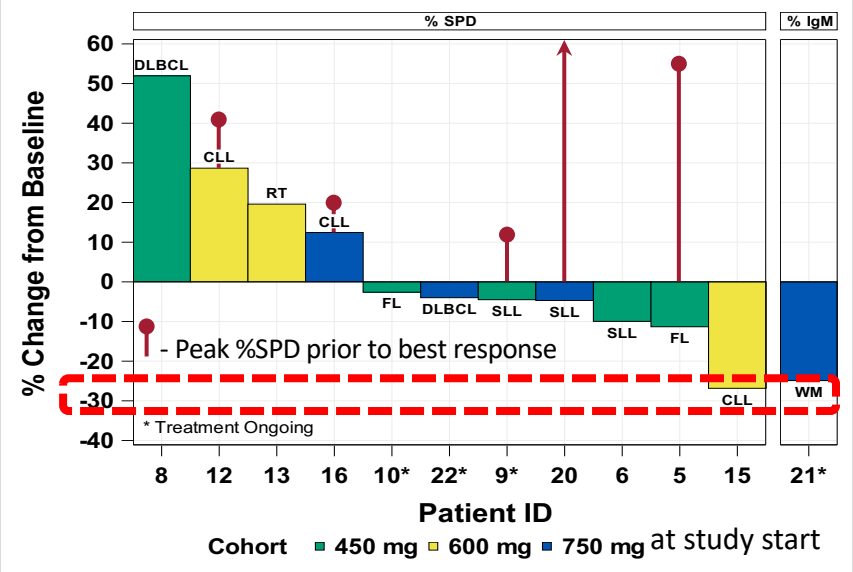
Luxeptinib: Standard Waterfall Plot Shows Encouraging Antitumor Activity Trend in Heavily Pretreated Patients with B-Cell Malignancies

EHA 2021: Best Response in Evaluable Patients

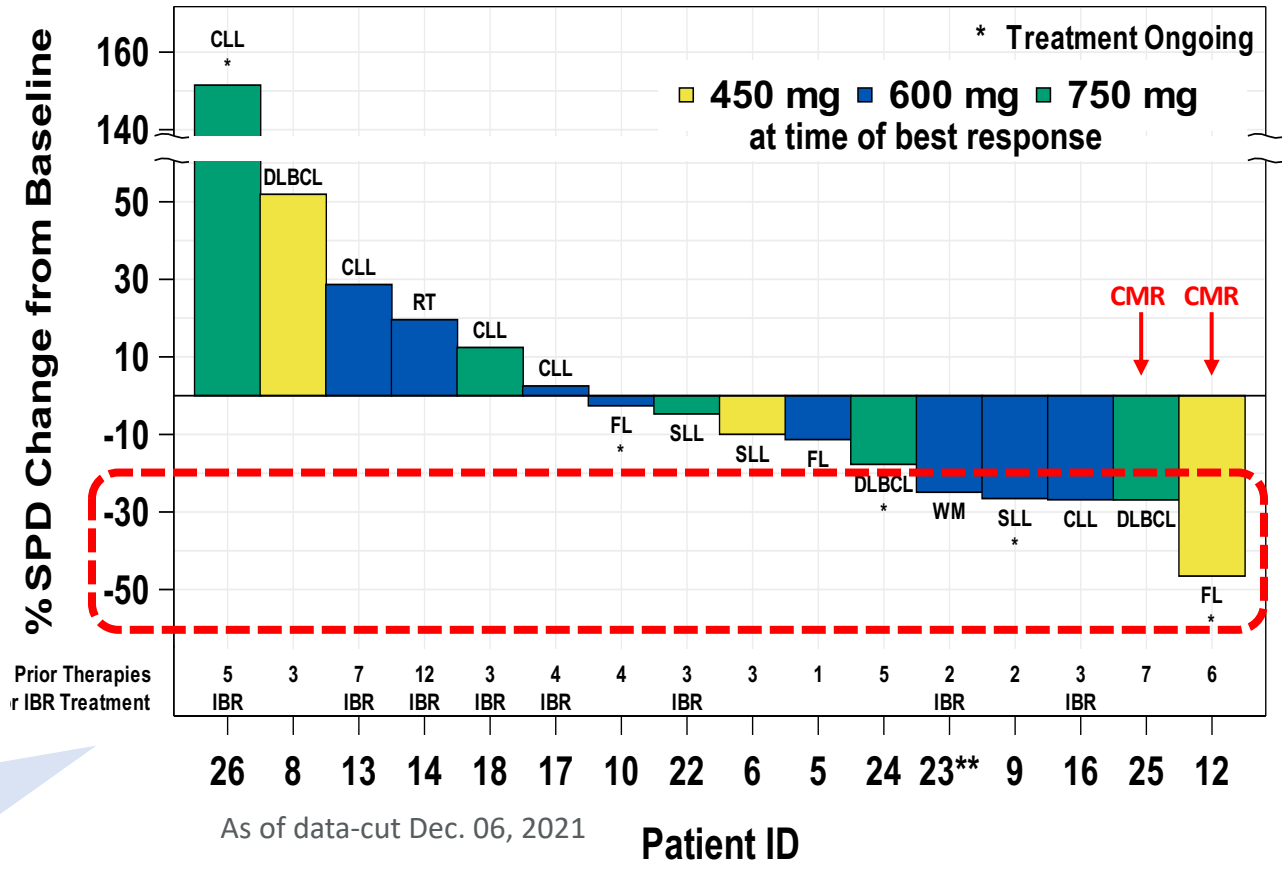
Data through **June 7, 2021** Presented at EHA 2021



Encouraging Trend: Observing greater antitumor activity since EHA and tumor reductions across diverse B-cell cancers with higher dose levels, higher plasma concentrations and longer time on study drug

ASH 2021: Best Response in Evaluable Patients

All patients, who had at least one imaging for tumor measurements or IgM measurement (WM patient) since starting treatment, were included (n=16).



As of data-cut Dec. 06, 2021

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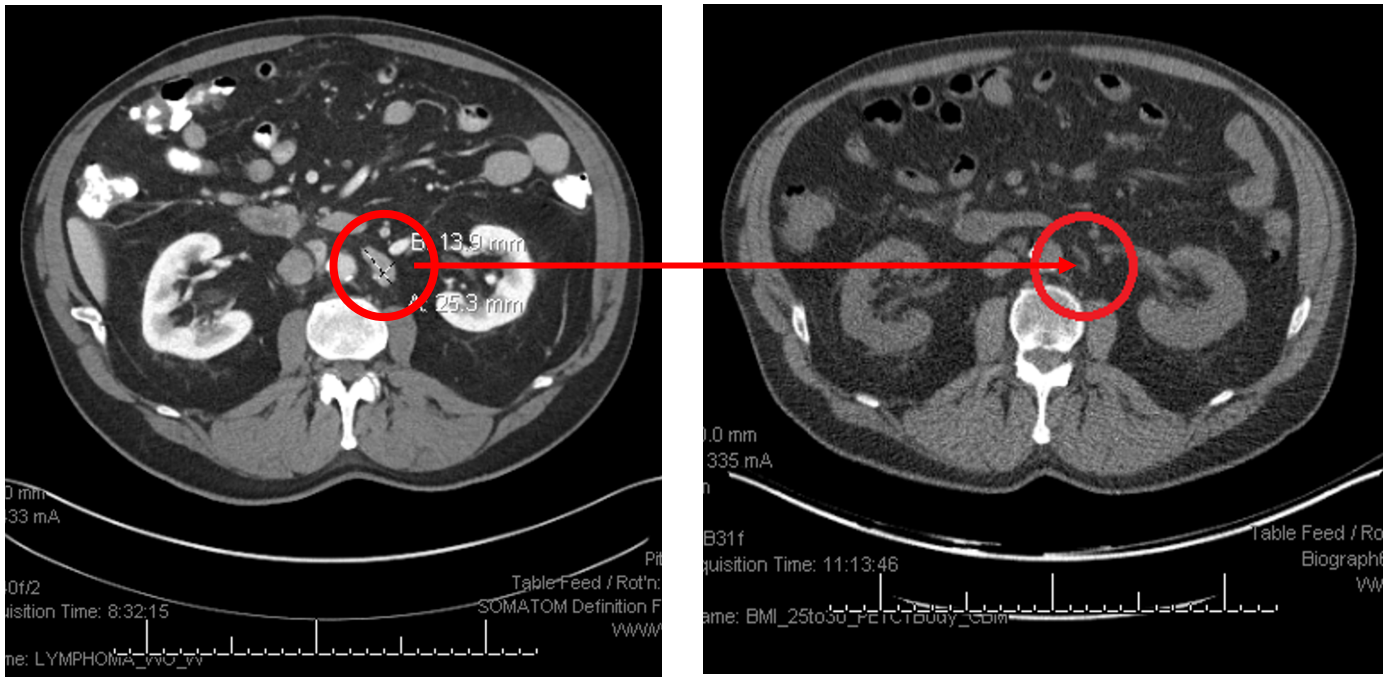
Luxeptinib Case Study: Significant Tumor Reduction (47%) with Accompanying Complete Metabolic Response (CMR) in Patient with Refractory Follicular Lymphoma

Screening



Cycle 5 Day 1

Follicular Lymphoma	Complete Metabolic Response and Tumor Reduction
Patient	72-year-old Male with Follicular Lymphoma : Received 450mg BID Luxeptinib
Prior Therapies Failed	• revlimid+obinutuzumab, obinutuzumab, ublituximab, umbralisib
Response at C5D1	• **47% tumor reduction by SPD (PR requires 50%); 29% Reduction by SLD (PR requires 30%)** • **CMR (Complete Metabolic Response) by Cycle 3**

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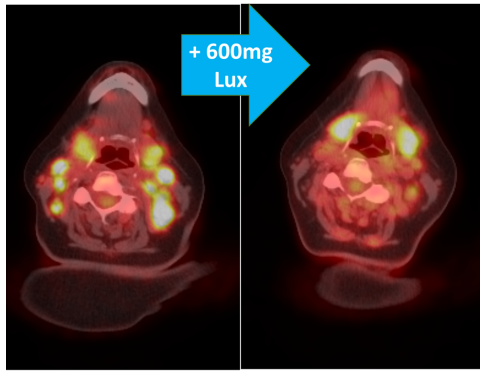
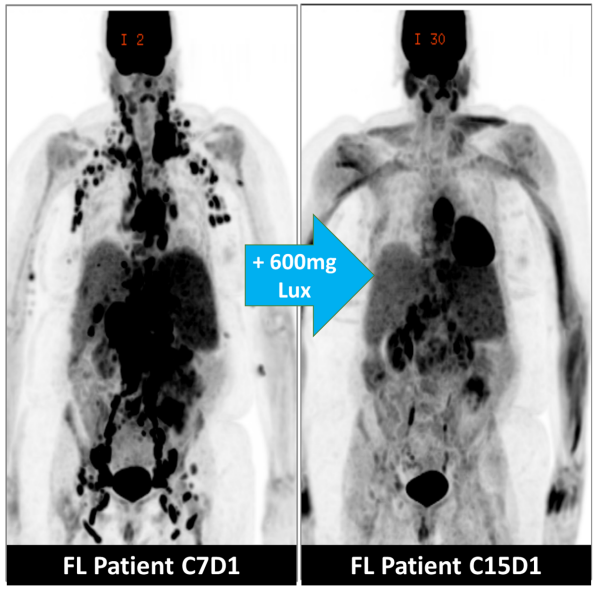
Luxeptinib Case Study: Dose-dependent Anti-tumor Activity in a Patient with Refractory Follicular Lymphoma



FL Patient C7D1
Neck

FL Patient C15D1
Neck



Follicular Lymphoma	Significant Tumor Reduction and Well Tolerated
Demographics	60-year-old female
Diagnosis at Study Entry	Grade 1 FL
Prior Therapies Failed	• bendamustine + obinutuzumab • rituximab
Dose	**450mg** BID 7 cycles, followed by **600mg** BID 8 cycles
Response	**Tumor growth continued, though slowed, while on 450mg BID through 7 cycles:** • SPD increased 28.2%, 10.7% and 8.7% at C3D1, C5D1 and C7D1, respectively, when compared with previous FDG PET-CT scan **43% tumor reduction from peak (12% below baseline) upon dose escalation to 600mg BID:** • Following dose escalation to 600mg in cycle 8, lesion growth arrested, followed by continuous reduction to below baseline • By C15D1, primary lesions shrank by 42.5% and 11.3% when compared with highest measurement (C7D1) and baseline (screening), respectively

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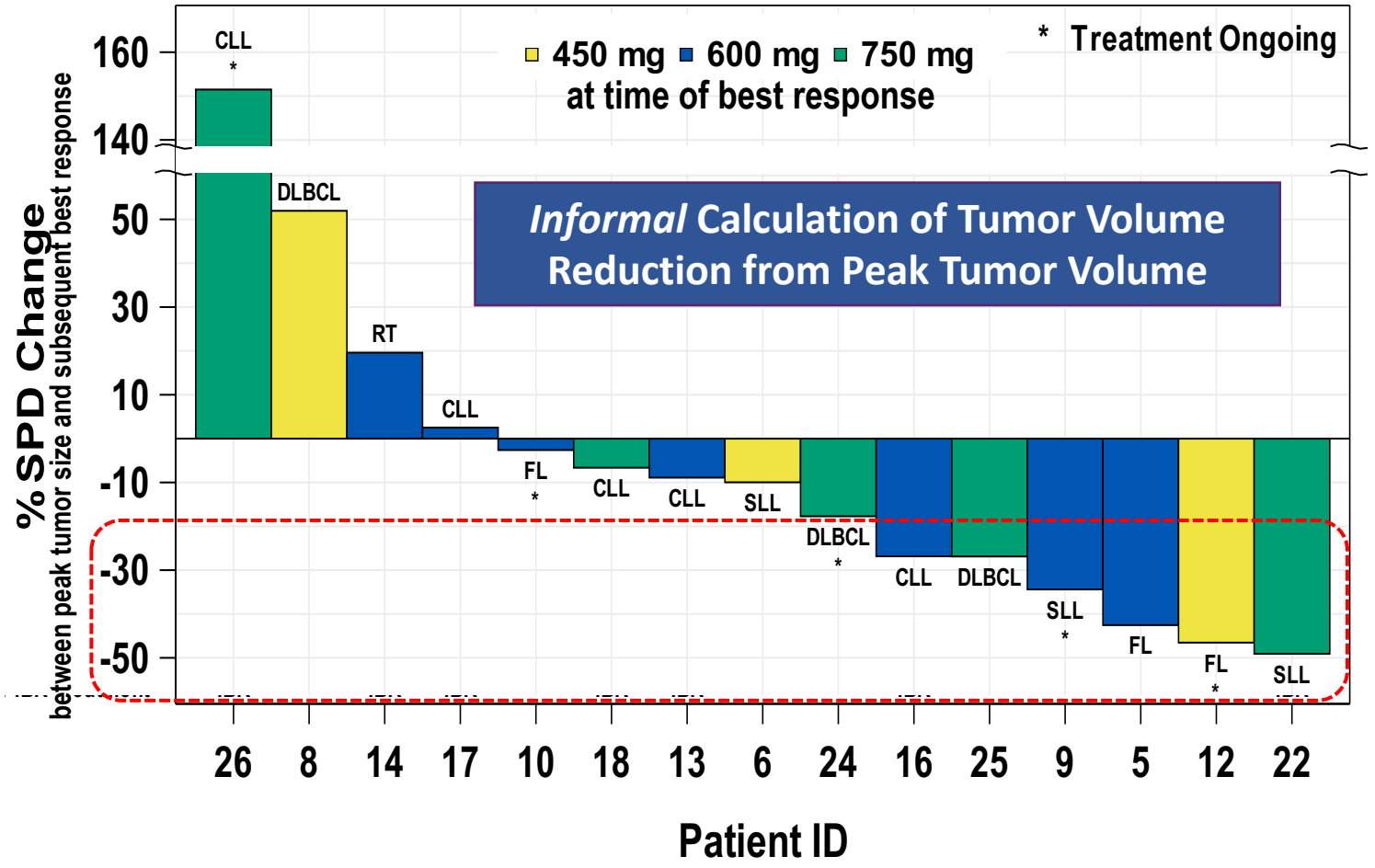
Luxeptinib: Informal Waterfall Plot Shows Tumor Reductions from Peak Tumor Volume in Heavily Pretreated B-cell Malignancies

- Many heavily-pretreated patients rapidly progressed during washout period immediately before treatment with Lux – phenomenon consistent with **BTKi-discontinuation tumor flare**
- As these patients discontinue BTKi (such as ibrutinib), they experience aggressive tumor growth, from screening until the first scan on Lux
- This was observed with several of our patients, so we have calculated "Tumor Reductions from Peak Tumor Volume" to better reflect the antitumor activity of Lux



Luxeptinib Summary of Phase 1a/b for B-cell Cancers and Plans for 2022

Dose Escalations

- Highly refractory population
- Completed 150-750mg cohorts
- Generally well-tolerated through 750mg BID over multiple cycles
- P-BTK target engagement
- On-target lymphocytosis in classic CLL patients
- Currently dosing at 900mg BID

Anti-tumor Activity

- **Improved anti-tumor activity** with higher dose levels, higher plasma concentrations and longer time on study drug
- Two patients with Complete Metabolic Response (CMR)
- **Dose related tumor reduction** in follicular lymphoma (FL) patient
- Two patients with tumor reductions accompanied by CMR
  - IgM reduction (25%) in patient with WM at 750mg dose
- **Broad anti-tumor activity**
  - FL, WM, CLL/SLL, DLBCL

Planned in 2022

- Explore doses **above 900mg**
- Select **Go Forward dose(s)**
- Select **target indications** for single agent expansion trials
- Select **target indications** and **approved drugs** for **combination trials**
- **Initiate single agent expansions and combination trials**, as appropriate
- Explore new **G3 formulation**

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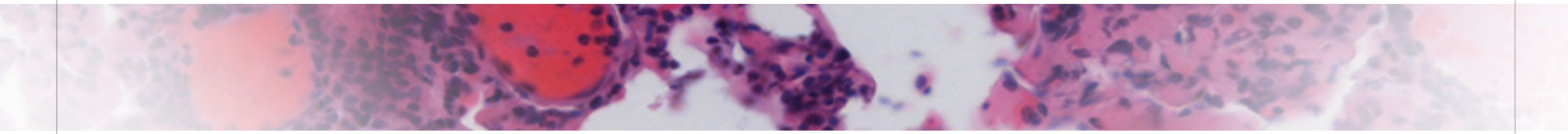
American Society *of* Hematology

Helping hematologists conquer blood diseases worldwide



Abstract #1272

A Phase 1a/b Dose Escalation Study of the Mutation Agnostic FLT3/BTK Inhibitor Luxeptinib (CG-806) in Patients with Relapsed or Refractory Acute Myeloid Leukemia

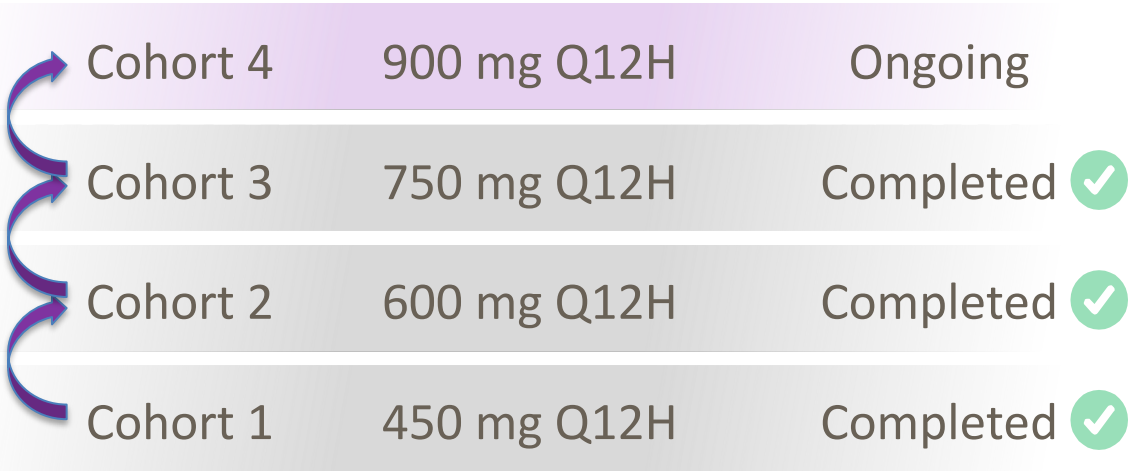
Aaron D. Goldberg1, Maro Ohanian2, Paul B. Koller3, Jessica Altman4, Mohamad Cherry5, Benjamin Tomlinson6, Namrata Chandhok7, Hongying Zhang8, Nasrin Rastgoo8, Khalid Benbatoul8, Yuying Jin8, Genia Su8, Donna N. Haney8, Jotin Marango8, Stephen Howell9, William Rice8, Rafael Bejar8,9

1Department of Medicine, Leukemia Service, Memorial Sloan-Kettering Cancer Center, New York, NY; 2Department of Leukemia, The University of Texas MD Anderson Cancer Center, Houston, TX; 3Department of Hematology/HCT, City of Hope, Duarte, CA; 4Robert H. Lurie Comprehensive Cancer Center of Northwestern University, Chicago, IL; 5Morristown Medical Center, Morristown, NJ; 6University Hospital of Cleveland, Cleveland, OH; 7Sylvester Comprehensive Cancer Center, University of Miami, Miami, FL; 8Aptose Biosciences Inc, San Diego, CA; 9Moores Cancer Center, University of California San Diego Health, San Diego, CA

Dr. Aaron Goldberg, Memorial Sloan-Kettering Cancer Center, New York, NY

December 11, 2021

Luxeptinib Phase 1a/b Study in R/R AML: Now in Cohort 4 (900mg BID)



Objectives

Ongoing Phase 1 a/b, open-label, single arm, multicenter, 3+3 dose-escalation clinical study (NCT04477291).

Primary objectives:

- Assess safety and tolerability of luxeptinib (CG-806)
- Determine maximum tolerated dose (MTD) and / or recommended Phase 2 dose (RP2D)

Key secondary objectives:

- Assess PK profile and PD activity
- Obtain preliminary evidence of antitumor activity

PATIENT POPULATION

Relapsed or refractory AML and higher-risk MDS who **failed or are ineligible for / intolerant of** intensive chemotherapy or transplantation

- Patients failed by FLT3i, IDHi, venetoclax, chemotherapy
- Patients unfit for intensive therapy or failed by HSCT
- Patients with WT-FLT3 or mutated TP53 or RAS genes

Dose Escalation Phase

- **Oral capsules administered twice daily** on a **28-day cycle**
- Planned expansion cohorts after dose escalation
- Additional patients may be enrolled (**back filling**) at dose levels previously declared safe
- **Intra-patient dose escalation** is allowed if higher dose is safe in 3 or more patients

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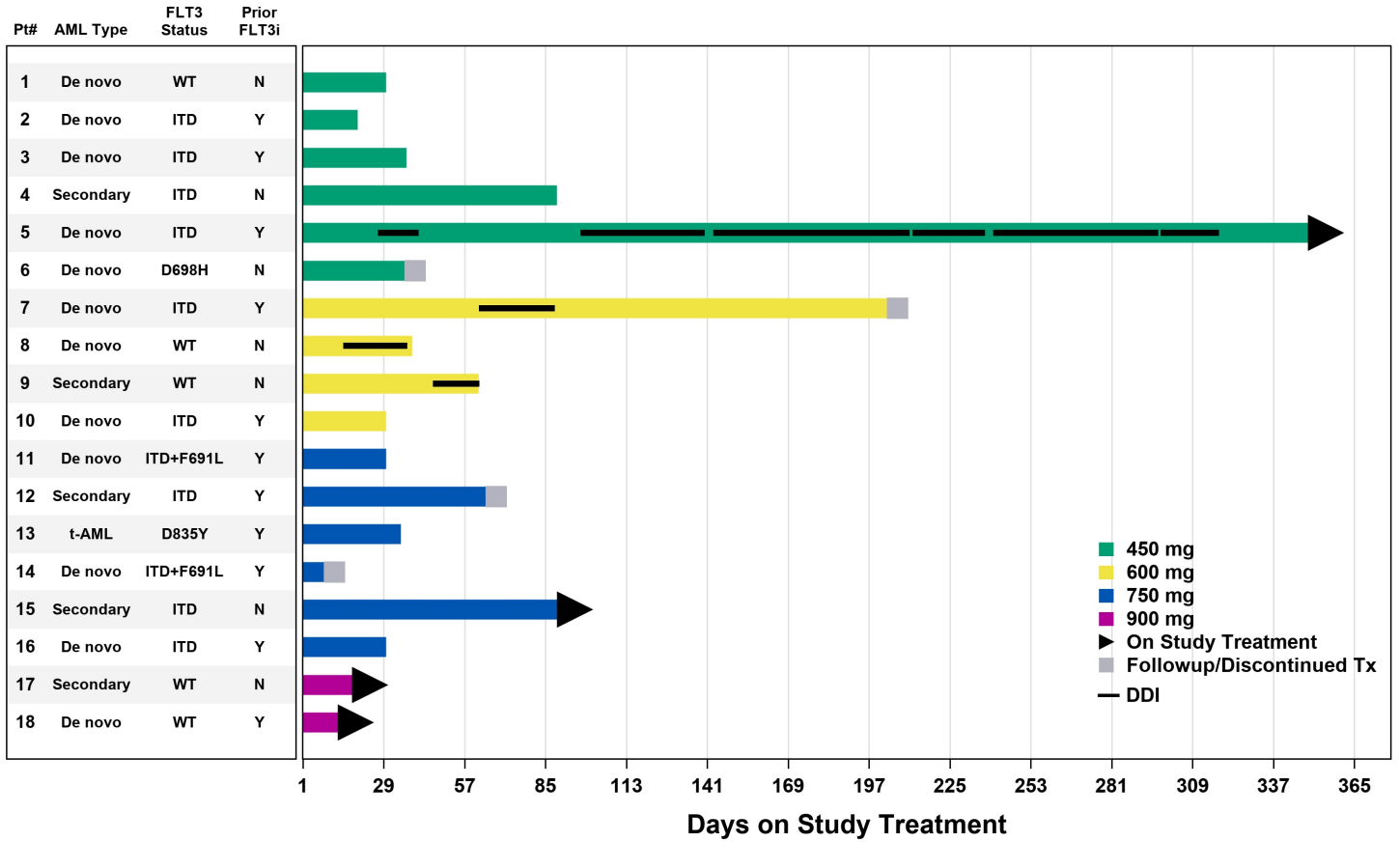
Luxeptinib: Administered to Patients in Cohorts 1-3 Over Multiple Cycles and Now Dosing Cohort 4 (900mg)

As of data-cut on December 6, 2021:

- 16 patients were treated across 3 cohorts: 11 FLT3-ITD (69%), 1 FLT3-TKD (6%), 4 FLT3 WT
- Heavily-pretreated AML patients with median 3 lines of prior therapies (range 1-8)
- 10 (62.5%) patients had prior FLT3i therapy: 9 (56%) received gilteritinib, 5 of them also received other FLT3i including midostaurin, quizartinib or crenolanib
- 4 patients in DDI study co-administered with a CYP3A4/5 inhibiting azole anti-fungal



Now planning patients for: (a) 1200 mg original formulation; (b) new G3 formulation

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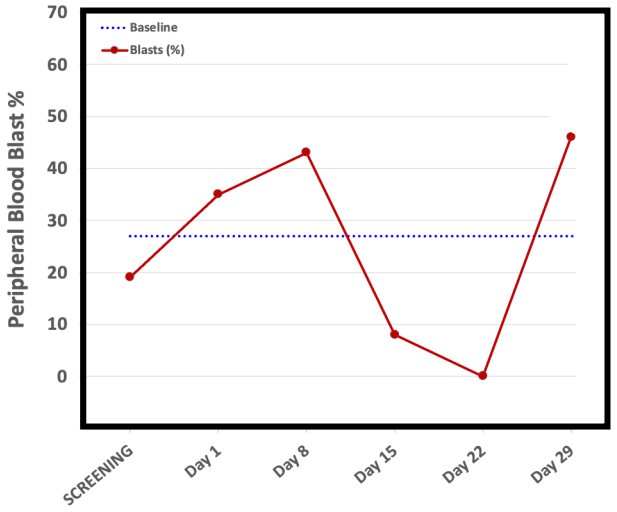
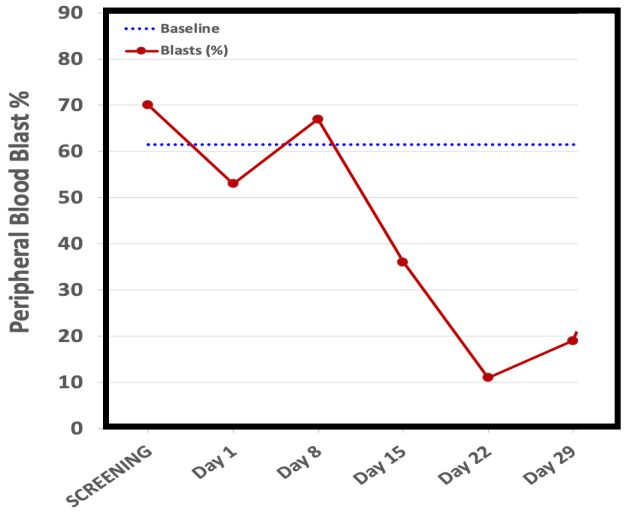
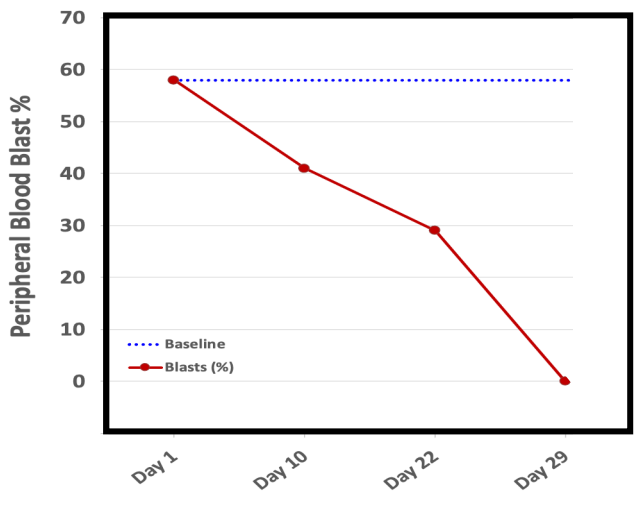
Luxeptinib: Examples of Blast Reductions in R/R FLT3-ITD+ AML Patients



- **36y, female, treated with Lux 450mg BID**
- **8 prior regimens** including FLT3 inhibitor gilteritinib and crenolanib, venetoclax and alloSCT
- Mutations detected at screening: FLT3-ITD, DNMT3A, NPM1, GATA2, WT1
- **90+% reduction of blasts** in Cycle 1, before disease progression in Cycle 2



- **64y, male, treated with Lux 750mg BID**
- **4 prior regimens** including azacitidine (for MDS), induction chemotherapy, Vyxeos, gilteritinib
- Mutations detected at screening: FLT3-ITD, GATA2, IDH2
- **80+% reduction of blasts** in Cycle 1, before disease progression in Cycle 2



- **61y, female, treated with Lux 750mg BID**
- **4 prior regimens** including induction and salvage chemotherapy, azacitidine, and venetoclax.
- Mutations detected at screening: FLT3-ITD, CBL, SRSF2, RUNX1, WT1
- **90+% reduction of blasts** in Cycle 1, before disease progression in Cycle 2

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Case Study: Durable MRD-negative CR in FLT3+ Patient at Lowest Luxeptinib Dose

Patient achieved CR and high plasma exposure levels in 2-4µM range

FLT3-ITD+ R/R AML	CR / MRD-
Demographics	46-year-old male
Diagnosis at Study Entry	**FLT3-ITD+, relapsed de novo AML** with myeloid sarcoma (bone marrow & extra medullary disease)
Prior Therapies	• **Heavily pretreated, failed by chemotherapy / prior-FLT3i / 2 allogeneic transplants** • Induction chemotherapy, followed by salvage chemotherapy + **FLT3i** followed by **HSC** Transplant #1 • Following **HSC** relapse, treated with decitabine + venetoclax + **FLT3i** followed by 2nd **HSC** Transplant • Following 2nd **HSC** relapse & increased BM blast received focal radiation to perispinal mass
Dose	450mg BID luxeptinib
Response	• Abnormal bone marrow blast reduced to 0.6% on C2D1 and remained undetectable thereafter • Patient experienced **no myelosuppression** with blood counts sustained at normal levels • Highly sensitive flow cytometry detected **no abnormal blasts in bone marrow** at C4D1 and C5D3

MRD- CR: FLT3+ patient continues on study in Cycle 13

Luxeptinib New G3 Formulation

Luxeptinib 1st Generation (G1) Formulation

Clinically active in B-cell cancers

Clinically active in AML

Safety & tolerability allow exploration of higher exposures

Luxeptinib 3rd Generation (G3) Formulation

Goal to improve absorption reduce pill burden, reduce total API administered, and increase exposures

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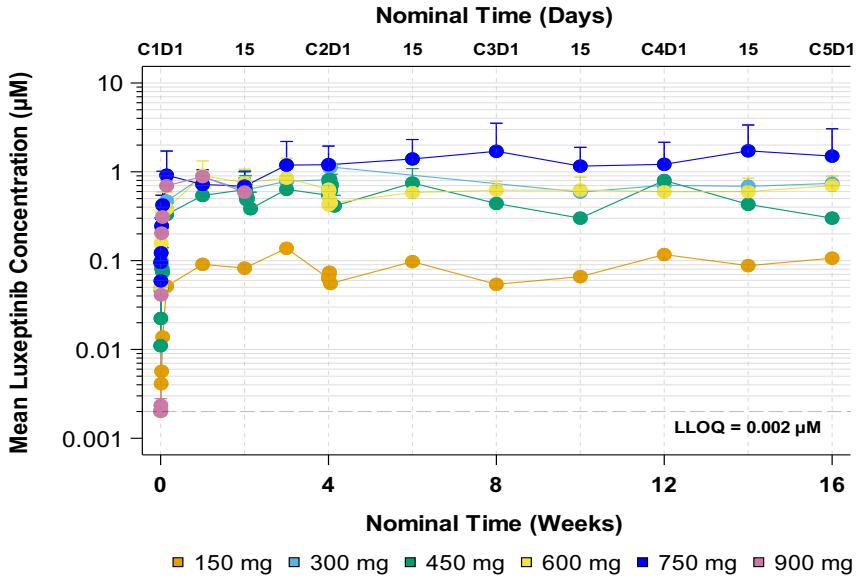
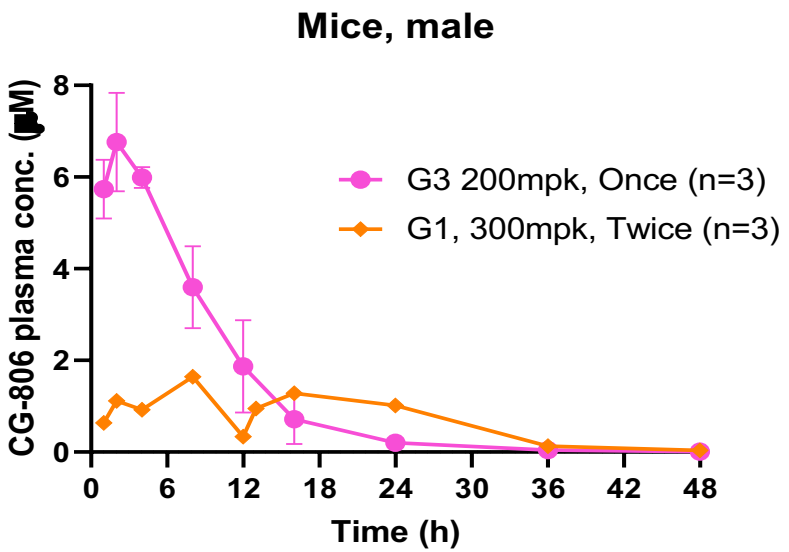
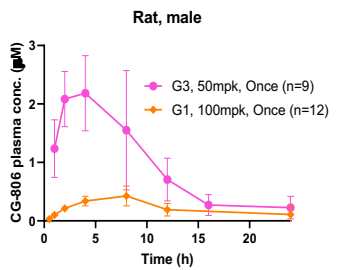
Luxeptinib: Pharmacokinetic Properties of G1 and G3 Formulations

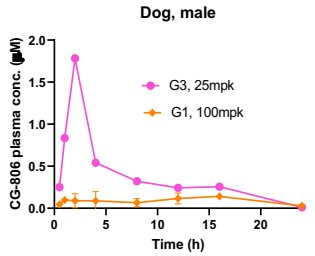
- Original formulation in the ongoing Phase 1 achieved dose-related steady state plasma concentrations
- Exposures increased incrementally from 450 to 750mg dose levels in AML and B-cell cancer patients
- AML patient with MRD- CR achieved 2-4µM+
- Goal: Want higher exposure levels consistently

- G3 new formulation developed over the period of two years
- G3 self emulsifying drug delivery system designed to improve oral bioavailability
- PK properties of orally administered G3 and G1 formulations were compared in mouse, rat and dog
- In all preclinical models, G3 outperformed significantly a higher dose of G1









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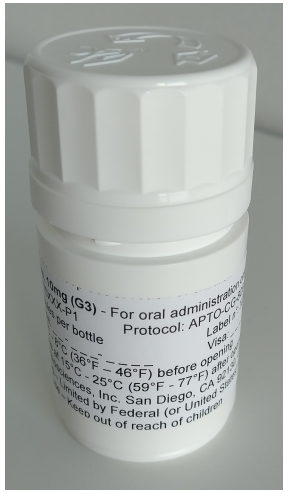
Luxeptinib: Plan to Introduce G3 Formulation to the Clinic

- **G3 Capsules**
  - Increased manufacturing throughput relative to G1
  - 10 mg and 50 mg strengths filled into hard capsules
  - Smaller size capsules that incorporate less drug substance than G1



- **GMP Manufacture of G3 Capsules**
  - Capsules passed stability testing at multiple temperature/RH conditions
  - Manufacture of the first GMP clinical batch is complete and released for human use
- **G3 included in protocol amendments for AML/MDS and CLL/SLL/NHL patients**
- **Plan to merge G3 into ongoing trials and match G1 exposures – Not starting over!**
  - Plan to evaluate single dose PK properties and then transition to continuous dosing in humans

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Luxeptinib: Dual Myeloid Kinome Inhibitor and Lymphoid Kinome Inhibitor

What have we learned

Oral KI targeting kinase constellations operative in AML and B-cell cancers
Well-tolerated through 750mg BID over multiple cycles – now at 900mg dose
Delivered dose-related antitumor activity and CMR in diverse B-cell cancers
Delivered MRD- CR in AML patient with high exposure levels (2-4uM)

What is needed

Luxeptinib is clinically active and well tolerated to justify further dose escalation
Yet, need consistent and higher exposure levels in AML & B-cell cancer patients
Original formulation from 450-750mg provided incremental exposure increases

What are next steps

Exploring 900mg and possibly higher doses with original formulation
Exploring improved G3 formulation to lower pill burden and boost exposure
Daily, low dose co-administered with CYP inhibitor as with AML CR patient
Select optimal formulation and doses for expansion & combination studies

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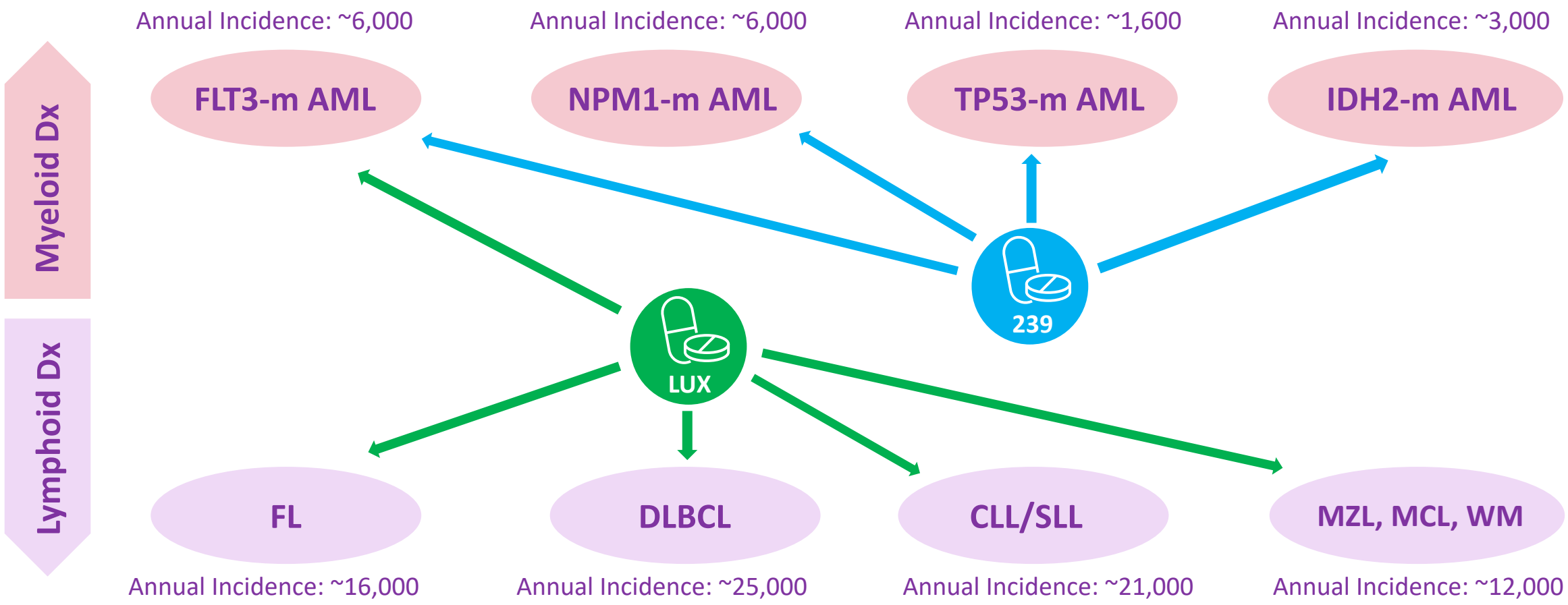
Aptose Kinome Inhibitor Pipeline: Potential Opportunities Across Hem/Onc



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Aptose Biosciences (NASDAQ: APTO)

APTOSE

Hematology company focused on precision medicines

Experienced leadership with deep expertise in kinase inhibitors

Multiple orphan hematology programs, with broader oncology optionality

Value-driving clinical updates through 1H22, with cash runway to early 2023

HM43239

Clinically validated *Myeloid Kinome Inhibitor (MKI)*

Multiple complete responses (CR) in an ongoing Phase 1/2 study of R/R AML

Meaningful clinical benefit in all responders (stem cell transplant; durable response)

CR in patients with FLT3-ITD/TKD, $NPM1^{MUT}$, $TP53^{MUT}$, RAS^{MUT}, IDH^{MUT} and others

LUXEPTINIB

Dual *Lymphoid and Myeloid Kinome Inhibitor (LKI/MKI)*

Inhibits all forms of FLT3: Ongoing Phase 1a/b dose escalation in AML, MDS

Inhibits all forms of BTK: Ongoing Phase 1a/b dose escalation in B-NHL

Clinically active: anti-tumor activity in high-bar clinical setting of R/R patients

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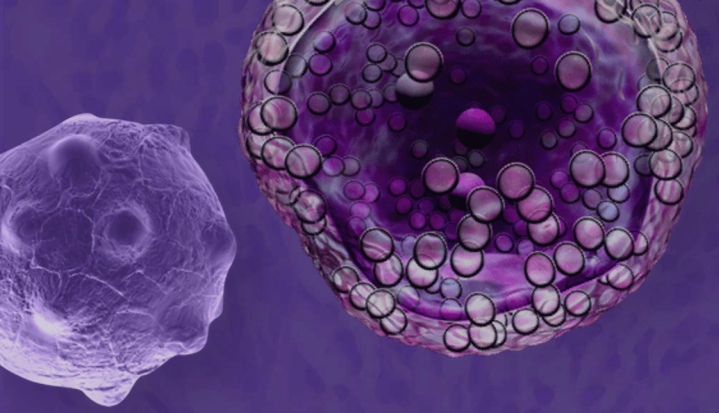

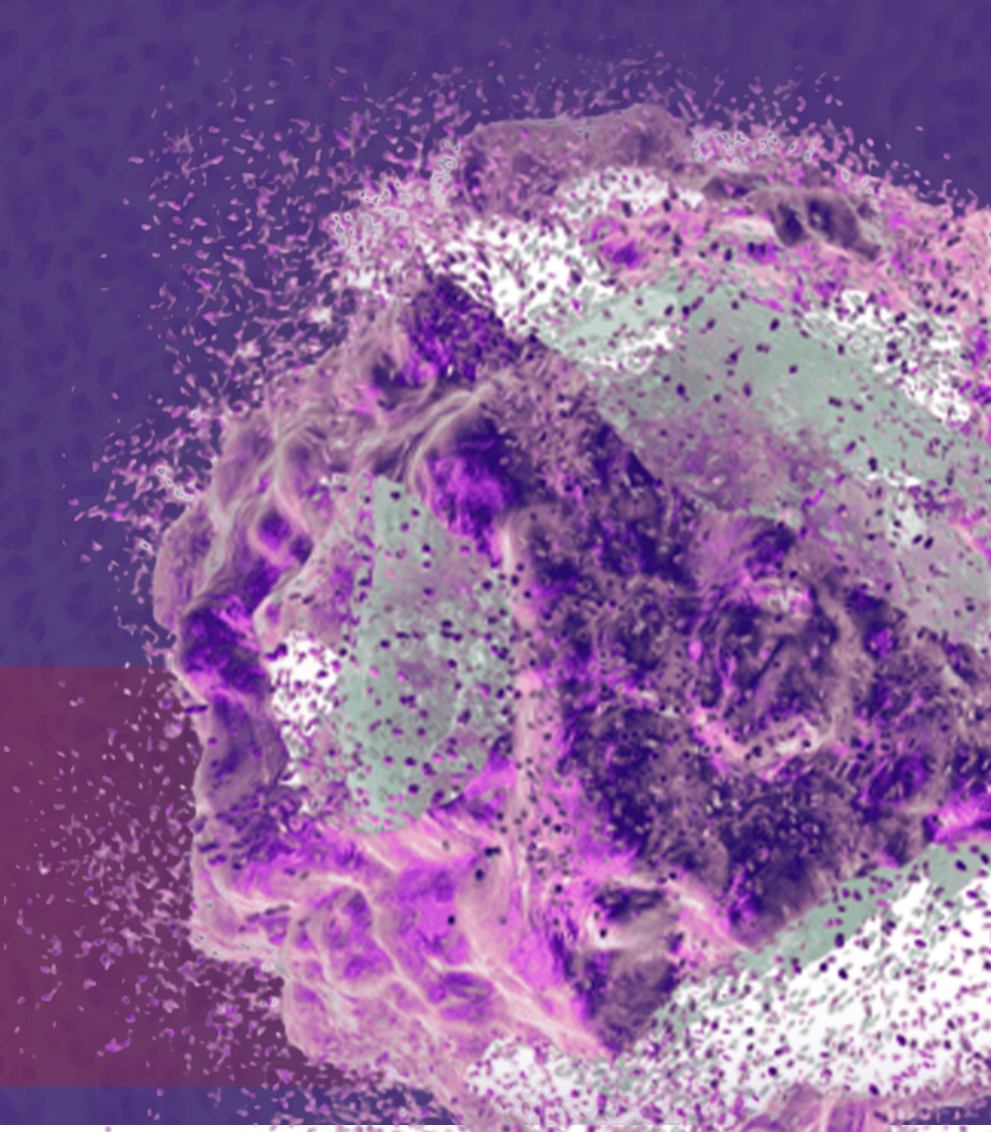

We thank our collaborators, investigators, and investors for helping us bring novel drugs to patients with the greatest need.

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PRECISION ONCOLOGY FOR THERAPIES OF TOMORROW