One Mission, Inspired by Patients: Defeat Cancer.™

January 3, 2023

decīphera®

DECIPHERA

DISCLAIMER

This presentation has been prepared by Deciphera Pharmaceuticals, Inc. for informational purposes only and not for any other purpose. Nothing contained in this presentation is, or should be construed as, a recommendation, promise or representation by Deciphera Pharmaceuticals, Inc. or any director, employee, agent, or adviser of Deciphera Pharmaceuticals, Inc. This presentation does not purport to be all-inclusive or to contain all of the information you may desire. Certain information contained in this presentation relates to or is based on studies, publications, surveys and other data obtained from third-party sources and Deciphera Pharmaceuticals, Inc.'s own internal estimates and research. While Deciphera Pharmaceuticals, Inc. believes these third-party sources to be reliable as of the date of this presentation, it has not independently verified, and makes no representation as to the adequacy, fairness, accuracy or completeness of, any information obtained from third-party sources. While Deciphera Pharmaceuticals, Inc. believes its internal research is reliable, such research has not been verified by any independent source.

Forward-Looking Statements

This presentation may contain forward-looking statements that are based on our current expectations, estimates and projections about our industry 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. 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 planned Phase 3 INSIGHT clinical study of QINLOCK versus sunitinib in second-line GIST patients with mutations in KIT exon 11 and 17/18 only, our expectations regarding the aggregate potential revenue opportunity for QINLOCK, plans to present results from the Phase 3 INTRIGUE ctDNA analysis, our ability to expand the market opportunity for QINLOCK in second-line GIST in our INSIGHT Phase 3 study; the vimseltinib enrollment and topline readout for the pivotal Phase 3 MOTION study and phase 1/2 study of vimseltinib, each in TGCT patients; updated data from the dose escalation phase and initial data from the combination dose escalation cohorts of the Phase 1 study of DCC-3116, plans to initiate one or more combination cohorts in the Phase 1/2 study of DCC-3116, plans to initiate a new dose escalation combination evaluating DCC-3116 in combination with encorafenib and cetuximab in patients with colorectal cancer plans to present additional preclinical data for DCC-3116; submitting an IND for DCC-3084, presenting preclinical data for DCC-3084; nominating a development candidate from our proprietary discovery engine of novel switch control inhibitors; 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 COVID-19, and 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 corporate strategy and restructuring plan, the success of our commercialization efforts with respect to QINLOCK, including our launch in Germany, 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; the ongoing effects of the COVID-19 pandemic, 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 Deciphera's Quarterly Report on Form 10-Q for the quarter ended September 30, 2022 filed with the Securities and Exchange Commission (the "SEC"), and Deciphera's other SEC filings.

DECIPHERA

AGENDA FOR TODAY'S INVESTOR CALL

Opening Remarks	**Steve Hoerter** *President and Chief Executive Officer*
INTRIGUE ctDNA Results	**Matt Sherman, M.D.** *Executive Vice President and Chief Medical Officer*
Commercial Opportunity	**Dan Martin** *Senior Vice President and Chief Commercial Officer*
Closing Remarks	**Steve Hoerter**

Q&A

Notes: ctDNA=circulating tumor deoxyribonucleic acid.

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 and Vimseltinib
Two Phase 3 Programs	**MOTION Topline Data** and INSIGHT Initiation Planned for 2023
Potential First-in-Class Autophagy Program	**Multi-billion Dollar Opportunity** Targeting Autophagy
Proven Discovery Engine	**High-Value Research Pipeline** of Switch-control Kinase Inhibitors

deciphera

INTRIGUE ctDNA RESULTS

Matt Sherman, M.D.

Executive Vice President and Chief Medical Officer

decīphera®

SIGNIFICANT UNMET MEDICAL NEED POST-IMATINIB REMAINS

Estimated U.S. Incidence of GIST: 4,000-6,000[1]

1L therapy
Imatinib[2]

18.9
months mPFS*

51.4%
ORR

49.0
months mOS*

*Results for imatinib 400 mg. This study compared imatinib 400 mg to imatinib 800 mg.[3]

2L therapy
Sunitinib[4,5]

5.6
months mPFS
HR=0.33

6.8%
ORR

17.0
months mOS
HR=0.87

~2,000
U.S. incident patients eligible for treatment[6]

3L therapy
Regorafenib[7]

4.8
months mPFS
HR=0.27

4.5%
ORR

17.4
months mOS
HR=0.91

~1,400–1,600
U.S. incident patients eligible for treatment[6]

4L therapy[8]
QINLOCK® (ripretinib) 50 mg tablets

6.3
months mPFS
HR=0.16[9]

11.8%
ORR[9]

18.2
months mOS
HR=0.41[9]

~1,000–1,300
U.S. incident patients eligible for treatment[6]

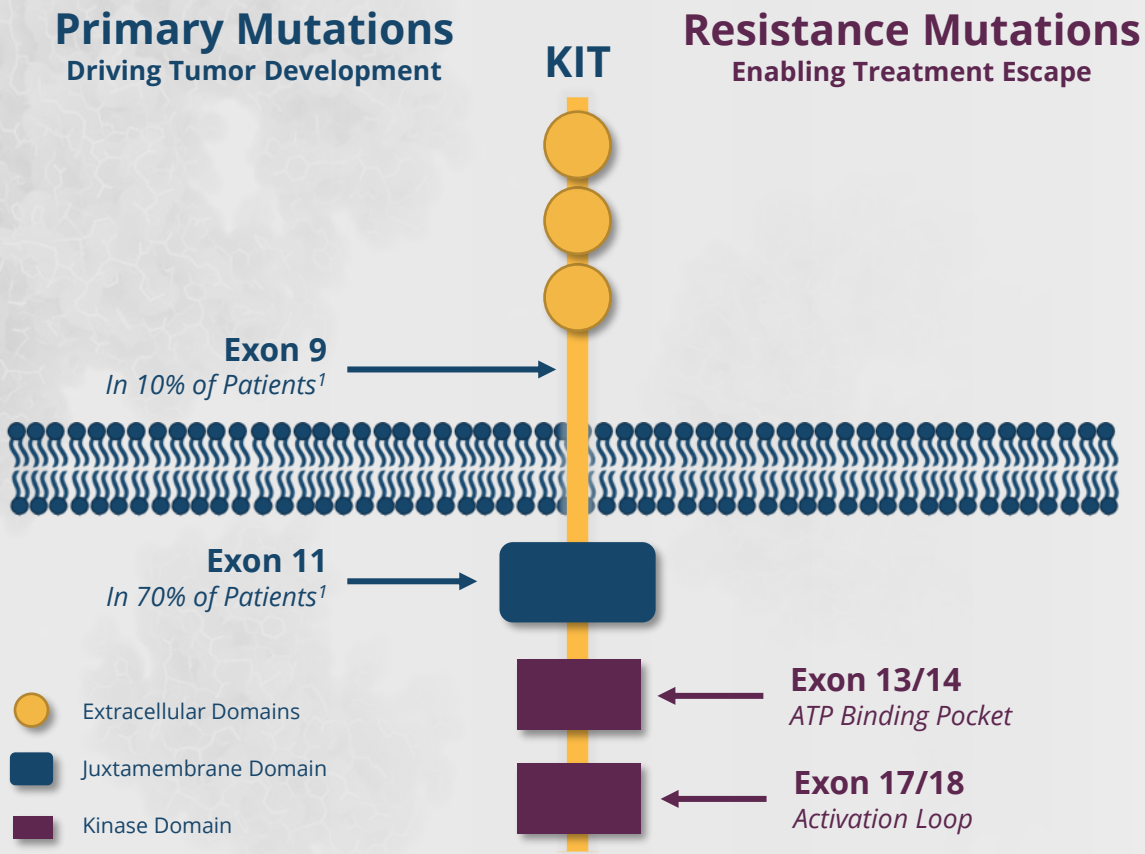
Avapritinib is approved in the U.S. for GIST patients with PDGFRA exon 18 mutations only, which are harbored by ~6% of patients with newly diagnosed GIST.[10,11]

deciphera

Notes: 1L=first-line; 2L=second-line; 3L=third-line; 4L=fourth-line; GIST=gastrointestinal stromal tumor; HR=hazard ratio; mOS=median overall survival; mPFS=median progression-free survival; ORR=objective response rate; PDGFRA=platelet-derived growth factor receptor α; (1) American Cancer Society, Key Statistics for Gastrointestinal Stromal Tumors, Accessed December 18, 2020; (2) Gleevec [package insert]. East Hanover, NJ: Novartis Pharmaceuticals Corp; 2020; (3) Gastrointestinal Stromal Tumor Meta-Analysis Group (MetaGIST). J Clin Oncol. 2010; 28:1247-1253; (4) Sutent [package insert]. New York, NY: Pfizer; 2020, mPFS and mOS converted from weeks to months; (5) Garrett CR, et al. Poster presented at: Connective Tissue Oncology Society: November 13-15, 2008; London, UK. Abstract 35049; (6) Internal Deciphera estimates of annual new treatment-eligible patients are based on analyses of U.S. claims data; eligible patients for 3rd and 4th lines exclude the estimated proportion of patients across lines that die, discontinue oncology treatment, or enter clinical trial and, therefore, are not eligible for treatment. Estimates are inherently uncertain; (7) Stivarga [package insert]. Germany: Bayer Healthcare; 2020; (8) QINLOCK [package insert]. Waltham, MA: Deciphera Pharmaceuticals; 2022; (9) Updated data on the INVICTUS Study presented at the ESMO Congress 2021; (10) Ayvakit [package insert]. Cambridge, MA: Blueprint Medicines Corp; 2021; (11) Lopes LF, Bacchi CE. J Cell Mol Med. 2010;14:42-50.

PROGRESSION DRIVEN BY SECONDARY RESISTANCE MUTATIONS IN KIT

KIT-DRIVEN MUTATIONS



- Early disease is driven by primary mutations in KIT exons 11 or 9
- Imatinib-resistant disease is driven by secondary mutations in KIT exons 17/18 and/or exons 13/14

deciphera®

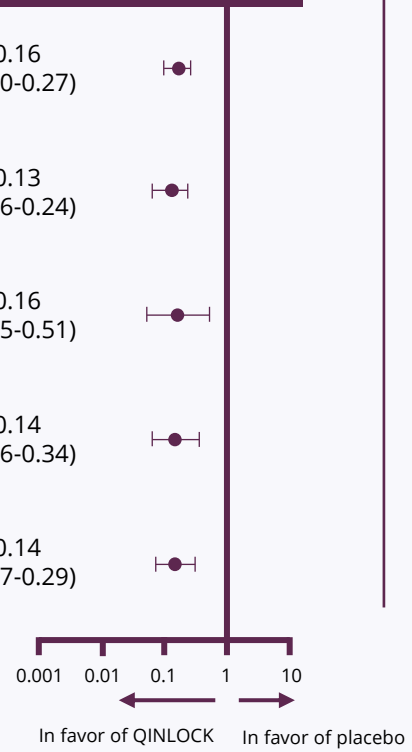
Notes: ATP=Adenosine Triphosphate; KIT=KIT proto-oncogene receptor tyrosine kinase; (1) Oppelt et al. J Gastrointest Oncol 2017;8(3):466-473.

.

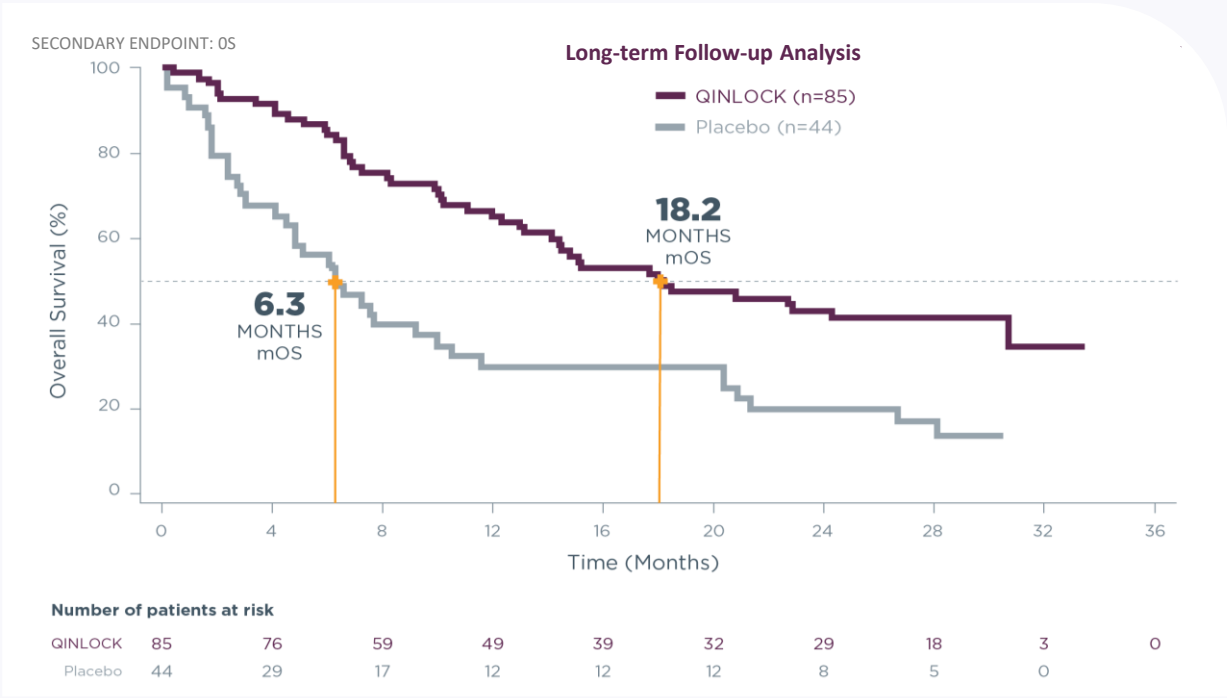
INVICTUS (4L+): QINLOCK SHOWED BENEFIT IN ALL MUTATION SUBGROUPS

Progression-Free Survival (INVICTUS 4L+)[3]

Mutation Subgroup	QINLOCK 150 mg QD (N)	Placebo (N)	Hazard Ratio (95% CI)
All Patients	85	44	0.16 (0.10-0.27)
Any KIT exon 11	52	34	0.13 (0.06-0.24)
Any KIT exon 9	16	7	0.16 (0.05-0.51)
Any KIT exon 13	27	16	0.14 (0.06-0.34)
Any KIT exon 17	44	27	0.14 (0.07-0.29)



Kaplan-Meier Plots of Overall Survival (INVICTUS 4L+)[1,2]



Notes: 4L=fourth-line; CI=confidence interval; HR=hazard ratio; mOS=median overall survival; OS=overall survival; PFS=progression-free survival; QD=daily; (1) Updated data on the INVICTUS Study presented at the ESMO Congress 2021, the long-term follow-up analysis was conducted approximately 19 months from the data cutoff date in the primary analysis and was not powered to show statistical significance; (2) QINLOCK OS in the primary analysis was 15.1 months vs 6.6 months (HR = 0.36 [95% CI, 0.21 – 0.62], nominal p value 0.0004); (3) Bauer et al. Clin Cancer Res. 2021;27(23):6333–6342.

INTRIGUE STUDY TESTED SUPERIORITY IN 2L GIST POPULATION[1]

INCLUSION CRITERIA

Patients ≥18 years old with a confirmed diagnosis of GIST who progressed on or had documented intolerance to imatinib

Patients were enrolled from 122 sites across North America, South America, Europe, Australia, and Asia

Stratified by

- Mutational status:
  - *KIT* exon 11
  - *KIT* exon 9
  - *KIT*/*PDGFRA* Wild Type
  - Other *KIT*/*PDGFRA*
- Intolerance to imatinib

INTRIGUE PHASE 3 CLINICAL STUDY

1:1 Randomization
Open label

QINLOCK 150 mg QD
(continuous)

No crossover option

Sunitinib 50 mg QD
(4 weeks on, 2 weeks off)

Primary endpoint

- PFS by IRR (using mRECIST v 1.1) in the KIT exon 11 ITT and AP ITT populations

Planned exploratory analysis

- Subgroup analysis for efficacy based on ctDNA mutation status

deciphera®

Notes: 2L=second-line; AP=all-patient; ctDNA=circulating tumor deoxyribonucleic acid; GIST=gastrointestinal stromal tumor; IRR=individual research result; ITT=intention-to-treat; KIT=KIT proto-oncogene receptor tyrosine kinase; mRECIST=modified Response Evaluation Criteria in Solid Tumors; PDGFRA=platelet-derived growth factor receptor alpha; PFS=progression-free survival; QD=once daily; (1) Bauer et al. *J Clin Onc.* 2022. 40:3918-3928.

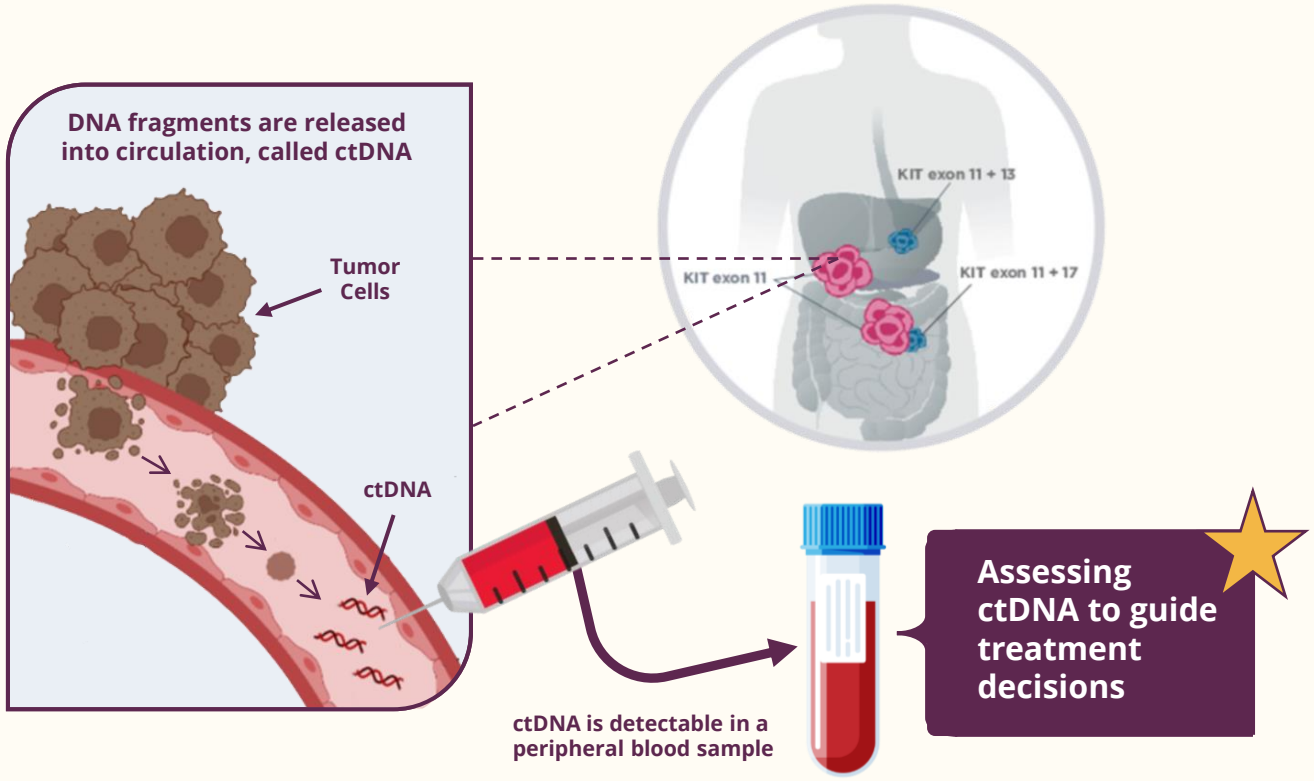
INTRIGUE STUDY TUMOR TISSUE BIOPSY ANALYSIS BY PRIMARY MUTATION[1]

	QINLOCK n (events)	Sunitinib n (events)	mPFS QINLOCK (months)	mPFS Sunitinib (months)	Hazard Ratio (95% CI)
Overall	**226 (146)**	**227 (130)**	**8.0**	**8.3**	**1.05 (0.82, 1.33)**
MUTATION TYPE					
KIT exon 11	163 (100)	164 (98)	8.3	7.0	0.88 (0.67, 1.17)
KIT exon 9	31 (27)	29 (14)	5.5	13.8	2.85 (1.48, 5.48)
KIT / PDGFRA Wild Type	15 (9)	18 (10)	7.0	4.1	0.90 (0.36, 2.23)
Other KIT / PDGFRA	17 (10)	16 (8)	6.8	8.4	0.90 (0.35, 2.28)

deciphera

Notes: 2L=second-line; CI=confidence interval; KIT=KIT proto-oncogene receptor tyrosine kinase; mPFS=median progression-free survival; PDGFRA=platelet-derived growth factor receptor alpha; (1) Bauer et al. *J Clin Onc*. 2022. 40:3918-3928.

PRACTICE CHANGING POTENTIAL WITH ctDNA IN GIST



- ctDNA is rapidly being adopted in oncology to identify patients harboring sensitive mutations and to treat patients with precision medicines
- Tissue biopsies may not capture the full clonal heterogeneity of GIST
- ctDNA was collected at baseline in the INTRIGUE study as an exploratory analysis

decīphera®

Notes: ctDNA=circulating tumor deoxyribonucleic acid; DNA=deoxyribonucleic acid; GIST=gastrointestinal stromal tumor; KIT=KIT proto-oncogene receptor tyrosine kinase.

DETECTION OF BASELINE KIT/PDGFRA MUTATIONS

Total Subjects
N=453

- Advanced GIST
- 2L after Imatinib

ctDNA Analyzed[1] — **n=362**

ctDNA Detected — **n=280**

Any KIT Mutation Detected → n=213

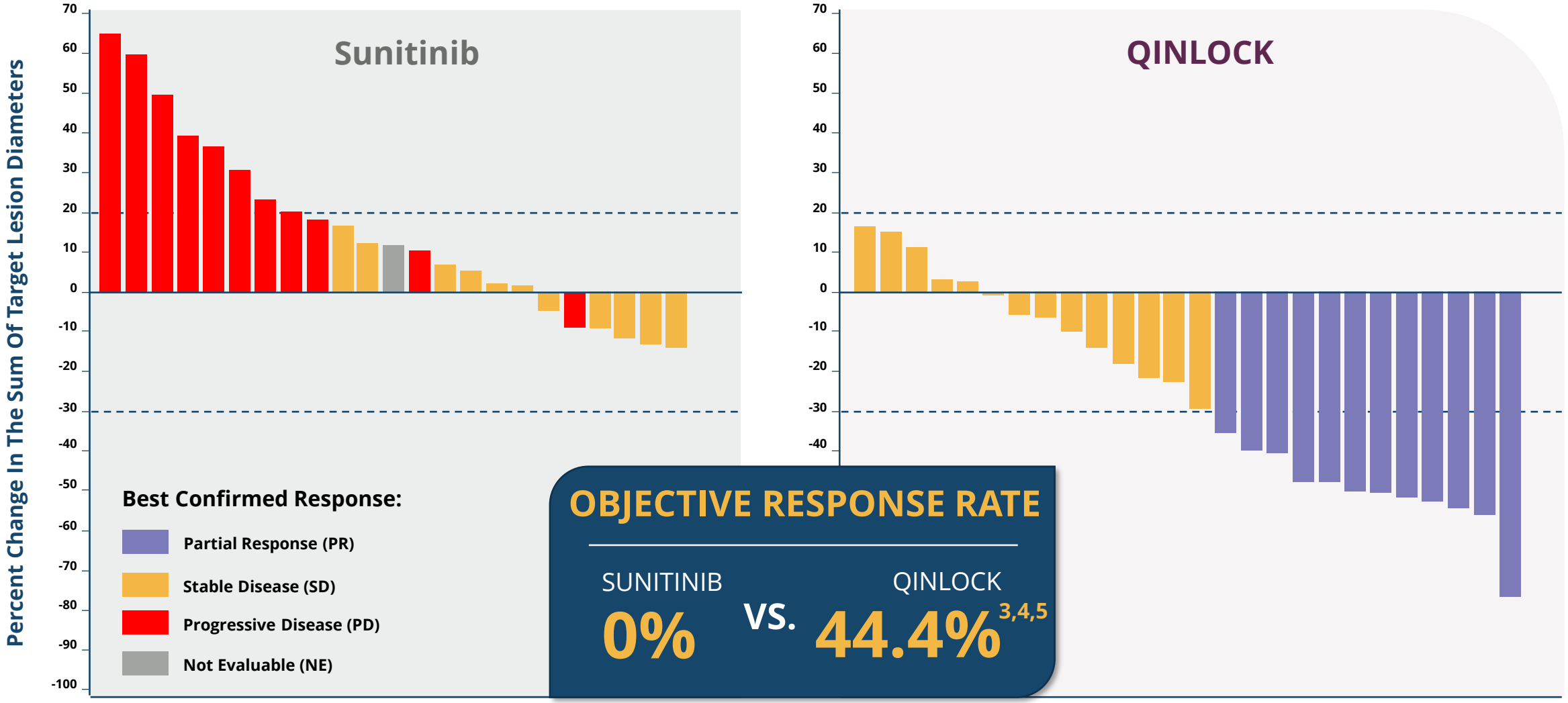
KIT Mutations Detected	
KIT Mutation Detected	**213 / 362 (59%)**
Any Exon 11	157 / 362 (43%)
Any Exon 9	36 / 362 (10%)
Any Exon 17/18 (Activation Loop)	89 / 362 (25%)
Any Exon 13/14 (ATP Binding Pocket)	81 / 362 (22%)

KIT Exon 11 Primary Mutation + Secondary Mutations	
Exon 11+17/18 **Only** (Activation Loop)	52 / 362 (14%)
Exon 11+13/14 **Only** (ATP Binding Pocket)	41 / 362 (11%)
Exon 11+13/14 **And** 17/18	22 / 362 (6%)

deciphera®

Notes: Full prescribing information is available at www.QINLOCK.com; Deciphera Data on File; 2L=second-line; ATP=Adenosine Triphosphate; ctDNA=circulating tumor deoxyribonucleic acid; GIST=gastrointestinal stromal tumor; KIT=KIT proto-oncogene receptor tyrosine kinase; (1) of the 453 patients in the overall intent-to-treat population, baseline ctDNA was analyzed in 362 patients for whom evaluable samples were available.

IMPRESSIVE ORR FOR QINLOCK IN KIT EXON 11+17/18 ONLY PATIENTS[1,2]

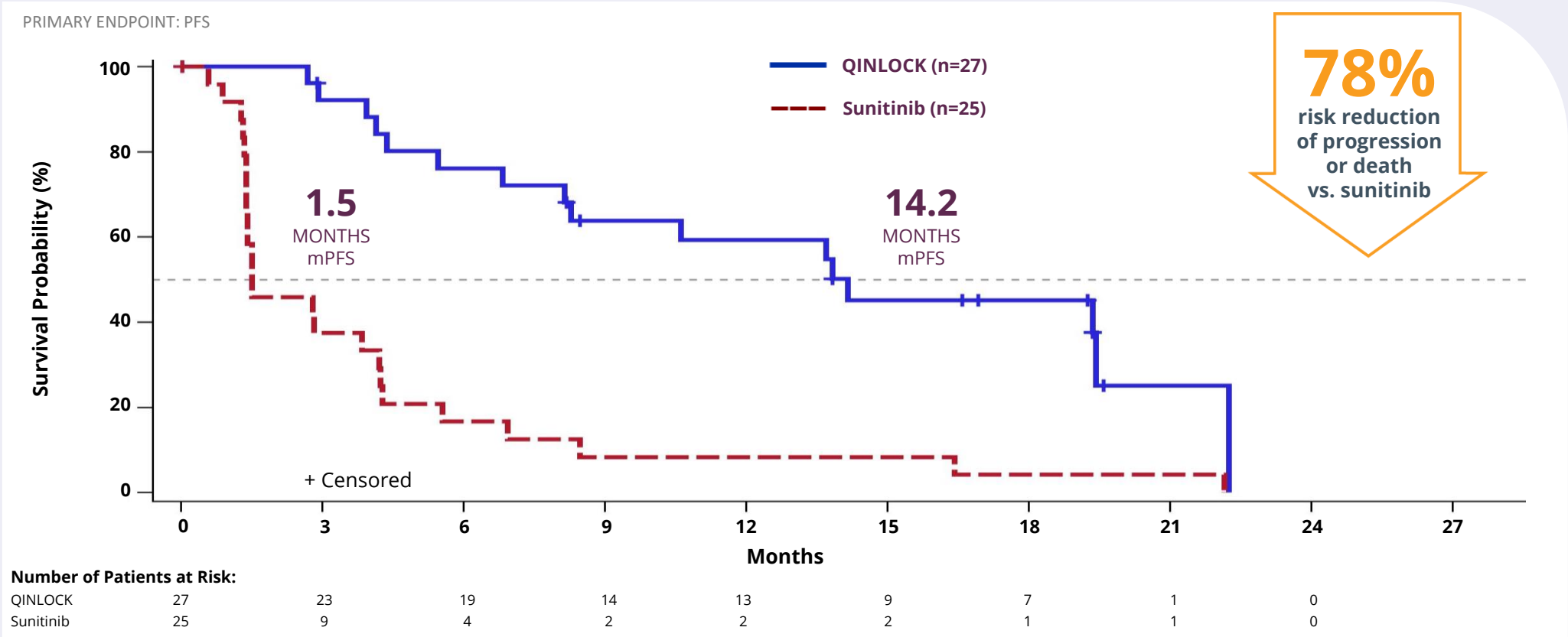


Notes: Full prescribing information is available at www.QINLOCK.com ; Deciphera Data on File; 2L=second-line; (1) data cut off date of September 1, 2021; (2) for 2 patients in the sunitinib arm and 1 patient in the ripretinib arm, no postbaseline disease assessment was available; (3) ORR was confirmed with follow-up imaging; (4) determined using modified Response Evaluation Criteria in Solid Tumors (RECIST) 1.1 criteria; (5) response difference=44.4%, 95% CI (23.0, 62.7), nominal p value 0.0001.

PFS STRONGLY FAVORS QINLOCK IN KIT EXON 11+17/18 ONLY PATIENTS[1]

Progression-Free Survival

KIT exon 11+17/18 only



(median PFS of 14.2 months vs. 1.5 months; HR=0.22, 95% CI [0.11-0.44], nominal p value <0.0001)

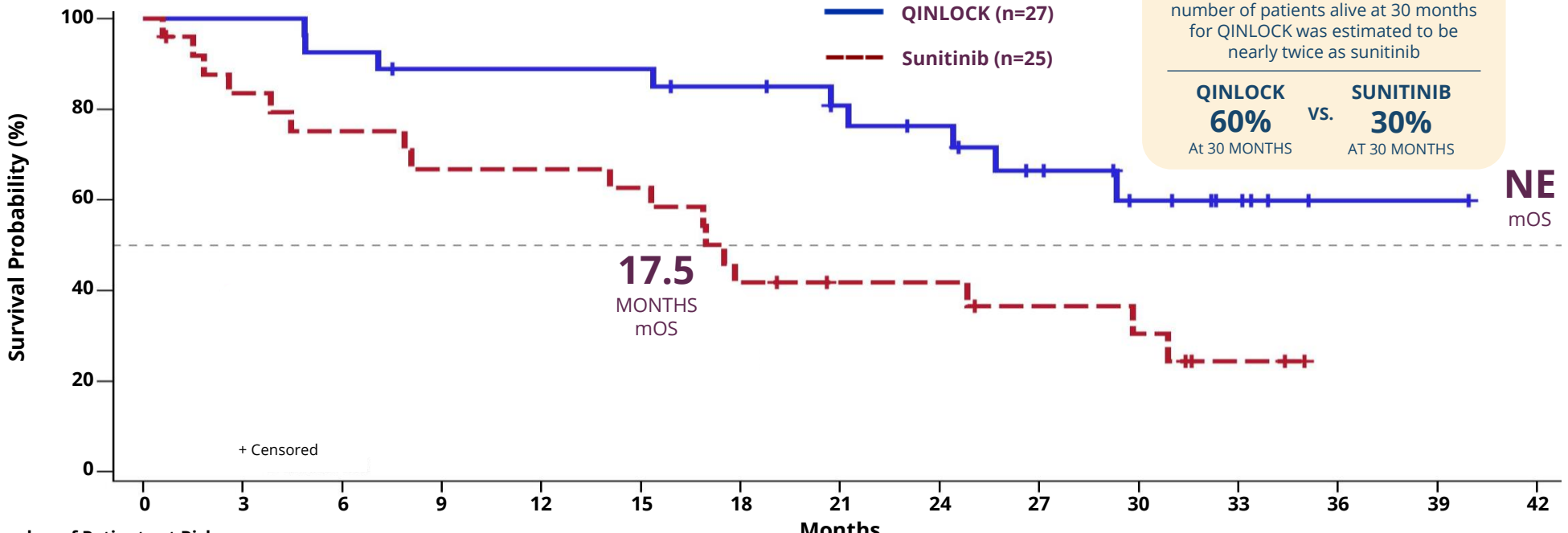
Notes: Full prescribing information is available at www.QINLOCK.com ; Deciphera Data on File; 2L=second-line; HR=hazard ratio; KIT=KIT proto-oncogene receptor tyrosine kinase; mPFS=median progression-free survival; PFS=progression-free survival; (1) data cut off date of September 1, 2021.

SUBSTANTIAL OS FOR QINLOCK IN KIT EXON 11+17/18 ONLY PATIENTS[1]

Overall Survival Analysis

KIT exon 11+17/18 only

SECONDARY ENDPOINT: OS



LANDMARK ANALYSIS

number of patients alive at 30 months for QINLOCK was estimated to be nearly twice as sunitinib

QINLOCK	VS.	SUNITINIB
60%		30%
At 30 MONTHS		AT 30 MONTHS

NE
mOS

(median OS of NE months vs. 17.5 months; HR=0.34, 95% CI [0.15-0.76], nominal p value 0.0061)

Notes: Full prescribing information is available at www.QINLOCK.com; Deciphera Data on File; 2L=second-line; HR=hazard ratio; KIT=KIT proto-oncogene receptor tyrosine kinase; NE=not estimable; OS=overall survival; (1) the data cut off date for the second interim analysis for overall survival was September 1, 2022.

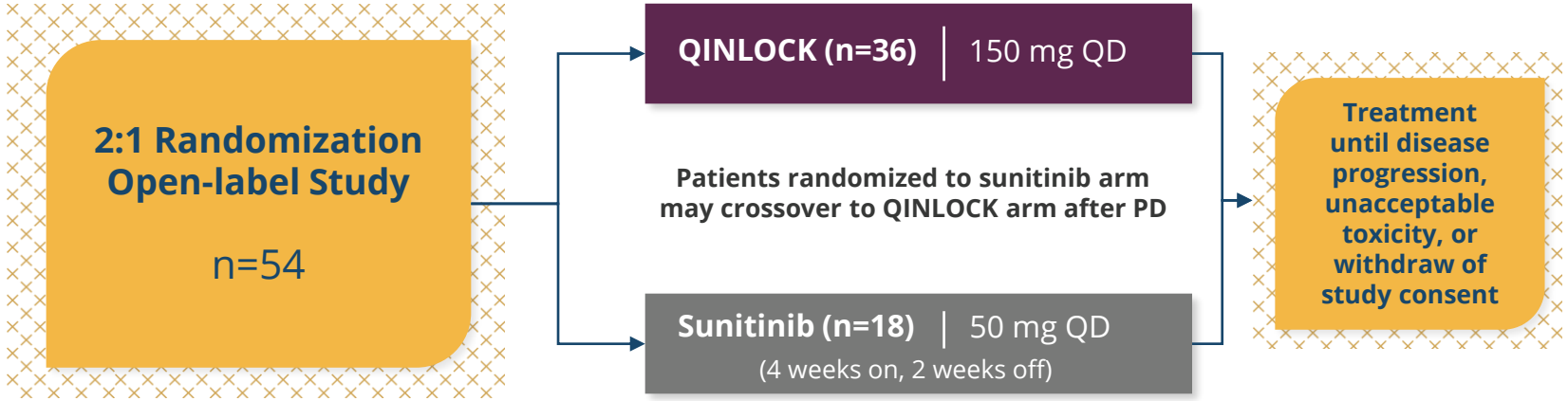
INSIGHT PIVOTAL PHASE 3 STUDY EXPECTED TO INITIATE IN 2H 2023

INCLUSION CRITERIA

Patients with GIST previously treated with imatinib

- 1 prior line of imatinib
- KIT exon 11+ (17 and/or 18) via ctDNA at prescreening
  - KIT exon 9, 13, and/or 14 are excluded
  - Other co-mutations are allowed
- Measurable disease per mRECIST
- ECOG performance status ≤ 2

PLANNED PHASE 3, RANDOMIZED, MULTICENTER, OPEN-LABEL STUDY



Primary Endpoint
- PFS by IRR using mRECIST

Key Secondary Endpoints
- ORR by IRR using mRECIST
- OS

Notes: 2L=second-line; ctDNA=circulating tumor deoxyribonucleic acid; ECOG=Eastern Cooperative Oncology Group; GIST=gastrointestinal stromal tumor; IRR= individual research result; KIT=KIT proto-oncogene receptor tyrosine kinase; mRECIST=modified Response Evaluation Criteria in Solid Tumors; ORR=objective response rate; OS=overall survival; PD=progressive disease ; PFS=progression-free survival; QD=daily.

KEY SUCCESS FACTORS FOR INSIGHT PIVOTAL PHASE 3 STUDY

Strong Scientific Rationale and Compelling Efficacy Results for QINLOCK from ctDNA analysis

- Validates preclinical evidence and KOL's expectations of differential activity of each drug
- Dramatic and consistent clinical benefit of QINLOCK shown across all efficacy endpoints
- Conviction about results reinforced by PFS hazard ratio, confidence intervals, and nominal p-value

Consistency between INTRIGUE and INSIGHT Trial Designs

- Assumptions based on contemporary data from INTRIGUE
- INSIGHT patient population is the same size as the INTRIGUE ctDNA subgroup
- Dosing regimens, outcome measures and other material features are identical in INSIGHT and INTRIGUE

Confidence in Study Execution

- Significant investigator interest in using precision medicine to improve outcomes in 2L GIST
- Patient focused design with 2:1 randomization to QINLOCK and crossover to QINLOCK
- Design based on feedback from KOLs and FDA
- Deciphera is the most experienced company at running global GIST trials (over 750+ GIST patients)

deciphera

Notes: 2L=second-line; ctDNA=circulating tumor deoxyribonucleic acid; FDA=U.S. Food and Drug Administration; GIST=gastrointestinal stromal tumor; HR=hazard ratio; KIT=KIT proto-oncogene receptor tyrosine kinase; KOL=key opinion leader; NE=not estimable; ORR=objective response rate; mPFS=median progression-free survival; mOS=median overall survival; PFS=progression-free survival.

COMMERCIAL OPPORTUNITY

Dan Martin

Senior Vice President and Chief Commercial Officer

decīphera

OPPORTUNITY TO ADVANCE THE STANDARD OF CARE ACROSS MULTIPLE LINES OF THERAPY

4L

Established 4L Standard-of-Care Across All Mutations

QINLOCK® (ripretinib) 50 mg tablets

6.3 mo. mPFS (HR=0.16)[1]
11.8% ORR
mOS 18.2 mo. (HR=0.41)

~90% of prescribers cite QINLOCK as the 4L standard-of-care across all mutations[2]

- ✓ KIT exon 11
- ✓ KIT exon 9
- ✓ PDGFRA
- ✓ Wild Type
- ✓ Unknown mutational status

+

2L[3]

Potential to Optimize 2L Therapy Based on Secondary Mutations

QINLOCK® (ripretinib) 50 mg tablets

For exon 11+17/18 only patients

ctDNA Analysis

14.2 mo. mPFS (HR=0.22)[4]
44.4% ORR
mOS not estimable (HR=0.34)

Sunitinib

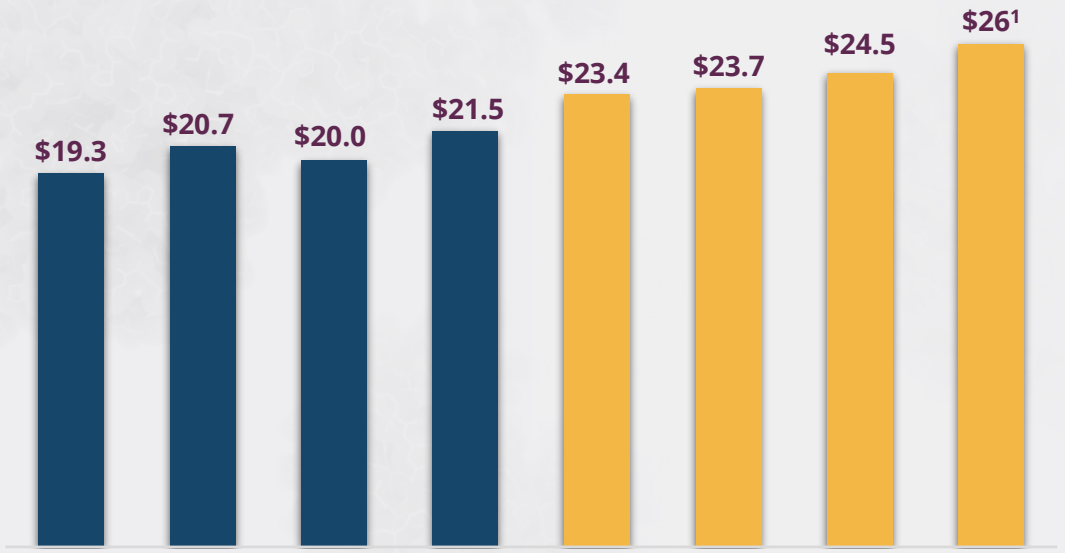
deciphera®

Notes: 2L=second-line; 4L=fourth-line; HR=hazard ratio; mOS=median overall survival; mPFS=median progression-free survival; (1) Updated data on the INVICTUS Study presented at the ESMO Congress 2021; Full prescribing information is available at www.QINLOCK.com; Overall survival data includes all time periods, including dose escalation. Placebo arm includes patients taking placebo who, following progression, were crossed-over to QINLOCK treatment; The long-term follow-up analysis was conducted approximately 19 months from the data cutoff date in the primary analysis and was not powered to show statistical significance; (2) Deciphera ATU survey, 1Q 2022; approximate % of GIST Treaters agreeing to strongly agreeing that QINLOCK is the standard of care for 4L+ advGIST patients; % of GIST treaters stating their likelihood to prescribe QINLOCK across GIST mutational types.; (3) Use of QINLOCK in the 2nd line setting for patients with GIST with exon 11 + 17/18 only mutations is subject to positive INSIGHT phase 3 study and approval by regulatory authorities; (4) Deciphera Data on File. Data cut off date of September 1, 2021.

U.S. PRODUCT REVENUE GREW SIGNIFICANTLY YEAR-OVER-YEAR

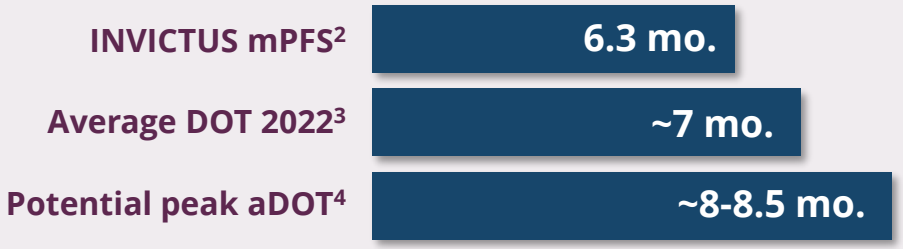
QINLOCK® U.S. Revenue ($MM)

2021	2022
$81	$98[1]



~20% YoY QINLOCK U.S. Revenue Growth

QINLOCK Volume Growth Driven by Maturing Average DOT

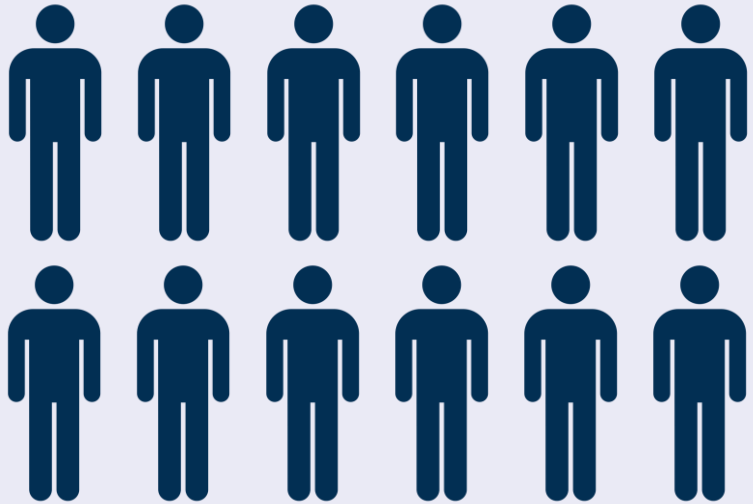


deciphera®

Notes: Full prescribing information is available at www.QINLOCK.com; aDOT=Average Duration of Therapy; DOT=Duration of Therapy; YoY=Year-Over-Year; (1) Financial information presented for the quarter and year ended December 31, 2022 are preliminary and are subject to completion of financial closing procedures. As a result, these amounts may differ materially from the amounts that will be reflected in the Company's consolidated financial statements for the year ended December 31, 2022; (2) QINLOCK [package insert]. Waltham, MA: Deciphera Pharmaceuticals; 2020; (3) Deciphera Data on File of internal estimates for QINLOCK average duration of therapy Q1 - Q3 2022; (4) Based on internal Deciphera estimates of QINLOCK peak average duration of therapy with input from published literature of oncologic drug approval measures [Ben-Aharon et al. Median Survival or Mean Survival: Which Measure Is the Most Appropriate for Patients, Physicians, and Policymakers?. *The Oncologist.* 2019;24:1469–1478], estimates are subject to change and are inherently uncertain.

A 2L KIT EXON 11+17/18 ONLY INDICATION EXPECTED TO DRIVE SIGNIFICANT GROWTH IF APPROVED

More Patients Treated
New QINLOCK-treated patients in 2L



+

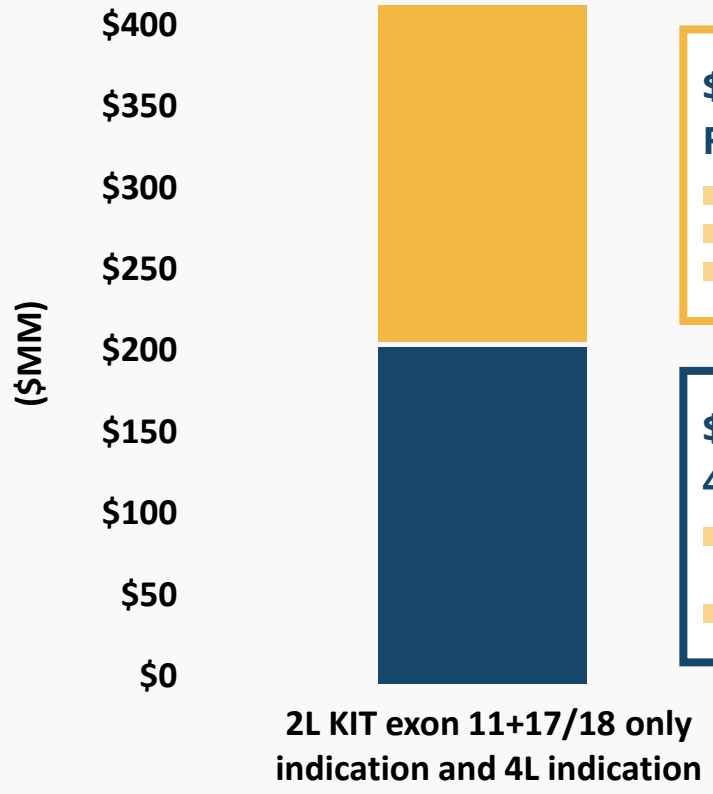
More Months of Therapy Per Patient
Driven by new 2L patients and patients 'shifted' from 4L

deciphera

Notes: Full prescribing information is available at www.QINLOCK.com; 2L=Second-Line; 4L=Fourth-Line.

A 2L KIT EXON 11+17/18 ONLY INDICATION ESTIMATED TO DOUBLE QINLOCK U.S. PEAK REVENUE POTENTIAL[1]

QINLOCK Estimated U.S. Peak Revenue ($MM)[1]



$175-$200MM *Incremental* Peak Revenue for 2L Indication

- New QINLOCK-treated patients in 2L
- More months of therapy per patient
- Net price growth

$175-$200MM Peak Revenue for 4L Indication

- Modest volume growth as average DOT matures
- Net price growth

$350-$400MM Total U.S. Peak Revenue[1]

deciphera

Notes: Full prescribing information is available at www.QINLOCK.com; 2L=Second-Line; 4L=Fourth-Line; DOT=Duration of Therapy; (1) These estimates are based on management's current expectations and assumptions, including, without limitation, reasonable expectations of the potential impact of the Inflation Reduction Act (the full impact of which is still under review) and an assumption of a second-line approval in GIST patients with mutations in KIT exon 11 and 17 or 18 only; estimates are subject to change and are inherently uncertain.

CLOSING REMARKS

Steve Hoerter

President and Chief Executive Officer

decīphera

QINLOCK® | EXPLORATORY ANALYSIS OF INTRIGUE STUDY IN 2L GIST

COMPELLING EFFICACY RESULTS IN KIT EXON 11+17/18 ONLY PATIENTS

OBJECTIVE RESPONSE RATE[1]

QINLOCK		SUNITINIB
44.4%[2]	vs.	0%

MEDIAN PROGRESSION-FREE SURVIVAL[1,3]

QINLOCK		SUNITINIB
14.2 MONTHS	vs.	1.5 MONTHS

MEDIAN OVERALL SURVIVAL[4]

QINLOCK		SUNITINIB
Not Estimable	vs.	17.5 MONTHS

INSIGHT PIVOTAL PHASE 3 STUDY
EXPECTED TO INITIATE IN 2H 2023

QINLOCK PEAK U.S. REVENUE POTENTIAL ESTIMATED TO DOUBLE WITH 2L KIT EXON 11+17/18 ONLY INDICATION[5]

deciphera®

Notes: Full prescribing information is available at www.QINLOCK.com ; Deciphera Data on File; 2L=second-line; KIT=KIT proto-oncogene receptor tyrosine kinase; ORR=objective response rate; OS=overall survival; PFS=progression-free survival; (1) data cut off date of September 1, 2021; (2) ORR was confirmed with follow-up imaging; (3) determined using modified Response Evaluation Criteria in Solid Tumors (RECIST) 1.1 criteria; (4) the data cut off date for the second interim analysis for overall survival was September 1, 2022; (5) These estimates are based on management's current expectations and assumptions, including, without limitation, reasonable expectations of the potential impact of the IRA (the full impact of which is still under review) and an assumption of a second-line approval in GIST patients with mutations in KIT exon 11 and 17 or 18 only; estimates are subject to change and are inherently uncertain.

DECIPHERA

EXPECTED 2023 MILESTONES

QINLOCK®

- Present results from Phase 3 INTRIGUE ctDNA analysis **(January 2023)**
- Initiate INSIGHT Phase 3 study in 2L KIT exon 11+17/18 only GIST patients **(2H 2023)**
- Continue geographic expansion with launches in key European markets **(2023)**

VIMSELTINIB

- Complete enrollment in the Phase 3 MOTION study **(1H 2023)**
- Announce top-line results from MOTION study **(4Q 2023)**
- Present updated Phase 1/2 data in TGCT patients **(2H 2023)**

DCC-3116

- Present updated Phase 1 single agent and initial combination dose escalation data **(2H 2023)**
- Initiate MEK/G12C expansion cohorts; initiate escalation cohort for encorafenib/cetuximab **(2H 2023)**
- Present preclinical data on new combinations **(1H 2023)**

DCC-3084

- Submit IND to FDA **(2H 2023)**
- Present data on preclinical profile **(1H 2023)**

PROPRIETARY DRUG DISCOVERY PLATFORM

- Nominate a new development candidate **(1H 2023)**
- Present new preclinical data from research programs **(1H 2023)**

deciphera®

Notes: 2L=second-line; 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; MEK=mitogen-activated extracellular signal-regulated kinase; TGCT= tenosynovial giant cell tumor.

Q&A

STEVE HOERTER

MATT SHERMAN, M.D.

DAN MARTIN

TUCKER KELLY

decīphera

THANK YOU