MOTION

MOTION Phase 3 Top-line Results and 3Q23 Earnings Conference Call

October 30, 2023

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One Mission,
Inspired by Patients:
Defeat Cancer.™

DECIPHERA

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Forward-Looking Statements

This presentation may contain forward-looking statements that are based on our current expectations, estimates and projections about our industry, our operations and financial performance, as well as management's beliefs and assumptions. Words such as "anticipates," "expects," "intends," "plans," "believes," "seeks," "estimates," "may," "will," and variations of these words or similar expressions are intended to identify forward-looking statements. Such forward-looking statements are subject to various risks and uncertainties, including important factors that could cause actual outcomes or results to differ materially from those indicated in these statements. These statements include, without limitation, the potential for our pre-clinical and/or clinical stage pipeline assets to be first-in-class and/or best-in-class treatments, plans to continue our geographic expansion of QINLOCK in Key European markets, our Phase 3 INSIGHT clinical study of QINLOCK versus sunitinib in second-line GIST patients with mutations in KIT exon 11 and 17/18, our expectations regarding the aggregate potential revenue opportunity for QINLOCK, our ability to expand the market opportunity for QINLOCK in second-line GIST in our INSIGHT Phase 3 study; the vimseltinib top-line readout for the pivotal Phase 3 MOTION study and phase 1/2 study of vimseltinib, each in TGCT patients; plans for our on-going phase 1/2 study of DCC-3116, the potential for our autophagy program to be a multi-billion dollar opportunity; submitting an IND for DCC-3084 in the fourth quarter of 2023, submitting an IND for DCC-3009 in the second half of 2024; clinical studies including status, progress and results, timing for clinical data readouts, planning efforts for future clinical studies, NDA/MAA (and equivalent) filings and potential additional approvals, research and discovery efforts including the potential of our drug candidates, IND filings, regulatory designations and programs, timing and likelihood of success, plans and objectives of management for future operations, estimated patient populations, the market opportunity for our drug and drug candidates and business guidance, including discovery, clinical and regulatory milestones, cash guidance, expectation regarding our financial performance and business strategy, and the potential impact of the Inflation Reduction Act (the "IRA"), speak only at the time this presentation was prepared. Such statements are based upon the information available to us now and are subject to change. We will not necessarily inform you of such changes. These statements are not guarantees of future performance and are subject to certain risks, uncertainties and assumptions that are difficult to predict. Therefore, actual results could differ materially and adversely from those expressed in any forward-looking statements as a result of various factors, including, among others, the success of our commercialization efforts with respect to QINLOCK, including our launch in key European markets, our limited experience as a commercial company, our ability to obtain, or any delays in obtaining, required regulatory approvals for our drug and drug candidates, our reliance on sole source third-party suppliers, our exposure to criminal sanctions, civil penalties, contractual damages, reputational harm, and diminished profits and future earnings from our relationships with customers and third-party payors that are subject to applicable anti-kickback, fraud and abuse, and other healthcare laws and regulations, and health information privacy and security laws, our failure to obtain or maintain adequate coverage and reimbursement for new or current products, recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize our drug candidates, the potential for QINLOCK or any current drug candidates, such as vimseltinib and DCC-3116, or future drug candidates, if successfully developed and approved, to cause undesirable side effects that limit the commercial profile or result in other significant negative consequences for approved products or delay or prevent further development or regulatory approval with respect to drug candidates or new indications, or cause regulatory authorities to require labeling statements, such as boxed warnings, our competition may discover, develop, or commercialize products before or more successfully than we do, our estimates for market opportunities for our approved drug and drug candidates, market acceptance by physicians, patients, third-party payors, and others in the medical community of QINLOCK, and of any future approved drugs, such as vimseltinib or DCC-3116, if approved, our failure to obtain additional marketing approvals in other foreign jurisdictions, the potential for ongoing enforcement of post-marketing requirements for QINLOCK and any drug candidate for which we obtain marketing approval to subject us to substantial penalties, including withdrawal of QINLOCK or any future approved product from the market, if we fail to comply with all regulatory requirements, our assumptions in connection with the market opportunity for the INSIGHT trial patient population including the aggregate potential revenue opportunity for QINLOCK, our ability to complete, and the costs and timing of completing, the development and commercialization of our drug and drug candidates, our success in enrolling patients in clinical trials, including in our clinical trials of vimseltinib or DCC-3116, the potential for serious adverse events or unacceptable side effects to be identified during the development of our drug or drug candidates, our ability to obtain or, if granted, retain orphan drug exclusivity for our drug or drug candidates; our incurrence of significant operating losses since our inception and our expectation that we will incur continued losses for the foreseeable future and may never achieve or maintain profitability, our ability to raise capital when needed, our reliance on third parties to conduct our clinical trials and preclinical studies, our reliance on third parties for the manufacture of our drug candidates for preclinical testing and clinical trials, and for the manufacture of QINLOCK for commercialization and clinical trials, and our ability to enforce our intellectual property rights throughout the world. New risk factors and uncertainties may emerge from time to time, and it is not possible to predict all risk factors and uncertainties. There can be no assurance that the opportunity will meet your investment objectives, that you will receive a return of all or part of such investment. Investment results may vary significantly over any given time period. The appropriateness of a particular investment or strategy will depend on an investor's individual circumstances and objectives. Investors should independently evaluate specific investments. For further information regarding these risks, uncertainties and other factors, you should read the "Risk Factors" section of our Quarterly Report on Form 10-Q for the quarter ended June 30, 2023 filed with the Securities and Exchange Commission (the "SEC"), and our other SEC filings.

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TODAY'S AGENDA

OPENING REMARKS
Steve Hoerter
President and Chief Executive Officer

MOTION PHASE 3 TOP-LINE RESULTS
Matt Sherman, M.D.
Executive Vice President and Chief Medical Officer

UPDATED VIMSELTINIB PHASE 1/2 RESULTS
Matt Sherman, M.D.
Executive Vice President and Chief Medical Officer

VIMSELTINIB MARKET OPPORTUNITY
Dan Martin
Senior Vice President and Chief Commercial Officer

U.S. COMMERCIAL UPDATE
Dan Martin
Senior Vice President and Chief Commercial Officer

INTERNATIONAL COMMERCIAL UPDATE
Margarida Duarte
Senior Vice President, Head of International

CLOSING REMARKS AND Q&A
Steve Hoerter
President and Chief Executive Officer

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Opening Remarks

Steve Hoerter

President and Chief Executive Officer

DECIPHERA

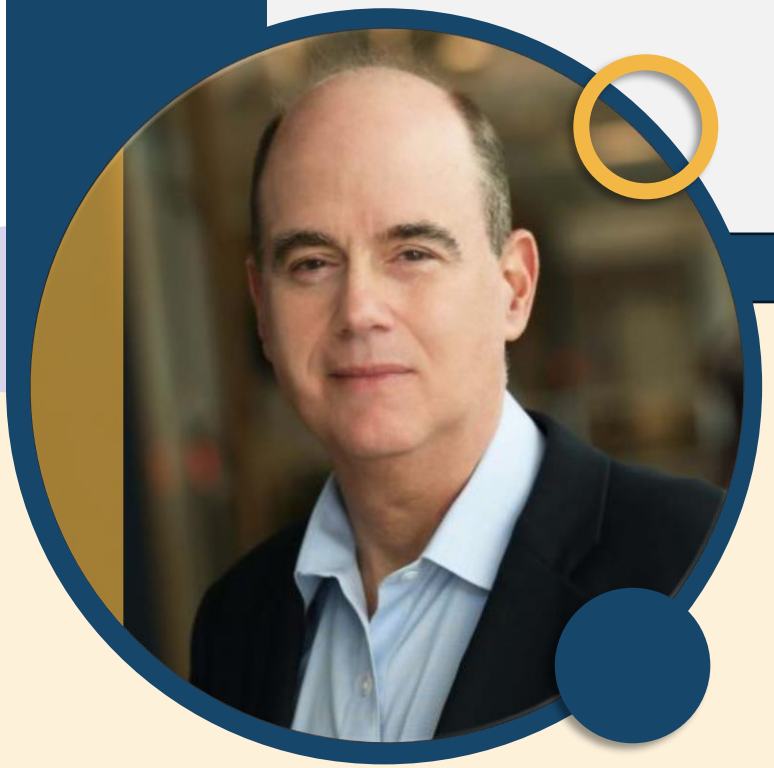
ONE MISSION, INSPIRED BY PATIENTS: DEFEAT CANCER™

Executing on our mission to discover, develop, and commercialize important new medicines to **improve the lives of people with cancer.**

Over $1 Billion	**Peak Worldwide Sales** Potential for QINLOCK® (ripretinib) and Vimseltinib
Two Phase 3 Programs	**MOTION Top-Line Data** Announced Today and INSIGHT Initiated in 3Q 2023[1]
Potential First-in-Class Autophagy Program	**Multi-Billion Dollar Opportunity** Targeting Autophagy
Proven Discovery Engine	**High-Value Research Pipeline** of Switch-Control Kinase Inhibitors

Notes: (1) Initiated the INSIGHT Phase 3 study opening the first sites for enrollment.

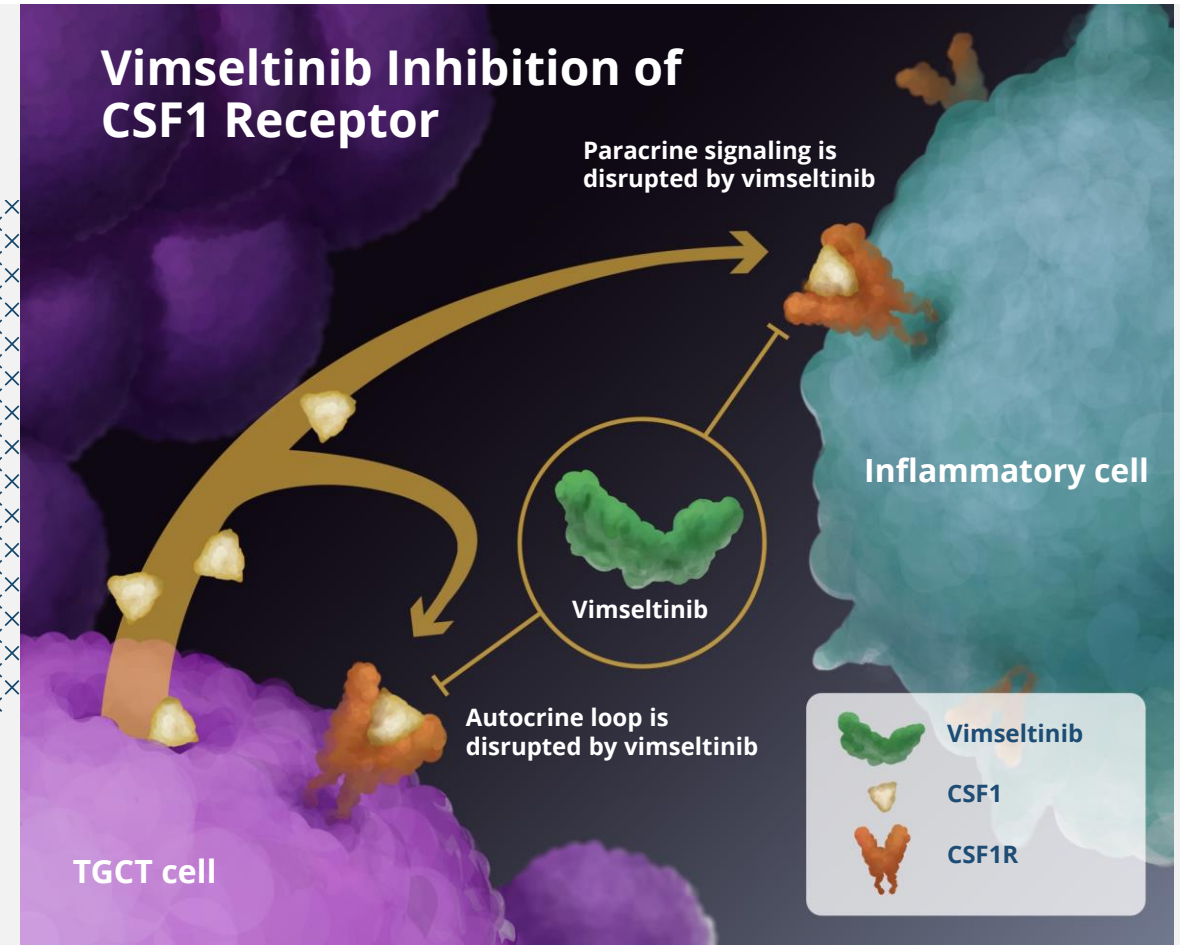
MOTION PHASE 3 TOP-LINE RESULTS



Matt Sherman, M.D.

Executive Vice President and Chief Medical Officer

VIMSELTINIB: CSF1R INHIBITOR FOR TENOSYNOVIAL GIANT CELL TUMOR (TGCT)



- Vimseltinib is an oral, switch-control TKI specifically designed to selectively and potently inhibit CSF1R
- TGCT is caused by translocation in *CSF1* gene, coding the ligand for CSF1R
- High unmet medical need in TGCT for effective therapy with improved safety profile

Notes: CSF1=colony-stimulating factor 1; CSF1R=colony-stimulating factor 1 receptor; TGCT=tenosynovial giant cell tumor; TKI=tyrosine kinase inhibitor;

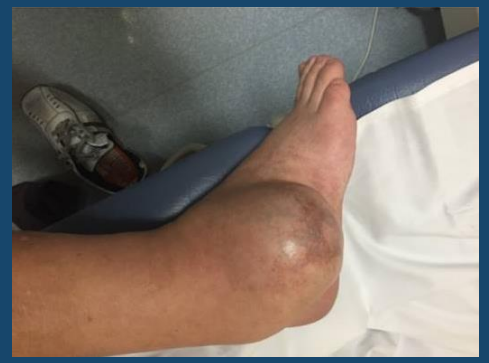
A LOCALLY AGGRESSIVE TUMOR ASSOCIATED WITH SUBSTANTIAL MORBIDITY

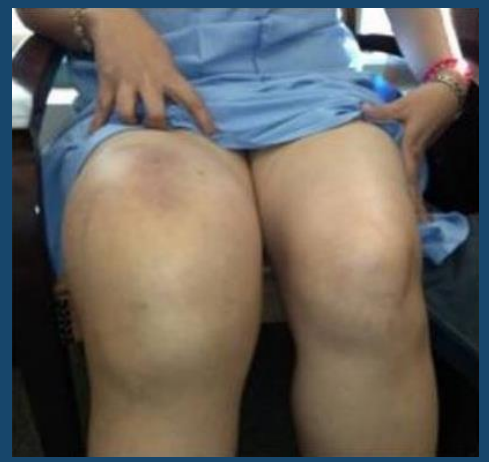
Diagnosis and Patient Burden

- Patients often have a long path to diagnosis
- High disease burden with patients suffering multiple symptoms including severe pain, limited function, swelling, and stiffness

Unmet Need

- Some patients not amenable to surgical resection; others have disease recurrence after one or more surgeries
- Pexidartinib approved by FDA has a black box warning and Risk Evaluation and Mitigation Strategy (REMS) program due to hepatotoxicity risks; rejected by EMA
- Unmet need remains for effective CSF1R inhibitor with favorable safety profile



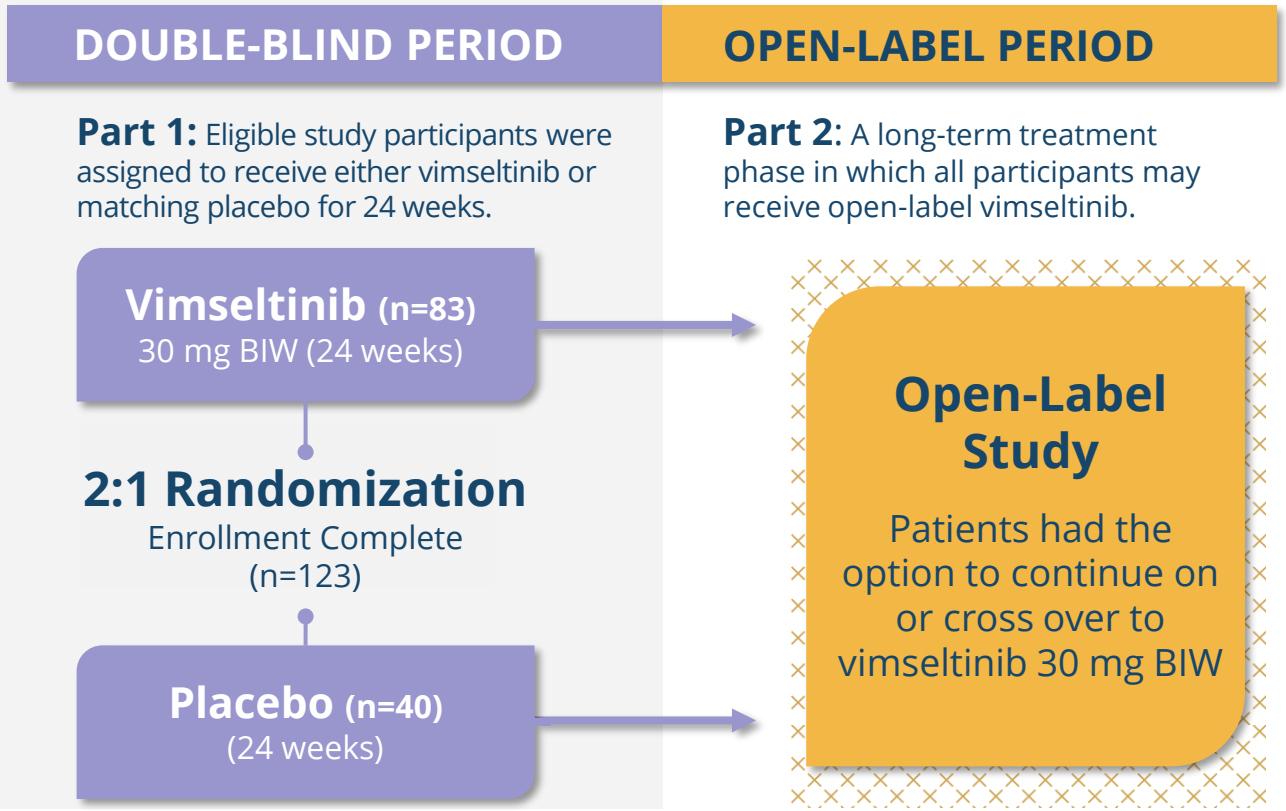


Ankle image courtesy of Tap WD, et al. ASCO 2018, abstract 11502; Knee image courtesy of Tap WD, et al. N Engl J Med. 2015;373:428-437.

Notes: CSF1R=colony-stimulating factor 1 receptor; EMA=European Medicines Agency; FDA=U.S. Food and Drug Administration; TGCT=tenosynovial giant cell tumor

A MULTICENTER, RANDOMIZED, PLACEBO-CONTROLLED, DOUBLE-BLIND STUDY

International Study with 35 Sites



Notes: BIW=twice weekly; TGCT=tenosynovial giant cell tumor. PROMIS=Patient-reported Outcomes Measurement Information System; worst stiffness by Numeric Rating Scale (NRS), worst pain response rate by Brief Pain Inventory (BPI). (1) Primary and secondary endpoints at Week 25.

Phase 3 MOTION Study

Assessed the efficacy and safety of vimseltinib for the treatment of patients with TGCT not amenable to surgery[1]

Primary Endpoint

- Objective Response Rate (ORR)

Secondary Endpoints

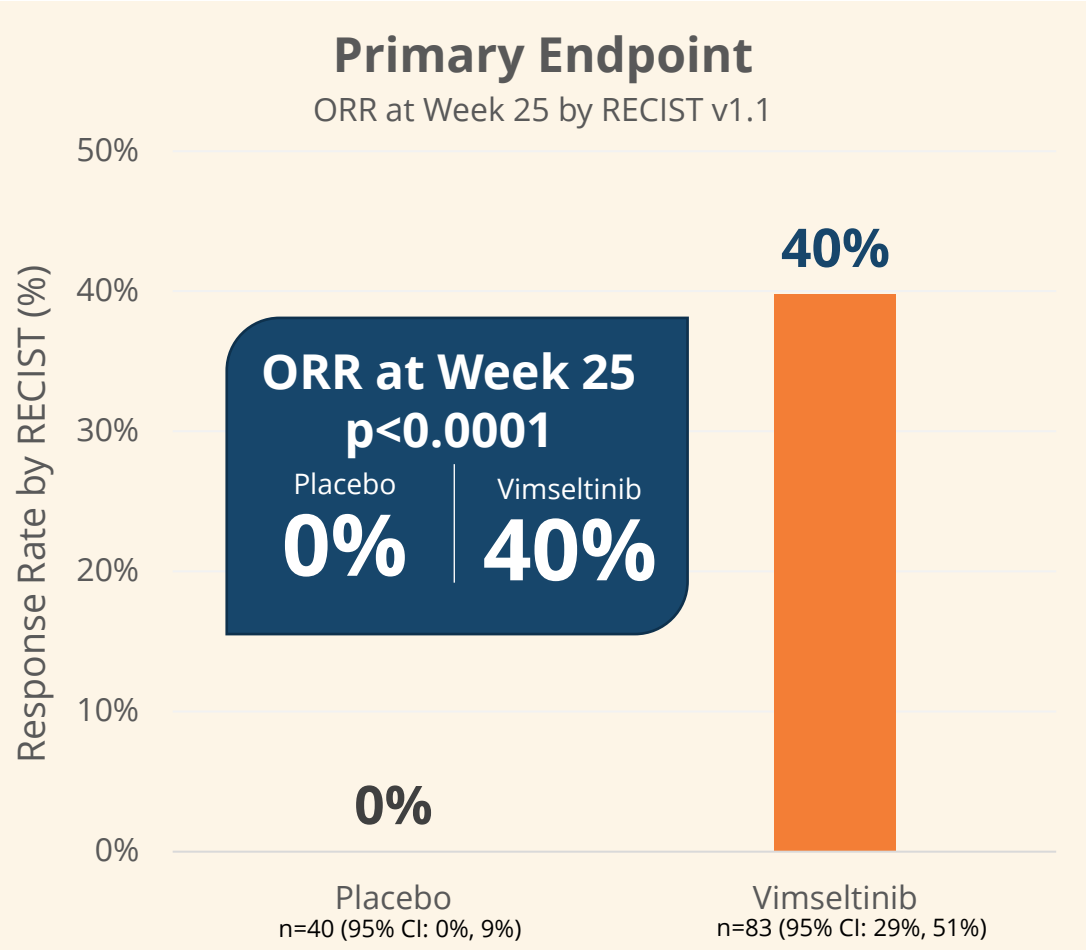
- ORR per Tumor Volume Score
- Mean Change From Baseline (CFB) in Active Range of Motion (ROM)
- Mean CFB in PROMIS-PF
- Mean CFB in Worst Stiffness NRS
- Mean CFB in EQ-VAS
- BPI-30 Response Rate in Worst Pain

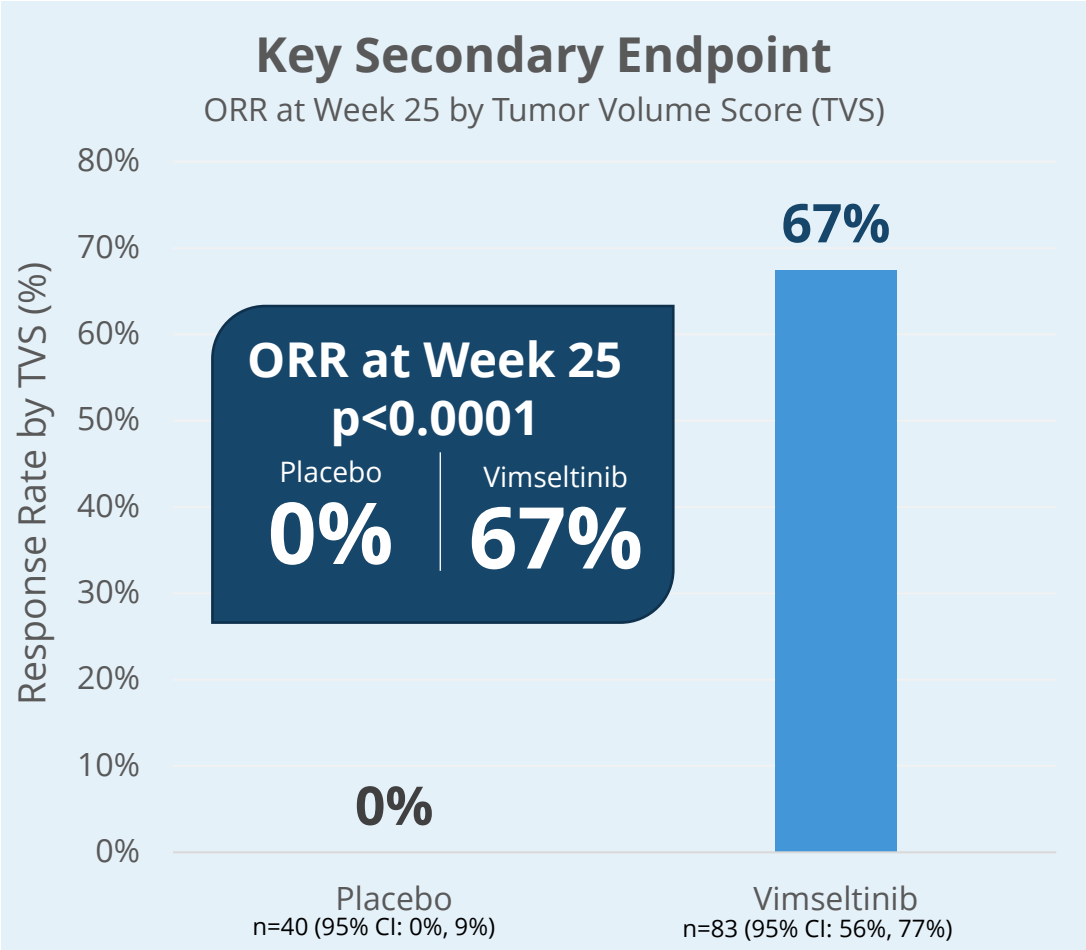
BASELINE CHARACTERISTICS

	Vimseltinib (n=83)	Placebo (n=40)	Total (n=123)
Median Age, Years (Range)	45 (20, 78)	43 (21, 72)	44 (20, 78)
Sex			
Female	46 (55%)	27 (68%)	73 (59%)
Male	37 (45%)	13 (33%)	50 (41%)
Disease Location			
Knee	56 (67%)	27 (68%)	83 (67%)
Ankle	9 (11%)	6 (15%)	15 (12%)
Hip	11 (13%)	1 (3%)	12 (10%)
Other	7 (8%)	6 (15%)	13 (11%)
Disease Subtype			
Diffuse	57 (69%)	28 (70%)	85 (69%)
Localized	26 (31%)	10 (25%)	36 (29%)
Prior Surgery	64 (77%)	27 (68%)	91 (74%)
Prior Systemic Therapy	19 (23%)	9 (23%)	28 (23%)
Imatinib	16 (19%)	7 (18%)	23 (19%)
Other	3 (4%)	4 (10%)	7 (6%)

Notes: Results are reported for patients with TGCT with a data cutoff of August 22, 2023; TGCT=tenosynovial giant cell tumor; Data are presented as n (%) unless otherwise noted; two placebo patients received both imatinib and nilotinib. Percentages might not add up to 100% due to rounding. Two patients had missing disease subtype.

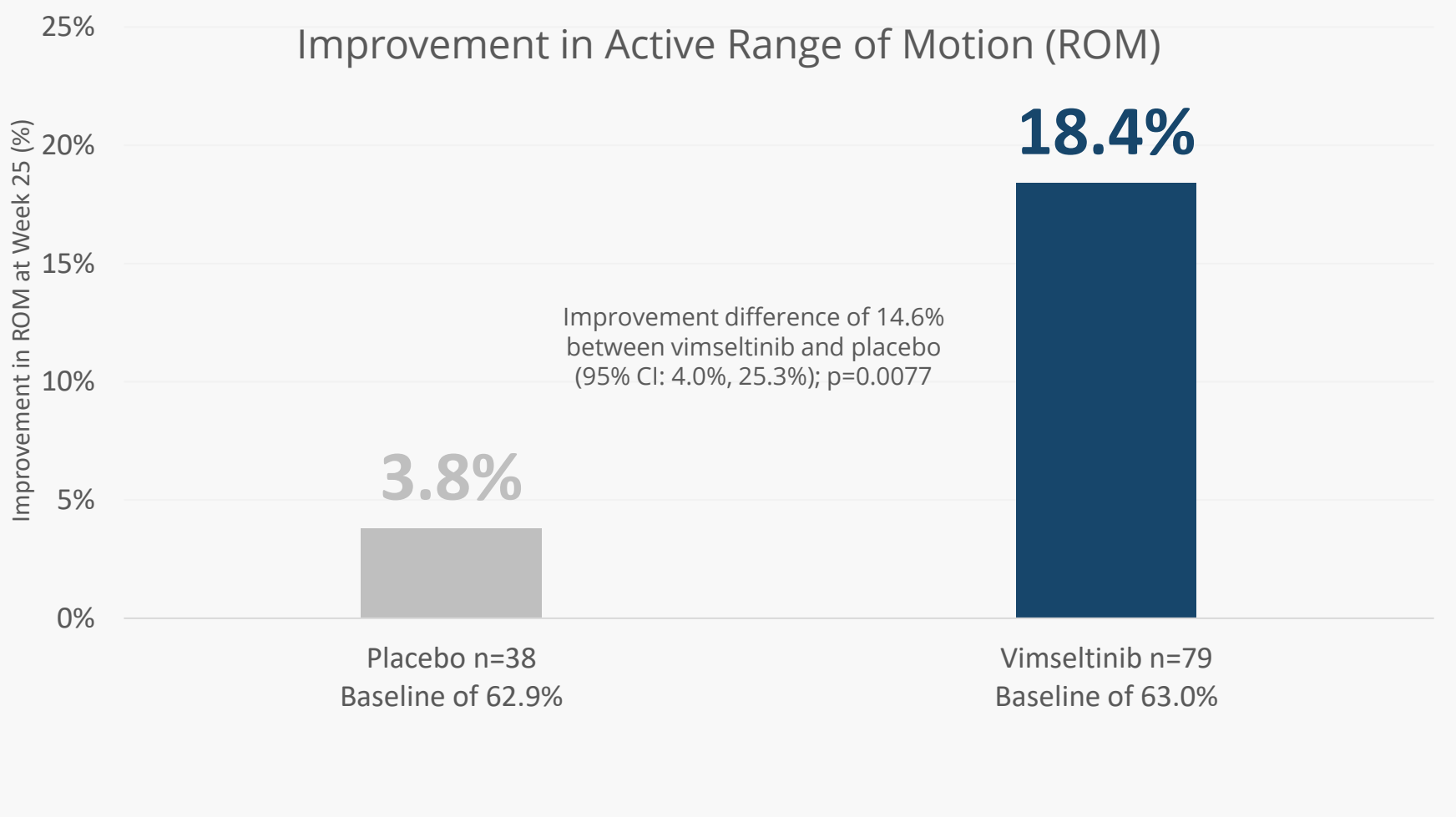
STUDY MET PRIMARY AND ALL SIX KEY SECONDARY ENDPOINTS





Notes: Endpoints evaluated by blinded independent radiologic review (IRR). ORR by Response Evaluation Criteria in Solid Tumors (RECIST) v1.1 Complete Response = 4 (5%); Partial Response = 29 (35%). ORR by TVS Complete Response = 4 (5%); Partial Response = 52 (63%). A response by TVS is defined as a ≥50% reduction in the tumor volume relative to baseline.

KEY SECONDARY ENDPOINT: ACTIVE RANGE OF MOTION



~5X
IMPROVEMENT
IN **ROM**
AT WEEK 25

Notes: n=number of patients with a baseline ROM value. Active ROM is measured for the affected joint as a percentage of a normal reference range as defined by the American Medical Association. The mean change from baseline at Week 25 was compared between the two treatment arms.

FAVORABLE SAFETY AND TOLERABILITY PROFILE FOR VIMSELTINIB

Treatment Emergent Adverse Events (TEAEs) in ≥15% of Patients

Preferred Term n (%)	Vimseltinib (n=83)		Placebo (n=39[1])	
	All Grades	Grade 3/4	All Grades	Grade 3/4
Periorbital edema^	37 (45%)	3 (4%)	5 (13%)	0
Fatigue^	27 (33%)	0	6 (15%)	0
Face edema^	26 (31%)	1 (1%)	3 (8%)	0
Pruritus^	24 (29%)	2 (2%)	3 (8%)	0
Headache^	23 (28%)	1 (1%)	10 (26%)	0
Asthenia^	22 (27%)	1 (1%)	9 (23%)	1 (3%)
Nausea^	21 (25%)	0	8 (21%)	1 (3%)
CPK increased	20 (24%)	8 (10%)	0	0
AST increased	19 (23%)	0	1 (3%)	0
Arthralgia^	16 (19%)	0	6 (15%)	1 (3%)
Rash^	16 (19%)	0	2 (5%)	0
Rash maculopapular^	16 (19%)	1 (1%)	0	0
Edema peripheral^	15 (18%)	0	3 (8%)	0
Hypertension	14 (17%)	4 (5%)	4 (10%)	1 (3%)
Diarrhea	10 (12%)	0	8 (21%)	1 (3%)

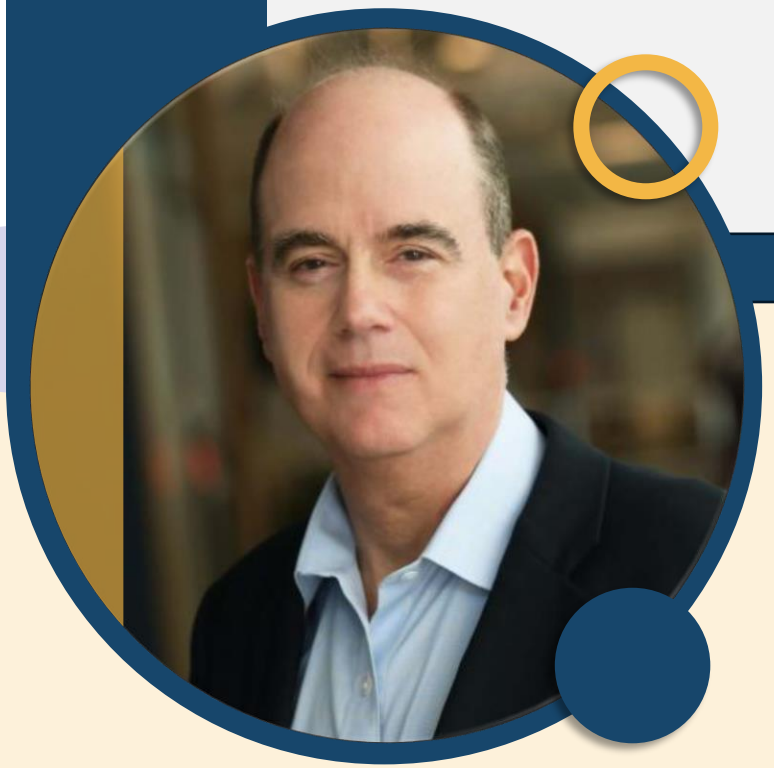
- **No evidence of cholestatic hepatotoxicity for vimseltinib**
- **Serum enzyme elevations were consistent with the known mechanism of action of CSF1R inhibitors**
- **5/83 (6%) treatment discontinuation due to TEAEs in the vimseltinib arm**

Notes: (1) Does not include one patient randomized to placebo that did not receive study drug.

TEAE incidence is based on maximum grades per CTCAE v5.0. The only Grade 4 adverse events were CPK Increased observed in two patients. TEAEs leading to dose interruption were 44 (53%) and dose reduction 35 (42%).

^ Denotes adverse events without Grade 4 criteria per CTCAE v5.0.

UPDATED VIMSELTINIB PHASE 1/2 RESULTS



Matt Sherman, M.D.
Executive Vice President and Chief Medical Officer

AN INTERNATIONAL, MULTICENTER, OPEN-LABEL PHASE 1/2 STUDY

PHASE 1 (DOSE ESCALATION)

- A pharmacologically guided 3 + 3 design, to determine the recommended Phase 2 dose (RP2D) and the maximum tolerated dose
- Enrollment in Phase 1 dose escalation is complete

COHORT 5 (n=8)

Loading Dose	Dose
30 mg QD x 5 days	30 mg twice weekly

COHORT 8 (n=12)

Loading Dose	Dose
30 mg QD x 3 days	10 mg QD

COHORT 9 (n=12)

Loading Dose	Dose
20 mg QD x 3 days	6 mg QD

PHASE 2 (EXPANSION)

- Study to evaluate the safety, tolerability, and preliminary efficacy in two TGCT expansion cohorts
- Recommended Phase 2 dose of 30 mg twice weekly with no loading dose

RP2D
30 mg twice weekly

PHASE 2 (n=65)

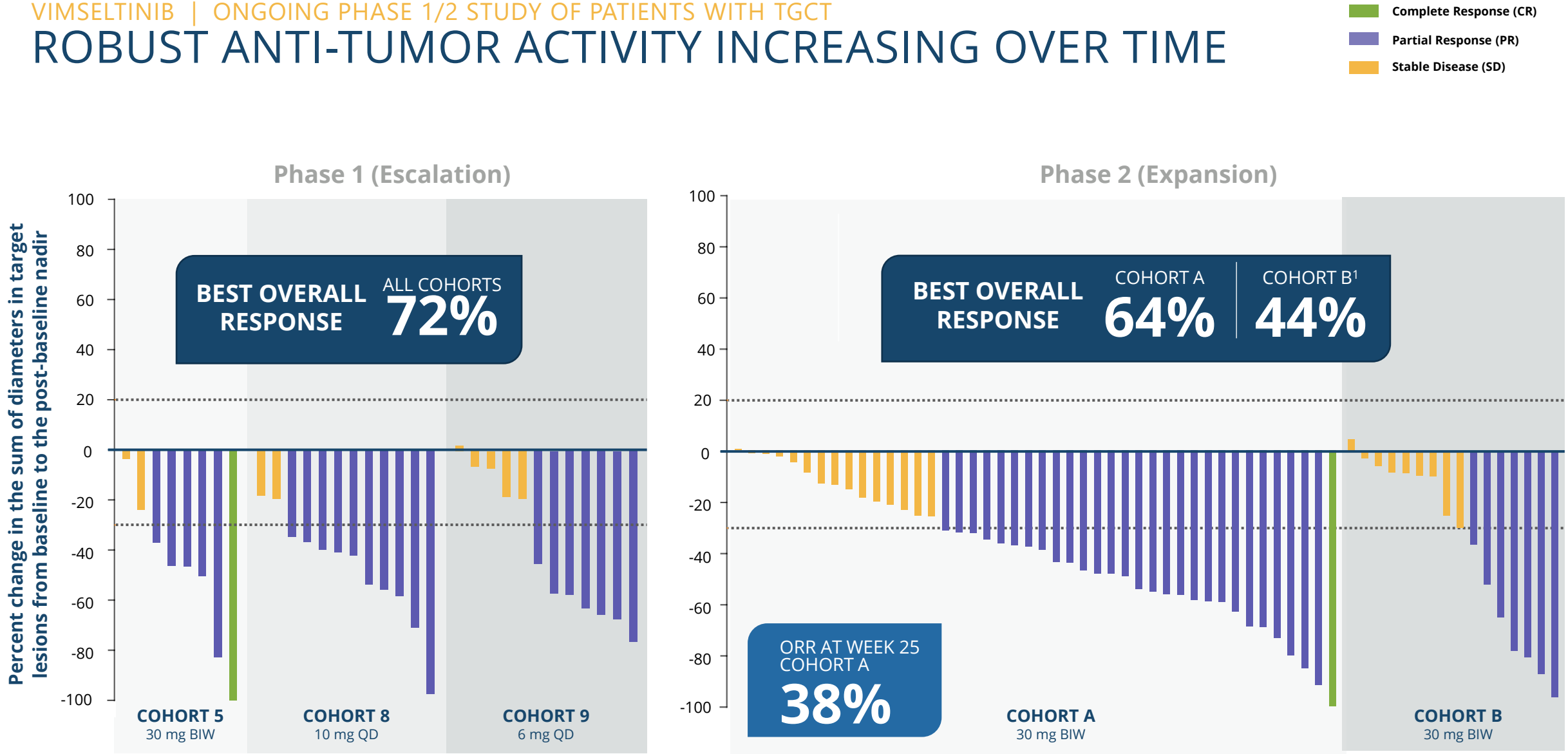
COHORT A (n=46)
TGCT patients with no prior anti-CSF1/CSF1R therapy (previous therapy with imatinib or nilotinib is allowed)

COHORT B (n=19)
TGCT patients with prior anti-CSF1/CSF1R therapy (previous therapy with imatinib or nilotinib alone would not be eligible)

Cohort B ACTIVE AND NOT RECRUITING

Notes: Data presented as of data cutoff of June 27, 2023; CSF1=colony-stimulating factor 1; CSF1R=colony-stimulating factor 1 receptor; QD=once daily; RP2D=recommended Phase 2 dose; TGCT=tenosynovial giant cell tumor.

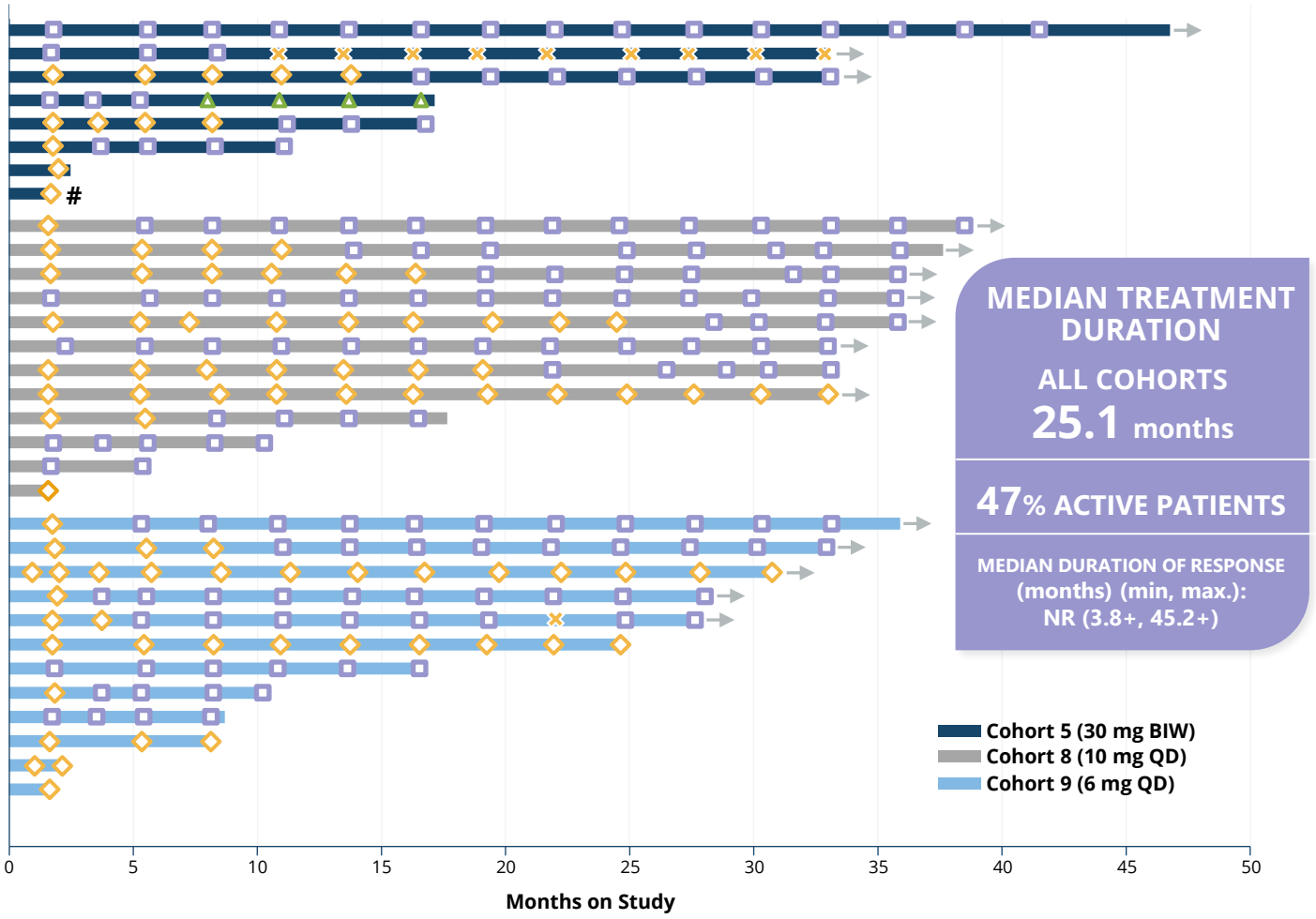
ROBUST ANTI-TUMOR ACTIVITY INCREASING OVER TIME



Notes: Results are reported for patients with TGCT with a data cutoff of June 27, 2023; ORR=objective response rate; (1) Previously treated with specific anti-CSF1/CSF1R agents

INCREASING DURATION OF THERAPY AND DURABLE RESPONSES

Phase 1 (Escalation)



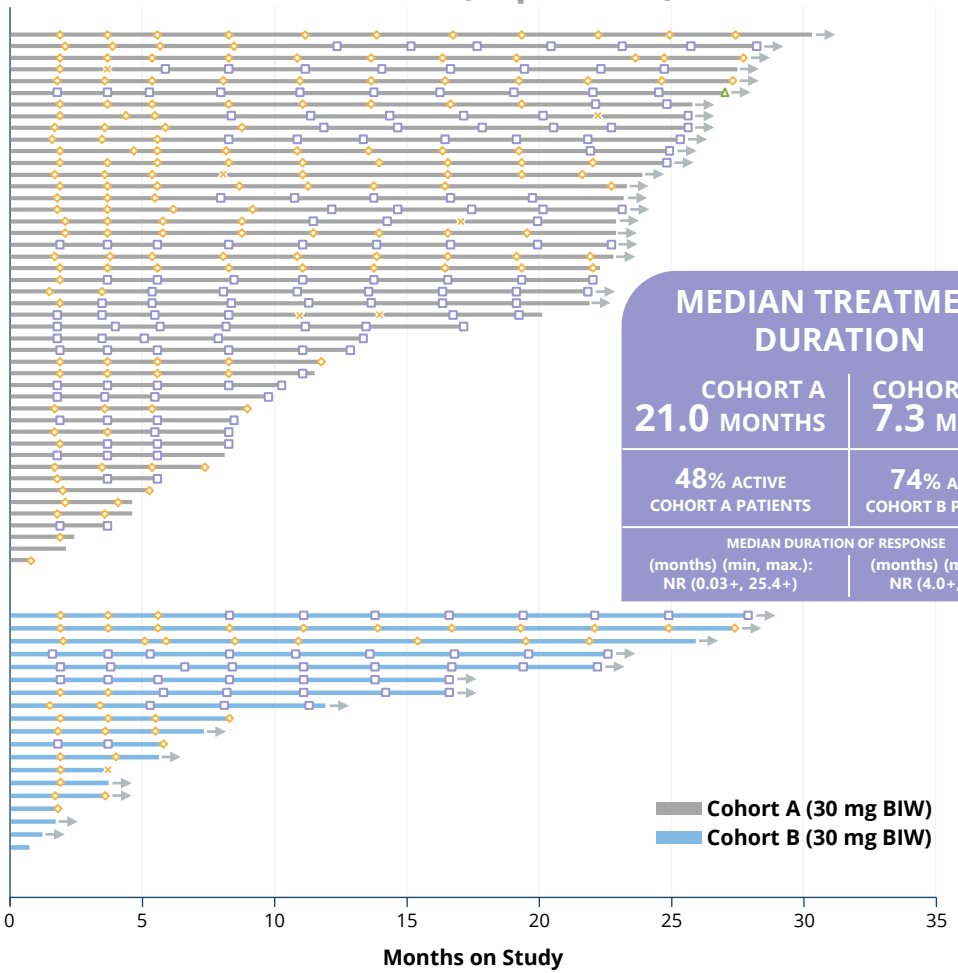
MEDIAN TREATMENT DURATION

ALL COHORTS
25.1 months

47% ACTIVE PATIENTS

MEDIAN DURATION OF RESPONSE (months) (min, max.): NR (3.8+, 45.2+)

Phase 2 (Expansion)



MEDIAN TREATMENT DURATION

COHORT A	COHORT B
21.0 MONTHS	7.3 MONTHS
48% ACTIVE COHORT A PATIENTS	74% ACTIVE COHORT B PATIENTS
MEDIAN DURATION OF RESPONSE (months) (min, max.): NR (0.03+, 25.4+)	MEDIAN DURATION OF RESPONSE (months) (min, max.): NR (4.0+, 21.0+)

Complete Response (CR) | Partial Response (PR) | Stable Disease (SD)
Ongoing | Not Evaluable | # From Local Data

Notes: Results are reported for patients with TGCT with a data cutoff of June 27, 2023. NR=not reached by Kaplan-Meier analysis. + indicates response is ongoing.

FAVORABLE SAFETY AND TOLERABILITY PROFILE FOR VIMSELTINIB WITH LONG TERM FOLLOW UP

Treatment Emergent Adverse Events (TEAEs) in ≥15% of Patients Receiving Vimseltinib

Preferred Term n (%)	Phase 1/2 Combined: All Patients (n=95)	
	All Grades	Grade 3/4
Blood CPK increased	63 (66%)	39 (41%)
Periorbital edema^	45 (47%)	0
Headache^	37 (39%)	0
Fatigue^	35 (37%)	2 (2%)
Myalgia^	28 (29%)	3 (3%)
Nausea^	28 (29%)	0
AST increased	27 (28%)	4 (4%)
Arthralgia^	27 (28%)	2 (2%)
Asthenia^	23 (24%)	1 (1%)
Edema peripheral^	23 (24%)	0
Rash maculopapular^	21 (22%)	1 (1%)
Face edema^	21 (22%)	0
Pruritus^	20 (21%)	0
Diarrhea	19 (20%)	1 (1%)
Rash^	18 (19%)	0
COVID-19	18 (19%)	0
Hypertension	15 (16%)	6 (6%)
Lipase increased	15 (16%)	4 (4%)
Amylase increased	15 (16%)	3 (3%)
ALT increased	15 (16%)	1 (1%)

- **No evidence of cholestatic hepatotoxicity**
- **Serum enzyme elevations were consistent with the known mechanism of action of CSF1R inhibitors**
- **9/95 (9%) treatment discontinuation due to TEAEs in combined Phase 1/2**

Notes: Results are reported for patients with TGCT with a data cutoff of June 27, 2023. TEAE incidence is based on maximum grade per CTCAE v4.03. TEAEs were summarized in n=95 patients with TGCT across all cohorts in the Phase 1/2 study. One patient from Phase 1 and one patient from Cohort A discontinued and enrolled into Cohort B. The only Grade 4 adverse events were CPK increased.

^ Denotes adverse events without Grade 4 criteria per CTCAE v4.03.

VIMSELTINIB

SUMMARY OF PHASE 1/2 AND PIVOTAL PHASE 3 MOTION STUDY RESULTS

PHASE 1/2 STUDY UPDATE

Results demonstrate strong clinical benefit, well-tolerated safety profile, and long duration of treatment

Best Overall Response:

- **72%** (Phase 1) and **64%** (Phase 2 Cohort A)

Median Treatment Duration:

- **25.1** months (Phase 1), **21.0** months (Phase 2 Cohort A)

Active Patients on Treatment:

- **47%** (Phase 1) and **48%** (Phase 2 Cohort A)

PIVOTAL PHASE 3 MOTION STUDY

Met its primary and all key secondary endpoints and demonstrated a well-tolerated safety profile

Primary Endpoint ORR at Week 25:

- **40%** for vimseltinib vs. **0%** for placebo (p<0.0001)

Key Secondary Endpoints:

Statistically significant and clinically meaningful improvement across all key secondary endpoints, including:

- **67%** for vimseltinib vs. **0%** for placebo (p<0.0001) ORR by Tumor Volume Score
- **~5X** improvement in active range of motion vs. placebo (p=0.0077)

Vimseltinib was well-tolerated and the safety profile was consistent with previously disclosed data with no evidence of cholestatic hepatotoxicity

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Notes: ORR=Objective Response Rate

VIMSELTINIB

PROGRAM STATUS AND NEXT STEPS

- **MOTION Open Label Period Ongoing**: Vimseltinib and placebo crossover patients on study in the open label period
- **Phase 1/2 Study Ongoing**: **53%** of patients remain on study as of data cut

Engage with Regulatory Authorities Regarding Registration

- **Q2 2024**
  Anticipated NDA submission
- **Q3 2024**
  Anticipated MAA submission

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Notes: NDA=New Drug Application; MAA=marketing authorisation application

VIMSELTINIB MARKET OPPORTUNITY

Dan Martin

Senior Vice President and Chief Commercial Officer

SIGNIFICANT OPPORTUNITY TO BENEFIT PATIENTS WITH TGCT

Primary U.S. Opportunity

U.S. patients[1]
~1,400 incident, ~9,000 prevalent

- ✓ Diagnosed
- ✓ Rx-treated
- ✓ May or may not have undergone surgery
- ✓ *Seen by an oncologist*

Incident Rx-treated	~1,400
Average Duration of Treatment	≥ 18 months
TAM (U.S. only)[2]	~$500MM

Additional U.S. Opportunity

- ✓ Diagnosed
- ✓ Rx-treated
- ✓ May or may not have undergone surgery
- ✗ Not seen by an oncologist
- ✓ Includes *~1,300* incident Rx-treated patients seen by surgeons

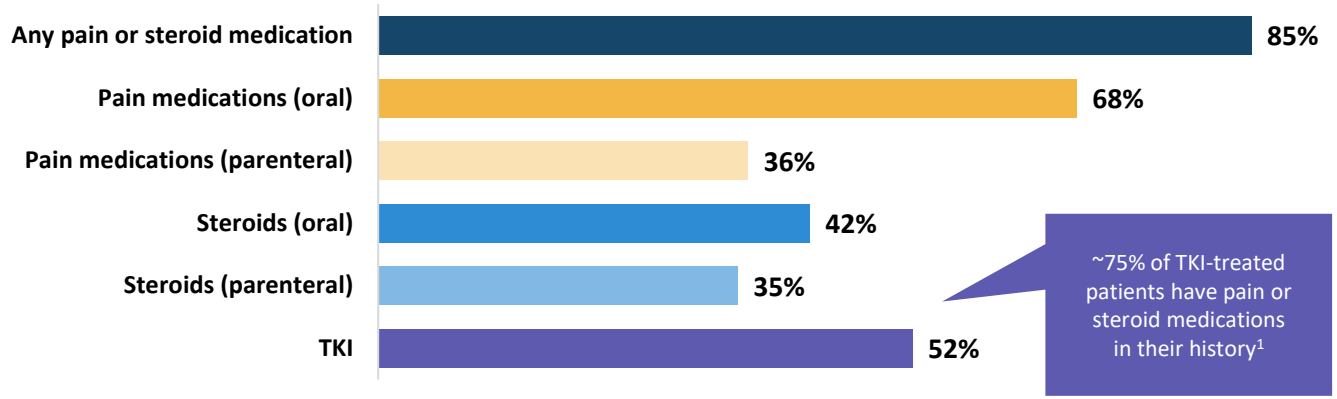
EU Opportunity

- Comparable incidence and recurrence rates in Europe[3]
- No approved therapies for TGCT

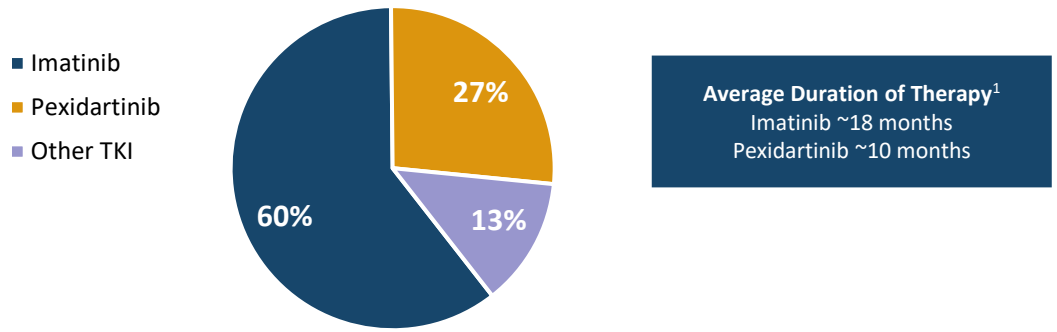
Notes: TAM=total addressable market; (1) Deciphera internal analysis of U.S. claims data; claims data span 2012-2022, estimates shown are for 2022; estimates are inherently uncertain;
(2) Total addressable market calculated as estimated Rx-treated patient incidence x 18 months duration x current pexidartinib WAC price and assumes opportunity at steady state. (3) Mastboom et al. Acta Orthopaedica. 2017;88(6):688-694

EXTENSIVE POLYPHARMACY TO MANAGE DISEASE MORBIDITY

Prescription Therapies Received by TGCT Patients Seen by an Oncologist (N=~1,400)[1]



Incident TKI-treated Patient Share[1]



Average Duration of Therapy[1]
Imatinib ~18 months
Pexidartinib ~10 months

Prescription Pain and Steroid Medications

- Opioids, NSAIDs
- Corticosteroids
- Oral and/or injectable formulations
- Perioperative use excluded from analysis

Imatinib

- Not FDA or EMA approved for TGCT
- Weak CSF1R inhibitor
- Guideline listed based on retrospective data showing 19% ORR[2,3]

Pexidartinib

- The only FDA approved agent for TGCT, not approved by EMA
- Inhibitor of CSF1R, KIT, FLT3, and PDGFRA/B
- Boxed warning for hepatoxicity, REMS, intensive liver monitoring

High Unmet Need

- Lifelong condition
- Locally aggressive neoplasm with significant morbidity
- HCPs and patients cite desire for effective therapy without having to sacrifice safety and tolerability[4]

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Notes: TGCT=tenosynovial giant cell tumor; TKI = tyrosine kinase inhibitor. (1) Deciphera internal analysis of U.S. claims data; claims data span 2012-2022, estimates shown are for 2022; estimates are inherently uncertain; (2) NCCN Guidelines Version 2.2023 Soft Tissue Sarcoma; (3) Cassier et al Cancer 2012:119:1649-1655; (4) Internal Deciphera market research.

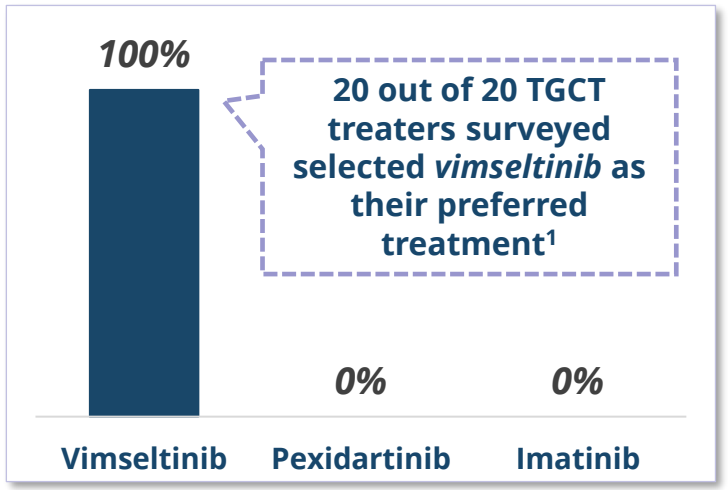
MARKET RESEARCH HIGHLIGHTS THE POTENTIAL FOR VIMSELTINIB TO DELIVER A BEST-IN-CLASS PROFILE AND ESTABLISH A NEW STANDARD OF CARE IN TGCT

Relative Scoring of Key Product Attributes

Clinical Attribute		Vimseltinib	Pexidartinib	Imatinib
Efficacy	***Tumor Response*** *(Objective Response, CBR)*			
	PROs *(Improvement in Pain & Stiffness)*			Limited Data
Safety	***Grade 3/4 AEs***			
	Hepatotoxicity			Not Reported in TGCT
	Discontinuation Rates *(Due to any TEAEs)*			

Highly Compelling Moderately Compelling Less Compelling

Preferred Systemic Treatment For TGCT



TGCT Treater Sentiments on Vimseltinib Profile

CLINICAL PROFILE

"This is very impressive data. Well over half the patients responded to the medication with excellent outcomes. Pain measurements and mobility scores are quite remarkable compared to anything currently available." – Onc

CLINICAL ACTIVITY

"It's great to see that the best overall response numbers improve over long-term. In fact, this would probably lead me to keep some patients on it longer than I usually would." – Onc

TREATMENT CHOICE

"I would give [vimseltinib] to all my future TGCT patients." - Onc

Notes: Qualitative market research conducted by Deciphera based on vimseltinib Phase 1/2 data presented at ESMO in Aug 2022 comparing target product profiles of vimseltinib (blinded), pexidartinib, and imatinib based on USPIs and published/presented literature for each product's efficacy and safety in TGCT diagnosed patients (n=20 HCPs). No head-to-head/comparative studies have been conducted. CBR=Clinical Benefit Rate, PROs=Patient Reported Outcomes, AEs=Adverse Events, TEAEs=Treatment-Emergent Adverse Events. (1) HCP asked to select their preferred (only 1) product to systemically treat TGCT patients based on current clinical profiles.

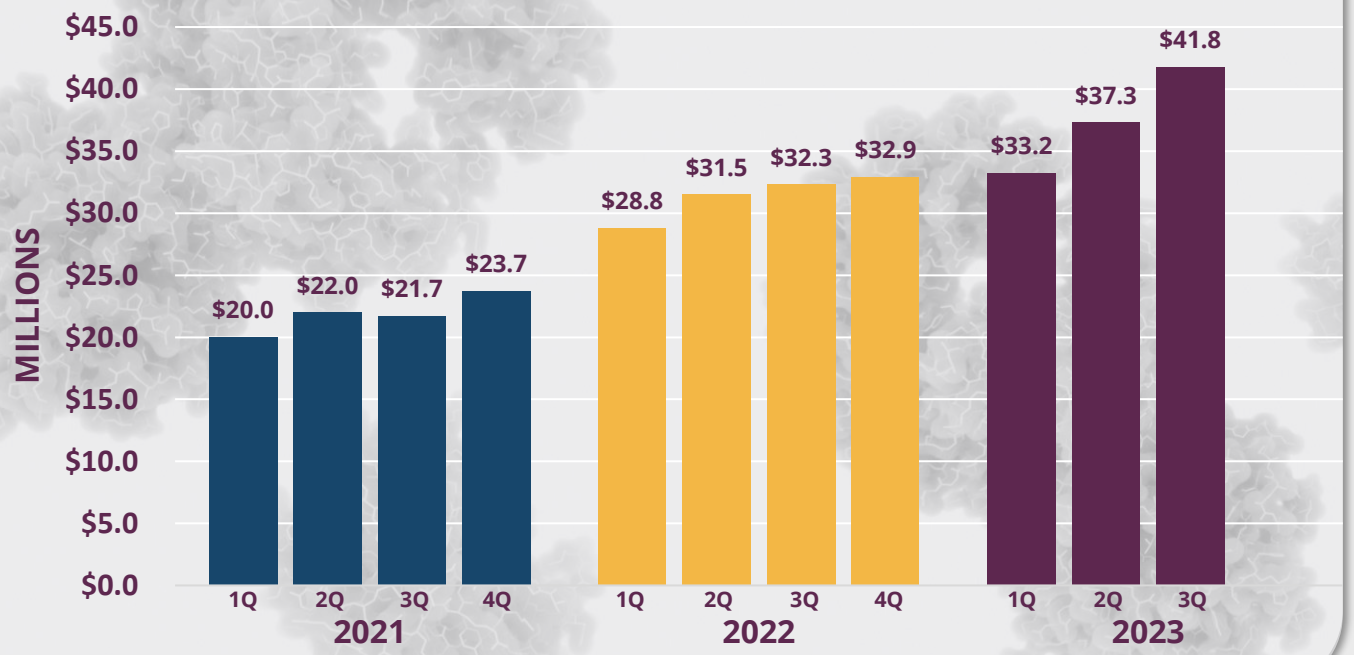
U.S. COMMERCIAL UPDATE

Dan Martin

Senior Vice President and Chief Commercial Officer

SUCCESSFUL LAUNCH OF QINLOCK AROUND THE WORLD

QINLOCK® Global Product Revenue[1]



3Q 2023 Summary

Total revenue of **$43.3MM** including:

- QINLOCK product revenue: **$41.8MM**
  - U.S. net product sales of **$32.7MM**
  - International net product sales of **$9.1MM**
- QINLOCK product revenue increased **12%** QoQ and **29%** YoY
- Collaboration revenue: **$1.5MM**

Notes: Full prescribing information is available at www.QINLOCK.com; (1) Chart for QINLOCK global product revenue does not include collaboration revenue.

INTERNATIONAL COMMERCIAL UPDATE

Margarida Duarte
Senior Vice President, Head of International

QINLOCK® | 4TH LINE GASTROINTESTINAL STROMAL TUMOR (GIST)

SUSTAINED MOMENTUM IN EUROPE DELIVERING A TOTAL OF $9.1MM IN 3Q 2023 INTERNATIONAL NET PRODUCT REVENUE

Strong Outcome from Germany Price Negotiations; Received "Major Additional Benefit" Rating

Strong Outcome Achieved In Italy; Received Full Innovation Status And Launch Underway

Received Unanimous ASMR III Rating in France

Advancing Access Discussions with Other Health Authorities Across Europe

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Notes: ASMR=amélioration du service médical rendu; GIST=gastrointestinal stromal tumor.

GLOBAL APPROVALS AND EXPANSION

Significant progress expanding QINLOCK access to 4th line GIST patients globally

Canada (June 2020)

United States (May 2020)

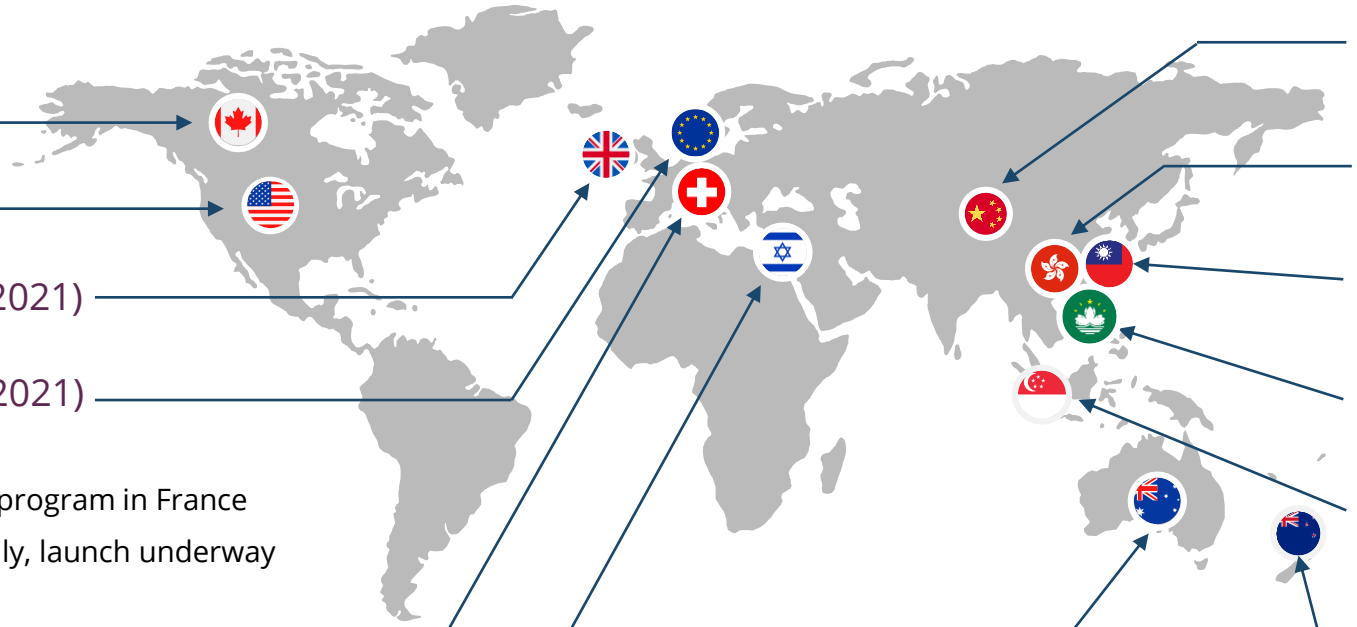
United Kingdom (December 2021)

European Union (November 2021)

- Launch in Germany underway
- Ongoing post-approval paid access program in France
- Received full innovation status in Italy, launch underway

Switzerland (October 2021)

Israel (January 2023)



China (March 2021)[1]

Hong Kong (March 2021)[1]

Taiwan (September 2021)[1]

Macau (January 2023)[1]

Singapore (May 2023)

Australia (July 2020)

New Zealand (December 2022)

Notes: GIST=gastrointestinal stromal tumor; (1) Exclusive development and commercialization license with Zai Lab in Greater China for QINLOCK.

CLOSING REMARKS AND Q&A

Steve Hoerter

President and Chief Executive Officer

DECIPHERA

FINANCIAL HIGHLIGHTS

As of September 30, 2023

Weighted-Average Shares Outstanding[1]

85.8MM

Weighted average shares includes outstanding common stock and common stock issuable upon exercise of prefunded warrants

Cash, Cash Equivalents & Marketable Securities

$376.9MM

Cash Expected to Fund Operating Expenses and CapEx into 2026[2]

Notes: CapEx=capital expenditures. (1) As of September 30, 2023, there were 80.0MM outstanding shares, 6.4MM prefunded warrants, and 12.5MM options outstanding; (2) cash guidance based on current operating plan.

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EXPECTED 2023 MILESTONES

QINLOCK®

- ✓ Present additional data from Phase 3 INTRIGUE ctDNA analysis at an ASCO Plenary Session
- ✓ Initiate INSIGHT Phase 3 study in 2L KIT exon 11+17/18 GIST patients
- ✓ Continue geographic expansion with launches in key European markets

VIMSELTINIB

- ✓ Complete enrollment in the Phase 3 MOTION study
- ✓ Announce top-line results from MOTION study
- ✓ Present updated Phase 1/2 data in TGCT patients

DCC-3116

- ✓ Present preclinical data on new combinations
- ✓ Program update on completed phase 1 single agent and ongoing combination dose escalation
- ✓ Initiate escalation combination cohorts for QINLOCK and encorafenib/cetuximab

DCC-3084

- ✓ Present data on preclinical profile
- Submit IND to FDA **(4Q 2023)**

PROPRIETARY DRUG DISCOVERY PLATFORM

- ✓ Nominate development candidate for pan-KIT inhibitor (DCC-3009 pan-KIT inhibitor)
- ✓ Present new preclinical data from research programs

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Notes: 2L=second-line; ASCO=American Society of Clinical Oncology; ctDNA=circulating tumor deoxyribonucleic acid; FDA=U.S. Food and Drug Administration; G12C=single point mutation with a glycine-to-cysteine substitution at codon 12; GIST=gastrointestinal stromal tumor; IND=Investigational New Drug Application; KIT=KIT proto-oncogene receptor tyrosine kinase; KRAS=Kirsten rat sarcoma virus; TGCT=tenosynovial giant cell tumor.

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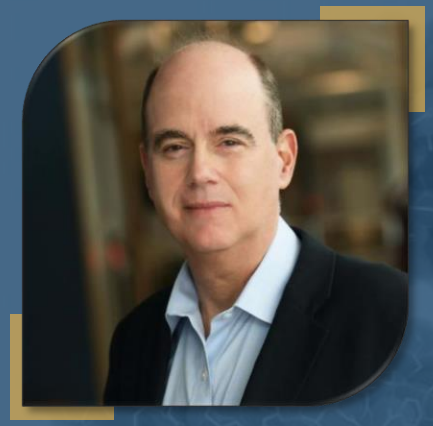
Q&A

Steve Hoerter
Chief Executive Officer



Matt Sherman
Chief Medical Officer

Dan Martin
Chief Commercial Officer

Margarida Duarte
Head of International

Tucker Kelly
Chief Financial Officer

THANK YOU