40th ANNUAL

J.P. MORGAN VIRTUAL HEALTHCARE CONFERENCE

January 2022

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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 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, our expectations and timing regarding vimseltinib and the pivotal Phase 3 MOTION study in TGCT patients, the potential for vimseltinib to be a best-in-class treatment for TGCT, our Phase 1 study of DCC-3116 in patients with mutant RAS or RAF cancers, initial data from the dose escalation phase of the Phase 1 study of DCC-3116, expanding the study of DCC-3116 to add a cohort in combination with a mutant KRAS G12C inhibitor in non-small cell lung cancer patients subject to feedback from health authorities, exploration of pre-clinical combinations of DCC-3116 with multiple additional targeted oncology agents, nominating a development candidate for our pan-RAF program, continuing to develop our in-licensed research stage VPS34 program, and expectations regarding our business strategy, QINLOCK (ripretinib)'s U.S. commercialization for fourth-line GIST patients, ex-U.S. strategies including in Germany and France, as well as exploring other channels for patient access in other European territories, 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 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 uncertainty around the severity and duration of the impact of COVID-19 on our business and operations, our ability to successfully commercialize QINLOCK, our ability to build in Europe for a potential EU launch, our history of significant losses since inception, our ability to obtain necessary capital when needed on acceptable terms, the timing and results from ongoing or future clinical and non-clinical studies, the possibility preliminary or top-line data may not be indicative of final data, unexpected adverse events, our ability to obtain or expand regulatory approval for our candidates or products, our ability to partner with licensees or distributors, comments, feedback and actions of regulatory agencies, our ability to obtain and maintain reimbursement for any approved products and the extent to which patient assistance programs are utilized, any or all of which may affect the initiation, timing and progress of clinical studies and the timing of and our ability to obtain regulatory approval and make QINLOCK and any investigational drugs that may receive approval, available to patients, the fact we may not receive the benefits of regulatory designations, our ability to execute on our marketing plans for any approved drugs, the inherent uncertainty in estimates of patient populations, our ability to comply with healthcare regulations and laws, competition from other products or procedures, our reliance on third-parties to conduct our clinical and non-clinical studies, our reliance on and ability to manage third-party and single source suppliers to manufacture drug supplies and our ability to obtain, maintain and enforce our intellectual property rights. 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, 2021 filed with the Securities and Exchange Commission (the "SEC"), and Deciphera's other SEC filings.

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ONE MISSION, INSPIRED BY PATIENTS: DEFEAT CANCER™

SUCCESSFUL COMMERCIAL FRANCHISE AND RESEARCH ENGINE TO FUEL PIPELINE

QINLOCK®

- Building on successful U.S. launch
- Now approved in nine territories, including the U.S., E.U., and China
- Launch in Germany now underway

Leader in Autophagy Inhibition in Cancer

- DCC-3116, first-in-class ULK inhibitor, now in Phase 1
- Active VPS34 research program

Vimseltinib

- Potential best-in-class product profile
- Phase 3 study of vimseltinib underway
- Updated Phase 1/2 data in TGCT patients expected in 2H 2022

Pan-RAF Program

- Program targeting inhibition of BRAF and CRAF kinases
- Nomination of development candidate planned for later this year

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Notes: BRAF=proto-oncogene b-RAF; CRAF=proto-oncogene c-RAF; RAF=rapidly accelerated fibrosarcoma; TGCT=tenosynovial giant cell tumor; ULK=unc-51-like autophagy-activating kinase.

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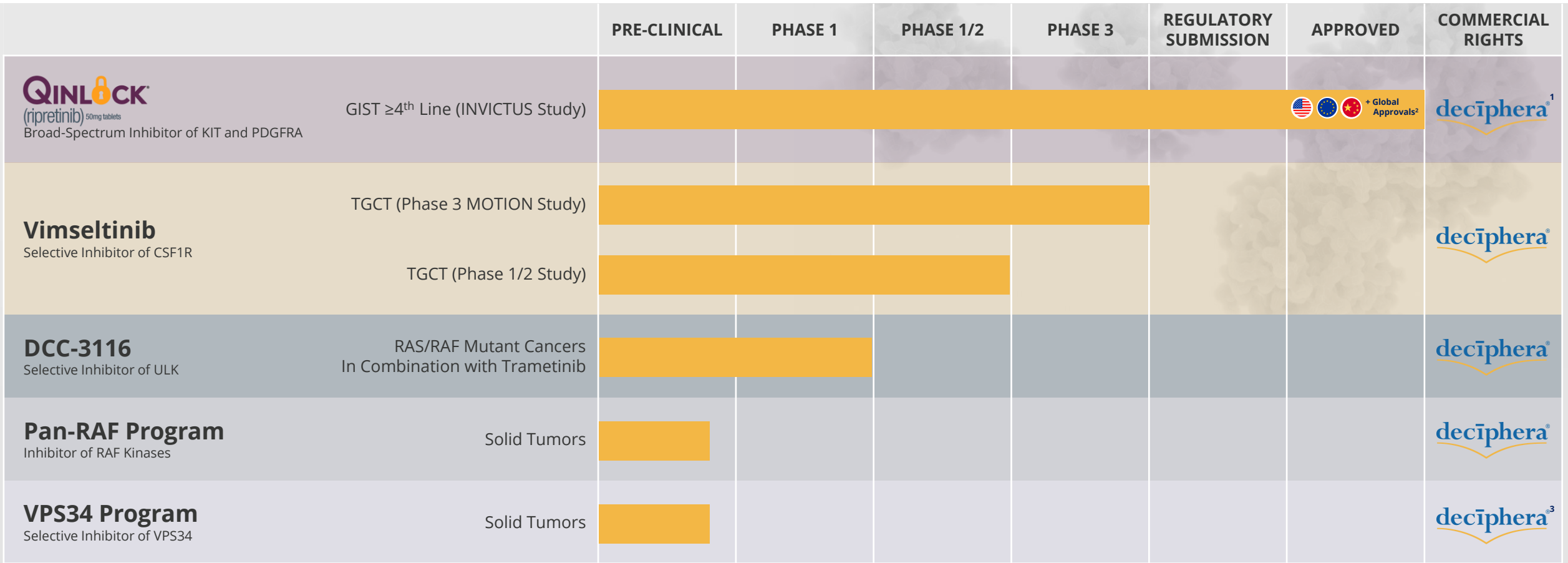
ROBUST PIPELINE OF SWITCH-CONTROL KINASE INHIBITORS



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Notes: CSF1R=colony-stimulating factor 1 receptor; GIST=gastrointestinal stromal tumor; KIT=KIT proto-oncogene receptor tyrosine kinase; PDGFRA=platelet-derived growth factor receptor α; RAF=rapidly accelerated fibrosarcoma; RAS=rat sarcoma gene; TGCT=tenosynovial giant cell tumor; ULK=unc-51-like autophagy-activating kinase; (1) Exclusive development and commercialization license with Zai Lab in Greater China for QINLOCK; (2) QINLOCK is approved for 4th line GIST in the United States, Australia, Canada, China, European Union, Hong Kong, Switzerland, Taiwan, and the United Kingdom; (3) Agreement with Sprint Bioscience for exclusive in-license worldwide rights to a research-stage program targeting VPS34.

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STRATEGIC PRIORITIES FOR 2022

QINLOCK® (ripretinib) 50 mg tablets

- Further entrench as standard of care in 4th line GIST in the U.S.
- Successfully launch in key European markets
- Present INTRIGUE data at upcoming ASCO Plenary Series Session

Vimseltinib

- Rapidly enroll Phase 3 MOTION study
- Present updated clinical data from ongoing Phase 1/2 study

DCC-3116

- Present initial data from Phase 1 dose-escalation study
- Advance to dose expansion phase in combination with a MEK inhibitor
- Expand program to include KRAS G12C inhibitor combination in NSCLC[1]

Proprietary Drug Discovery Platform

- Declare pan-RAF inhibitor development candidate

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Notes: ASCO=American Society of Clinical Oncology; G12C=single point mutation with a glycine-to-cysteine substitution at codon 12; GIST=gastrointestinal stromal tumor; KRAS=kirsten rat sarcoma virus; MEK=MAPK/ERK kinase; NSCLC=non–small-cell lung cancer; RAF=rapidly accelerated fibrosarcoma; (1) subject to feedback from regulatory authorities.

QINLOCK® (ripretinib)

FIRST APPROVED TKI DESIGNED SPECIFICALLY FOR GIST

U.S. Approval and Commercial Launch

- Granted FDA Breakthrough Therapy Designation
- Approved by U.S. FDA in 4th line GIST in May 2020
- ~$100MM U.S. net sales launch through 3Q 2021

European Approvals and Commercial Launches

- Approved in E.U. by European Commission in 4th line GIST in November 2021
- Launched in Germany and named patient sales in Switzerland underway
- Transition to post-approval paid access program in France expected in 1H 2022

Other International Approvals

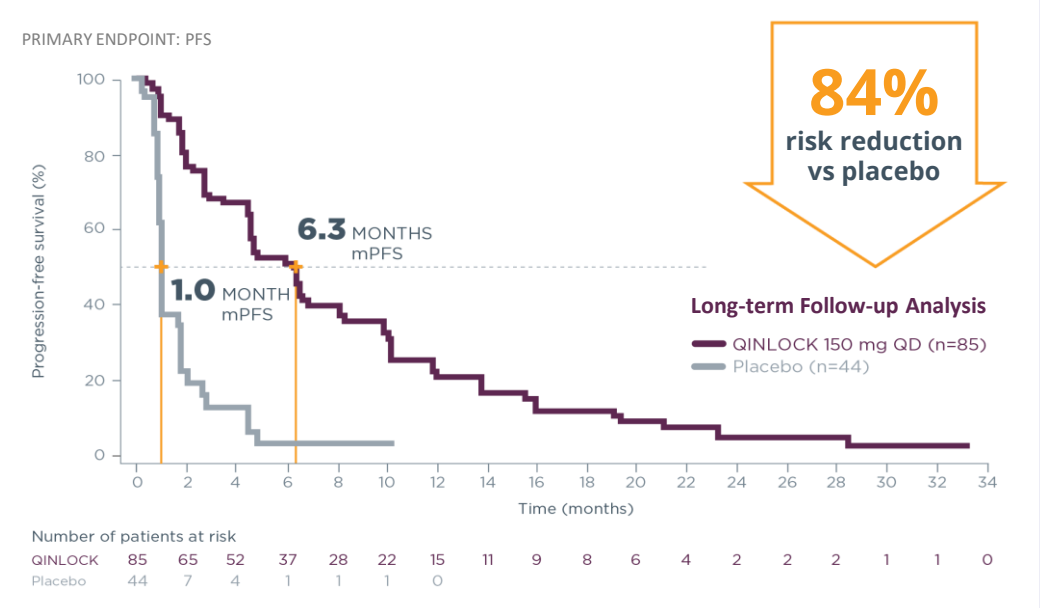
- Approved in Australia, Canada, China, Hong Kong, Taiwan, and the United Kingdom
- Commercial access through licensee and distribution partners

Notes: Full prescribing information is available at www.QINLOCK.com; TKI=Tyrosine kinase inhibitor; FDA=U.S. Food and Drug Administration; GIST=gastrointestinal stromal tumor; E.U.=European Union

CLEAR STANDARD OF CARE FOR THE TREATMENT OF 4th LINE GIST

Progression-free survival

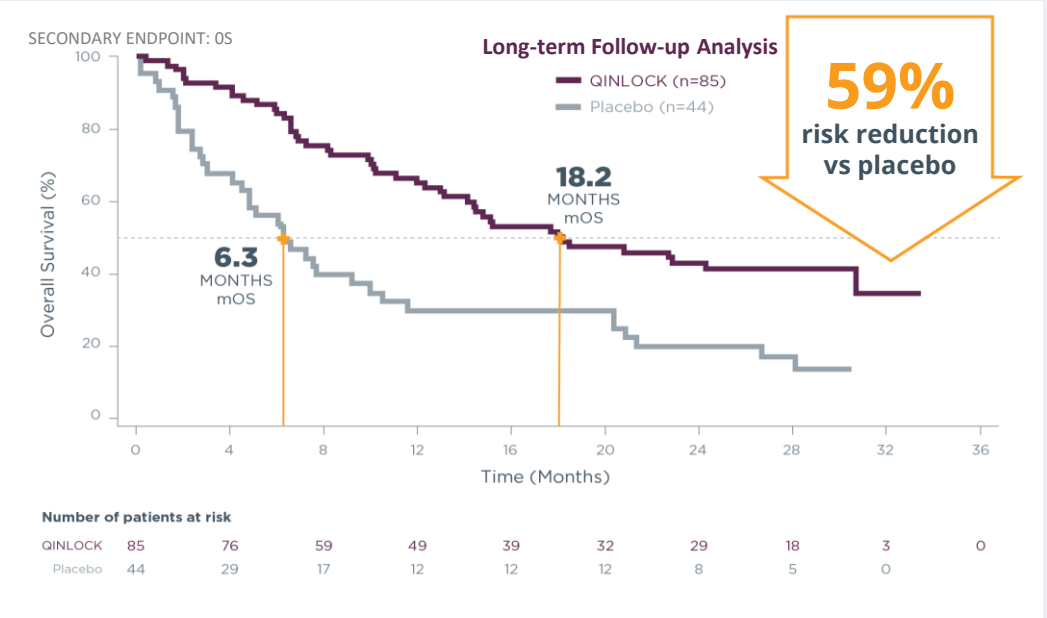
(median PFS of 6.3 months vs. 1.0 month; HR=0.16, 95% CI [0.01-0.27], P<0.0001)



QINLOCK PFS in the primary analysis: 6.3 months vs 1.0 months
(HR = 0.15 [95% CI, 0.09 – 0.25], p<0.001)

Overall survival

(median OS of 18.2 months vs. 6.3 months; HR=0.41, 95% CI [0.26-0.65])



QINLOCK OS in the primary analysis: 15.1 months vs 6.6 months
(HR = 0.36 [95% CI, 0.21 – 0.62], p<0.001)

Overall Response Rate:

- **Long-term follow-up analysis:** 11.8% with QINLOCK vs 0.0% with placebo
- **Primary analysis:** 9.4% with QINLOCK vs 0.0% with placebo (P=0.0504)

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Notes: 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; CI=confidence interval; GIST=gastrointestinal stromal tumor; HR=hazard ratio; mOS=median overall survival; mPFS=median progression-free survival; OS=overall survival; PFS=progression-free survival; QD=daily.

QINLOCK® | 4TH LINE GASTROINTESTINAL STROMAL TUMOR

HIGHLY SUCCESSFUL U.S. LAUNCH

Share-of-Voice	*Confidence*	*Prescriber Breadth*	*Revenue*
>55,000 HCP Interactions[1]	**>90%** Performance Ratings[2,3]	**~530** Unique Prescribers[1]	**~$100** Million
Highest level of HCP reach and share-of-voice in GIST market[2]	**GIST treaters indicate INTRIGUE results further highlight QINLOCK's clinical activity and favorable safety profile in 4th line GIST[4]**	**Broad utilization in both academic and community settings[1]**	**U.S. net sales (launch through 3Q 2021)**

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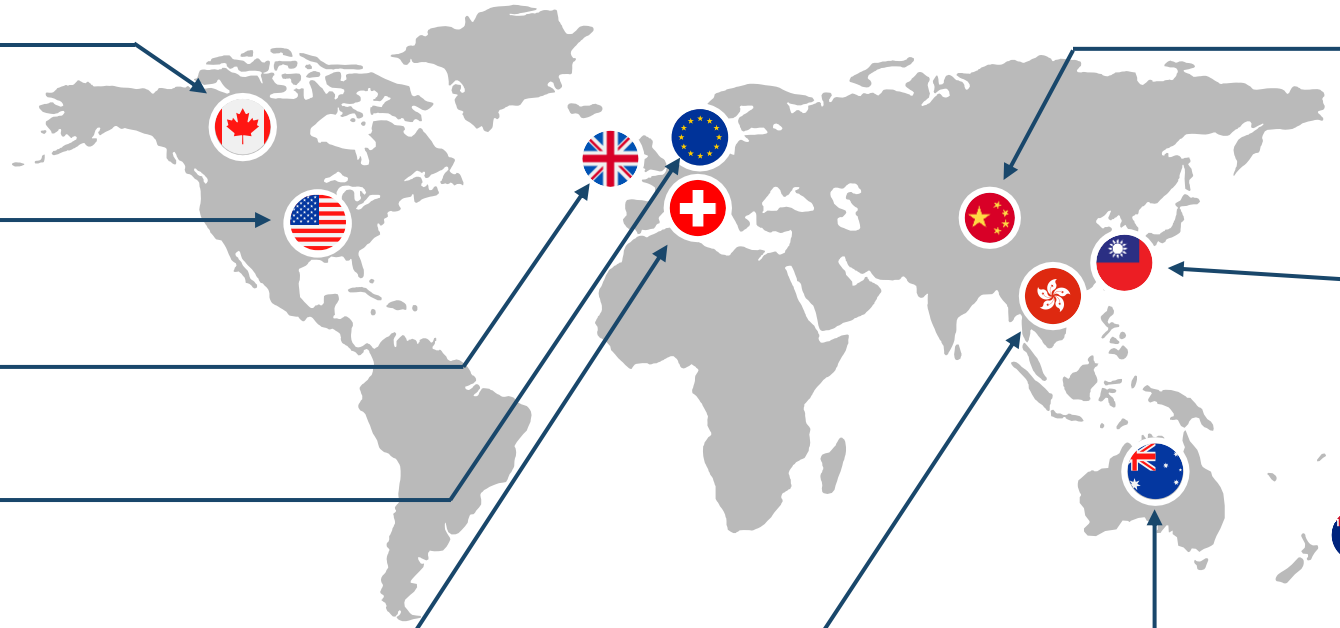
Notes: GIST=gastrointestinal stromal tumor; HCP=health care provider; QINLOCK launch data represented from May 15, 2020 through Sept 30, 2021. (1) Internal Deciphera Data.; (2) Deciphera ATU survey, 3Q 2021; (3) Deciphera ATU survey, 3Q 2021. 90% of users rate QINLOCK as performing well to extremely well (4) Deciphera market research post-INTRIGUE survey, 4Q 2021.

QINLOCK® | 4TH LINE GASTROINTESTINAL STROMAL TUMOR

GLOBAL APPROVALS AND EXPANSION

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



Canada
- Approved in June 2020

United States
- Approved in May 2020

United Kingdom
- Approved in December 2021

European Union
- Approved in November 2021
- Launch in Germany underway

Switzerland
- Approved in October 2021
- Named patient sales in Switzerland underway

China
- Approved in March 2021[1]

Taiwan
- Approved in September 2021[1]

Hong Kong
- Approved in March 2021[1]

Australia
- Approved in July 2020

New Zealand
- Marketing application accepted for review

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

VIMSELTINIB

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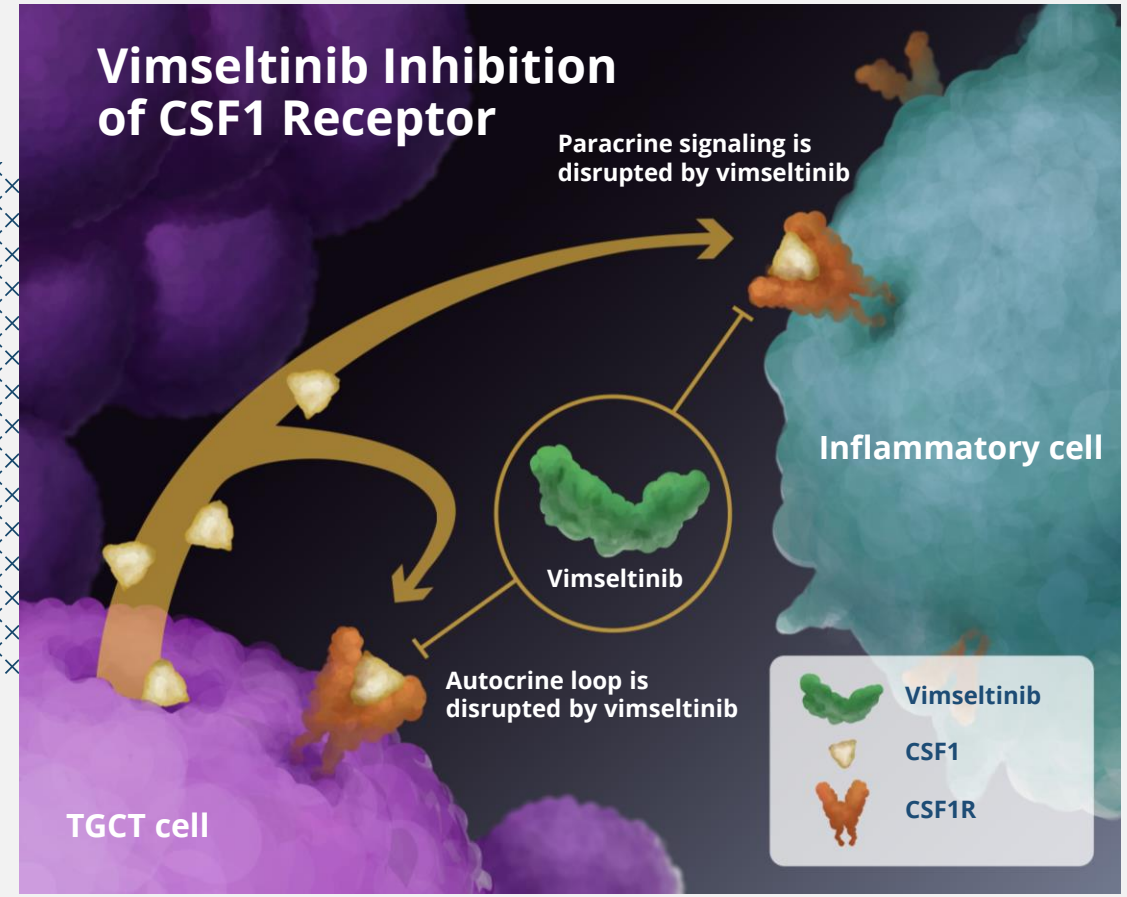
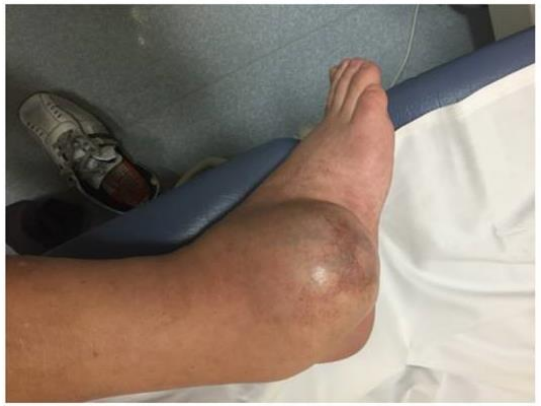
ENROLLMENT UNDERWAY FOR PHASE 3 MOTION STUDY IN TGCT

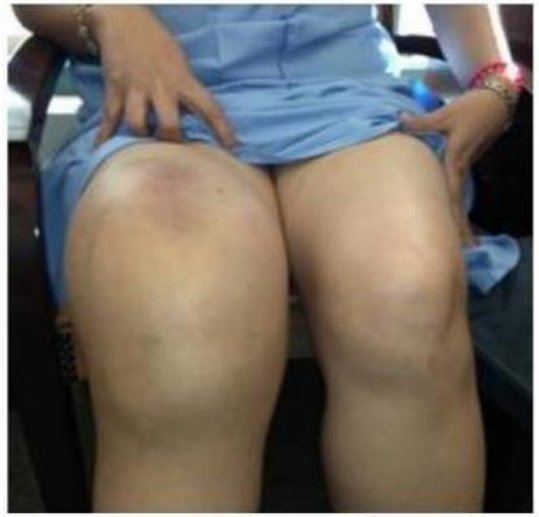


- Vimseltinib is an oral, switch-control TKI specifically designed to selectively and potently inhibit CSF1R
- TGCT caused by translocation in CSF1 gene, coding the ligand for CSF1R
- High unmet medical need in TGCT for effective therapy with improved safety profile
- Phase 1/2 study update showed ORR of 47% and well tolerated in TGCT patients with no cholestatic hepatotoxicity observed[1]
- Strong strategic fit with GIST based on overlapping KOLs and call-points

Notes: CSF1=colony-stimulating factor 1; CSF1R=colony-stimulating factor 1 receptor; GIST=gastrointestinal stromal tumor; KOL=key opinion leader; ORR=objective response rate; TGCT=tenosynovial giant cell tumor; TKI=tyrosine kinase inhibitor; (1) Data presented at the ESMO Congress 2021.

A LOCALLY AGGRESSIVE TUMOR ASSOCIATED WITH SUBSTANTIAL MORBIDITY





Disease Burden and Unmet Medical Need for TGCT Patients	
Diagnosis	Due to the slow-growing nature of TGCT and similar symptoms to other conditions like sports injuries and arthritis, patients may have a longer path to diagnosis
Patient burden	In the TOPP registry[1], patients at baseline commonly reported multiple symptoms, including pain (78%), limited function (64%), swelling (61%), stiffness (55%), and use of analgesics (15%)[2]

Unmet need	▪ Surgical resection is standard treatment
	▪ High rate of recurrence in diffuse TGCT
	▪ CSF1R inhibition has demonstrated clinical benefit in diffuse TGCT
	▪ Pexidartinib is only approved agent for TGCT patients no longer amenable to surgery (FDA approval in August 2019)
	  • FDA label includes boxed warning, REMS, and intensive liver monitoring due to off-target hepatotoxicity risks
	  • The EMA adopted the decision of refusal of the Turalio MAA in November 2020
	▪ Unmet medical need for effective CSF1R inhibitor with favorable safety/tolerability profile for TGCT patients

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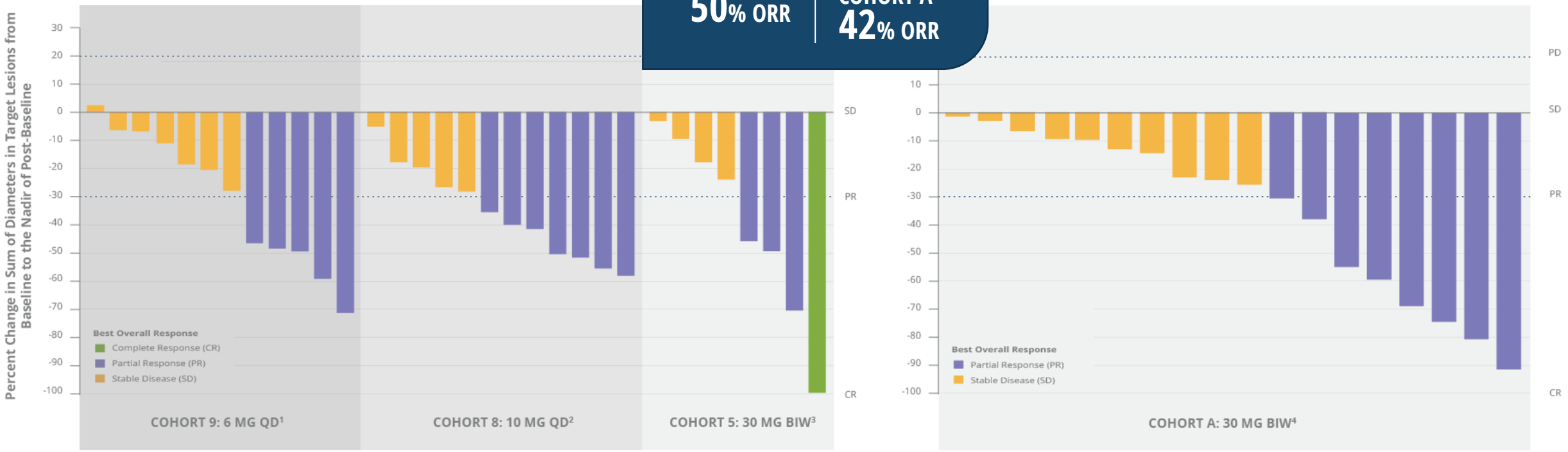
Ankle image courtesy of Tap WD, et al. ASCO 2018, abstract 11502; Knee image courtesy of Tap WD, et al. N Engl J Med. 2015;373:428-437.
Notes: CSF1R=colony-stimulating factor 1 receptor; EMA=European Medicines Agency; FDA=U.S. Food and Drug Administration; MAA=Marketing Authorisation Application; REMS=Risk Evaluation and Mitigation Strategy; TGCT=tenosynovial giant cell tumor; (1) The TOPP registry was a multinational, multicenter, prospective observational study involving 12 tertiary sarcoma centers in 7 European countries, and 2 US sites; (2) Patients experienced more than or equal to 3 symptoms (52%).

ENCOURAGING ANTI-TUMOR ACTIVITY

47% ORR

Across all dose cohorts of Phase 1 and Phase 2 Cohort A

PHASE 1	PHASE 2 COHORT A
50% ORR	42% ORR



Notes: Data presented at the ESMO Congress 2021; results are reported for patients with TGCT with a data cutoff of June 7, 2021; BIW=twice weekly; CR=complete response; ORR=objective response rate; PR=partial response; QD=once daily; SD=stable disease; TGCT=tenosynovial giant cell tumor; (1) After 3-day 20 mg QD loading dose; (2) After 3-day 30 mg QD loading dose; (3) After 5-day 30 mg QD loading dose; (4) No loading dose.

WELL-TOLERATED IN TGCT PATIENTS

TEAEs in ≥15% of Patients Receiving Vimseltinib

Preferred term	Phase 1 Cohort 5 (n = 8)		Phase 1 All Patients[1] (n = 32)		Phase 2 Cohort A[1] (n = 36)	
	All grades	Grade 3/4	All grades	Grade 3/4	All grades	Grade 3/4
Blood CPK increased	7 (88%)	4 (50%)	20 (63%)	10 (31%)	19 (53%)	9 (25%)
Periorbital edema	3 (38%)	0	17 (53%)	0	8 (22%)	0
Fatigue	3 (38%)	0	15 (47%)	0	6 (17%)	0
AST increased	5 (63%)	1 (13%)	14 (44%)	4 (13%)	12 (33%)	0
ALT increased	2 (25%)	0	10 (31%)	1 (3%)	4 (11%)	0
Myalgia	0	0	9 (28%)	1 (3%)	5 (14%)	0
Arthralgia	2 (25%)	0	8 (25%)	1 (3%)	2 (6%)	0
Face edema	0	0	8 (25%)	0	0	0
Headache	3 (38%)	0	8 (25%)	0	10 (28%)	0
Lipase increased	1 (13%)	0	8 (25%)	3 (9%)	4 (11%)	0
Peripheral edema	1 (13%)	0	8 (25%)	0	5 (14%)	0
Pruritus	1 (13%)	0	8 (25%)	0	3 (8%)	0
Amylase increased	1 (13%)	1 (13%)	7 (22%)	2 (6%)	5 (14%)	0
Diarrhea	1 (13%)	1 (13%)	6 (19%)	1 (3%)	2 (6%)	0
Generalized edema	2 (25%)	0	6 (19%)	0	0	0
Hypertension	0	0	6 (19%)	2 (6%)	1 (3%)	0
Nausea	2 (25%)	0	6 (19%)	0	8 (22%)	0
Constipation	1 (13%)	0	5 (16%)	0	2 (6%)	0
Parasthesia	0	0	5 (16%)	0	1 (3%)	0
Rash macular	0	0	5 (16%)	0	0	0
Rash maculopapular	0	0	5 (16%)	0	5 (14%)	0
Asthenia	1 (13%)	0	3 (9%)	0	6 (17%)	0

- Majority of the common (≥15%) TEAEs were ≤Grade 2
- Observed transaminase, pancreatic, and CPK enzyme elevations were mostly low grade and not associated with symptoms
- No abnormalities in bilirubin levels reported

Notes: Data presented at the ESMO Congress 2021; Results are reported for patients with TGCT with a data cutoff of June 7, 2021; Data are presented as n (%) unless otherwise noted; ALT=alanine aminotransferase; AST=aspartate aminotransferase; CPK=creatine phosphokinase; TEAE=treatment-emergent adverse event; (1) TEAE cutoff of ≥15% based on all grades for total Phase 1 and Phase 2 Cohort A.

ENCOURAGING RESULTS SUPPORT FURTHER DEVELOPMENT

- In patients with TGCT not amenable to surgical resection, vimseltinib demonstrated encouraging preliminary efficacy
- Vimseltinib was generally well-tolerated, and the safety profile remains manageable with longer-term follow-up across all Phase 1 dose cohorts and at the recommended Phase 2 dose in Cohort A
- These results support further evaluation of vimseltinib in the MOTION study, a randomized, placebo-controlled, Phase 3 trial in patients with TGCT not amenable to surgical resection

OBJECTIVE RESPONSE RATE

47%

Across all dose cohorts of Phase 1 and Phase 2 Cohort A

DEEPENING AND DURABLE RESPONSES OBSERVED ACROSS ALL DOSE COHORTS OF PHASE 1

ACTIVE PATIENTS

PHASE 1	PHASE 2 COHORT A
72%	83%

NO ABNORMALITIES IN BILIRUBIN LEVELS REPORTED

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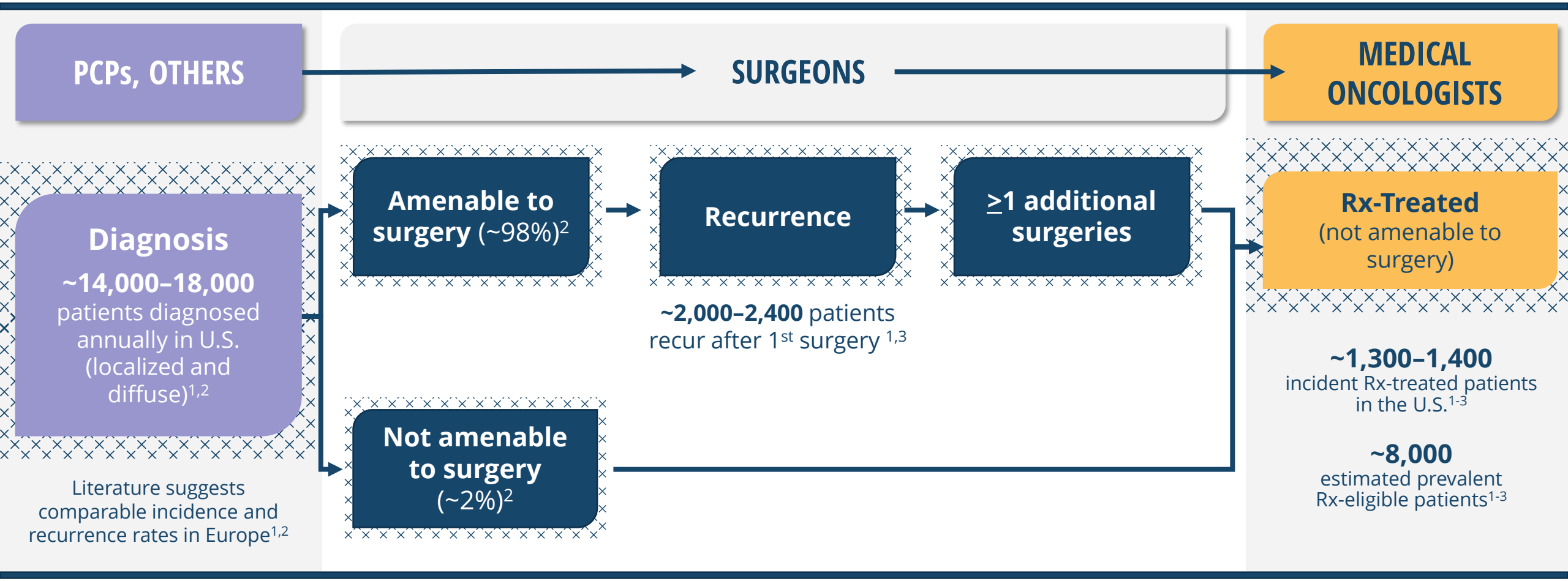
Notes: Data presented at the ESMO Congress 2021; results are reported for patients with TGCT with a data cutoff of June 7, 2021; TGCT= tenosynovial giant cell tumor.

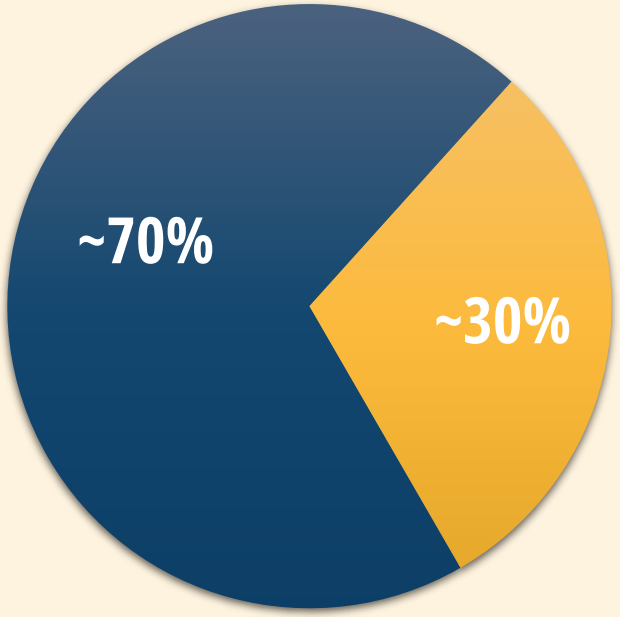
PATIENT JOURNEY OF TGCT PATIENTS NOT AMENABLE TO SURGERY



Notes: PCP=primary care physician; TGCT=tenosynovial giant cell tumor; (1) Mastboom et al. Acta Orthopaedica. 2017;88(6):688-694; (2) Internal Deciphera estimates based on market research and secondary data; estimates are inherently uncertain; (3) Ehrenstein. J Rheumatol. 2017;44(10):1476-1483.

SIGNIFICANT OPPORTUNITY TO BENEFIT PATIENTS WITH TGCT

U.S. TGCT Market Landscape: Imatinib is the Leading TKI Prescribed[1]

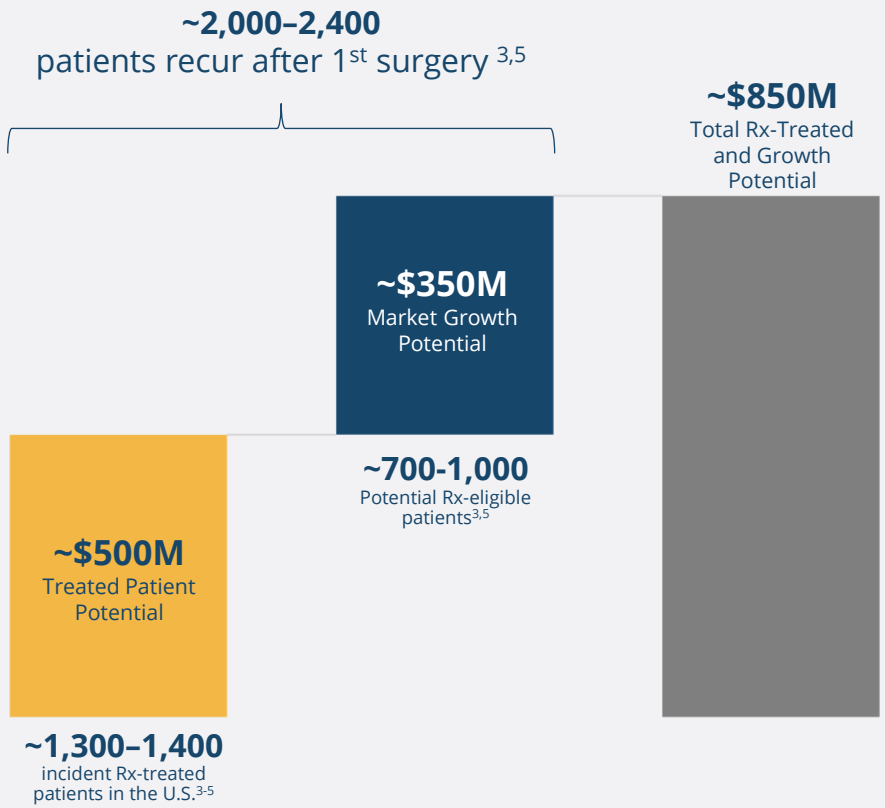


Imatinib Therapy

Other TKI Therapy
- Sunitinib, Pexidartinib, or Nilotinib

Avg Duration of Therapy (Imatinib)[2]: **18 months**

U.S. Incident Population: Total Addressable Market



U.S. Prevalent Population

~8,000
estimated prevalent Rx-eligible patients in the U.S.[3-5]

Notes: TGCT=tenosynovial giant cell tumor; TKI = Tyrosine Kinase Inhibitor. (1) Symphony Health IDV Claims; Analysis Period: 7/1/2020 – 6/1//2021. (2) Symphony Health IDV Claims; Analysis Period: 1/1/2008 – 2/1/2021; Patient Qualification: 1/1/2016 – 12/31/2020. (3) Mastboom et al. Acta Orthopaedica. 2017;88(6):688-694; (4) Internal Deciphera estimates based on market research and secondary data; estimates are inherently uncertain; (5) Ehrenstein. J Rheumatol. 2017;44(10):1476-1483. (6) Total Addressable Market calculated by estimated patient incidence x 18 months duration x current pexidartinib WAC price and assumes opportunity at steady state.

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

International Study with ~40 Sites

DOUBLE-BLIND PERIOD	OPEN-LABEL PERIOD
Part 1: Eligible study participants will be assigned to receive either vimseltinib or matching placebo for 24 weeks.	**Part 2**: A long-term treatment phase in which all participants receive open-label vimseltinib.

Vimseltinib (n = 80)
30 mg BIW (24 weeks)

2:1 Randomization
(n=120)

Placebo (n = 40)
(24 weeks)

Open-Label Study

Patients have the option to continue or cross over to vimseltinib 30 mg BIW

Phase 3 Motion Study

will assess the efficacy and safety of vimseltinib for the treatment of patients with TGCT not amenable to surgical resection

Primary Endpoint:

- Objective response rate (ORR) at 25 weeks

Key Secondary Endpoints:

- Range of motion (ROM)
- Patient-reported outcomes
- ORR per tumor volume score

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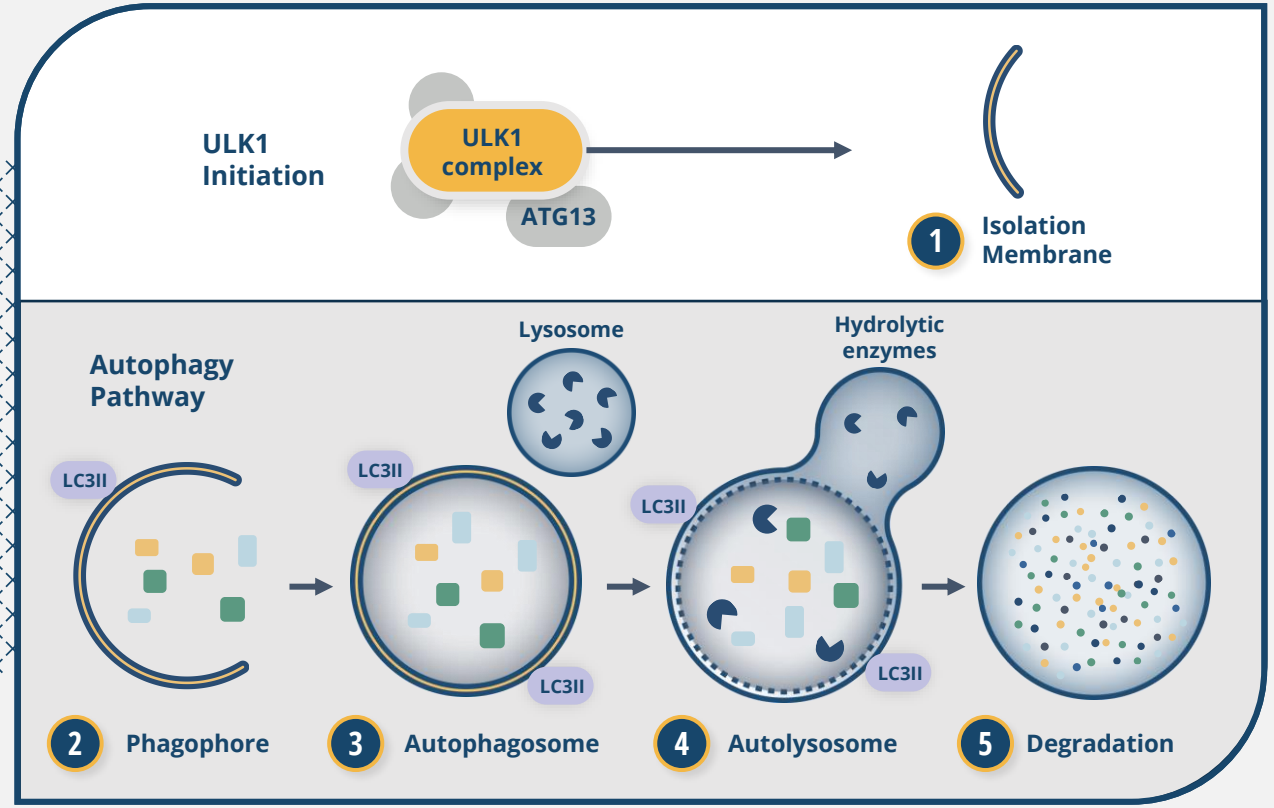
Notes: BIW=twice weekly; TGCT=tenosynovial giant cell tumor.

DCC-3116

AUTOPHAGY: A BROAD RESISTANCE MECHANISM IN CANCER

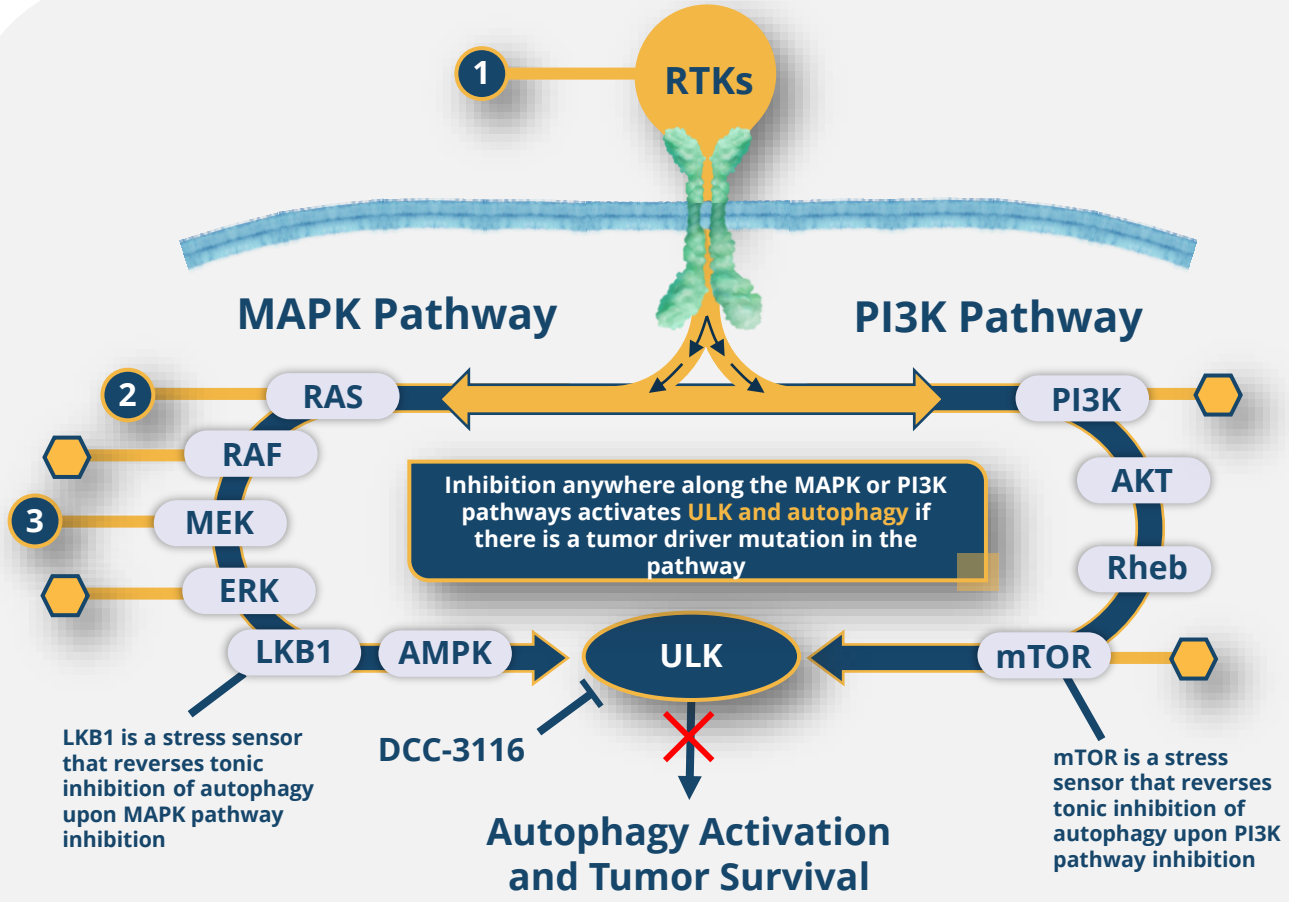
ULK: Initiating Factor for Autophagy



- Autophagy is a catabolic process in which cells recycle components to generate energy
- RTK-, RAS-, and RAF-mutant cancer cells activate autophagy in order to survive stresses or damage **due to anti-cancer therapeutic intervention** with MAPK and PI3K pathway inhibitors
- The **ULK kinase initiates the autophagy pathway** and provides a potential targeted approach to selectively inhibit autophagy in these cancers
- **DCC-3116 is a first-in-class small molecule** designed to inhibit cancer autophagy by inhibiting ULK kinase

Notes: G12C=single point mutation with a glycine-to-cysteine substitution at codon 12; MAPK=mitogen-activated protein kinase; PI3K=phosphatidylinositol-3 kinase; RAF=rapidly accelerated fibrosarcoma; RAS=rat sarcoma gene; RTK=receptor tyrosine kinase; ULK=unc-51-like kinase; ATG13= Autophagy-related protein 13.

CENTRAL ROLE FOR AUTOPHAGY IN THE RAS/MAPK AND PI3K PATHWAYS



GROWING PRECLINICAL VALIDATION FOR ROLE OF AUTOPHAGY IN CANCER

1 DCC-3116 In Combination with RTK Inhibition

- DCC-3116 exhibits synergy with osimertinib and afatinib resulting in tumor regression in EGFR-mutant NSCLC *in vivo*

2 DCC-3116 In Combination with KRAS G12C Inhibition

- DCC-3116 exhibits synergy with AMG-510 resulting in tumor regression in KRAS G12C-mutant NSCLC *in vivo*

3 DCC-3116 In Combination with MEK Inhibition

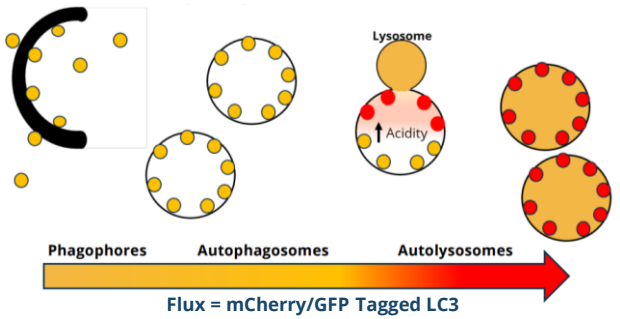
- DCC-3116 exhibits synergy in combination with trametinib and inhibited pancreatic, lung, and melanoma xenograft tumor growth

Other targets where therapeutic intervention activates ULK and autophagy

Notes: AKT=protein kinase B; AMPK=AMP-activated protein kinase; EGFR=epidermal growth factor receptor; ERK=extracellular signal-regulated kinase; G12C=single point mutation with a glycine-to-cysteine substitution at codon 12; KRAS=kirsten rat sarcoma virus; LKB1=liver kinase B1; MAPK=mitogen-activated protein kinase; MEK=mitogen-activated extracellular signal-regulated kinase; mTOR=mammalian target of rapamycin; NSCLC=non–small-cell lung cancer; PI3K=phosphatidylinositol-3 kinase; RAF=rapidly accelerated fibrosarcoma; RAS=rat sarcoma gene; Rheb=ras homolog enriched in brain; RTK=receptor tyrosine kinase; ULK=unc-51-like kinase.

DCC-3116 OBSERVED PRECLINICALLY TO DURABLY AND POTENTLY INHIBIT AUTOPHAGY INDUCED BY MULTIPLE PATHWAY INHIBITORS

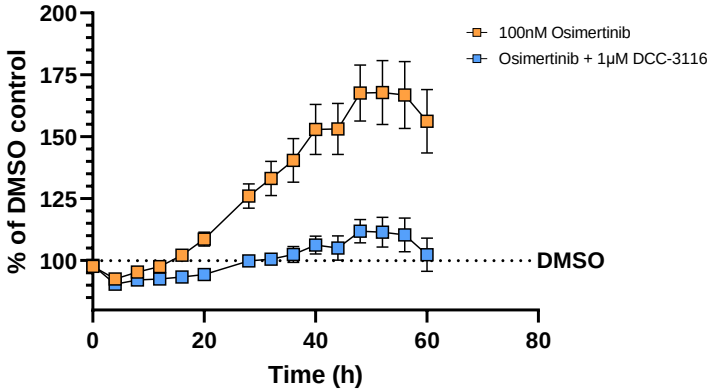
AUTOPHAGIC FLUX MATURATION



- RTK/RAS/MAPK induces significant autophagy flux
- DCC-3116 can sustainably inhibit this induction

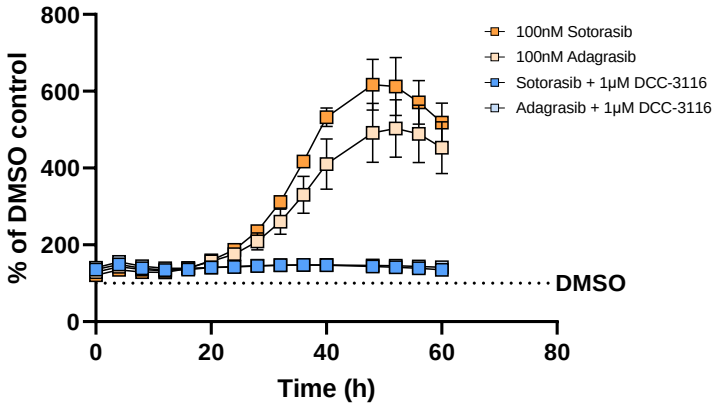
DCC-3116 + EGFR Inhibitor

NSCLC: Osimertinib-induced Autophagy Induction Over Time (mCherry/GFP Tagged LC3)



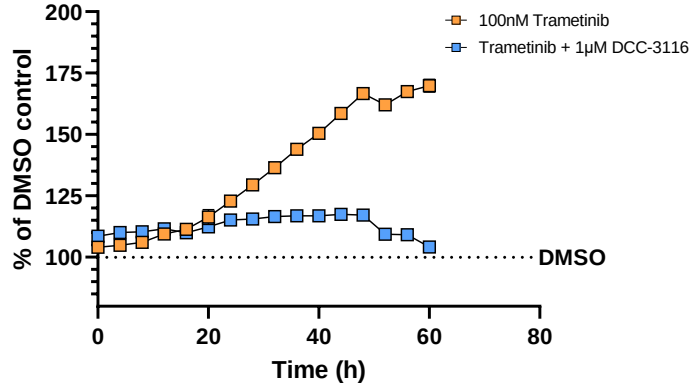
DCC-3116 + KRAS G12C Inhibitor

NSCLC: Sotorasib vs. Adagrasib-induced Autophagy Induction Over Time (mCherry/GFP Tagged LC3)



DCC-3116 + Trametinib

PDAC: Trametinib-induced Autophagy Induction Over Time (mCherry/GFP Tagged LC3)

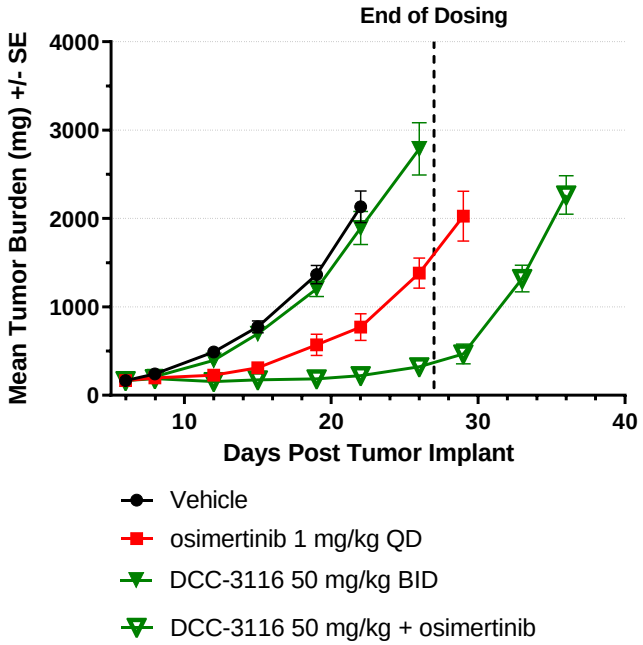


Notes: EGFR=epidermal growth factor receptor; G12C=single point mutation with a glycine-to-cysteine substitution at codon 12; KRAS=kirsten rat sarcoma virus; MAPK=mitogen-activated protein kinase; NSCLC=non–small-cell lung cancer; PDAC=pancreatic ductal adenocarcinoma; RAS=rat sarcoma gene; RTK=receptor tyrosine kinase.

DCC-3116 EXHIBITED SYNERGY IN COMBINATION WITH MULTIPLE RTK, RAS, OR MAPK PATHWAY INHIBITORS

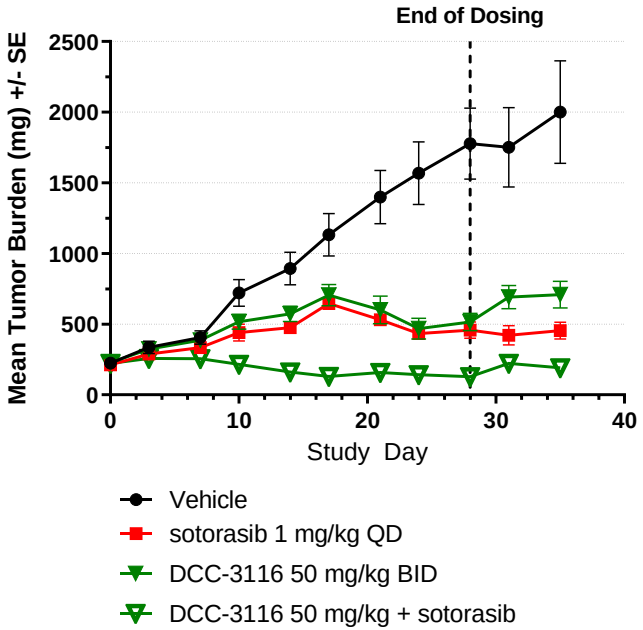
DCC-3116 + Osimertinib

NSCLC: H1975 Tumor Growth



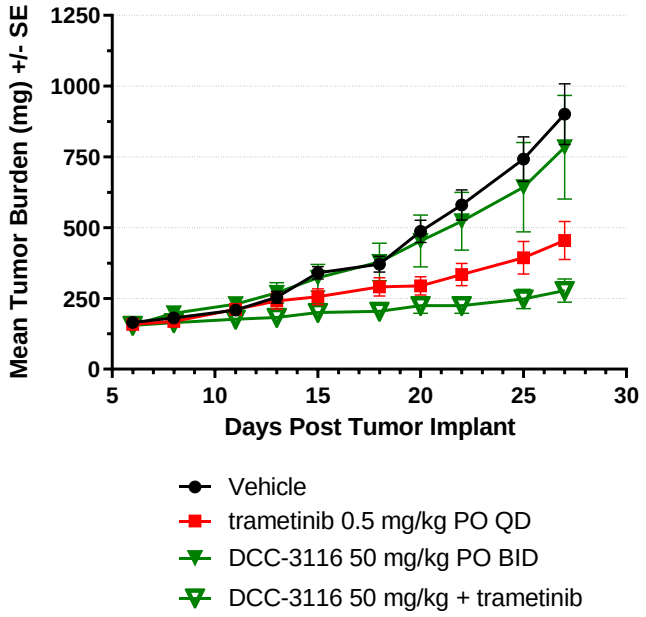
DCC-3116 + Sotorasib

NSCLC: H358 Tumor Growth



DCC-3116 + Trametinib

PDAC: MiaPaca-2 Tumor Growth

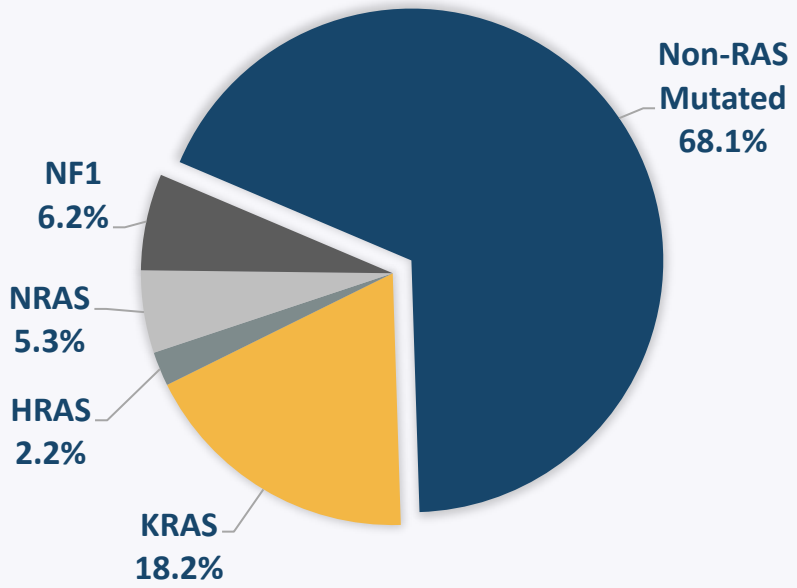


Notes: BID=twice daily; MAPK=mitogen-activated protein kinase; NSCLC=non–small-cell lung cancer; PDAC=pancreatic ductal adenocarcinoma; PO=by mouth; QD=once daily; RAS=rat sarcoma gene; RTK=receptor tyrosine kinase.

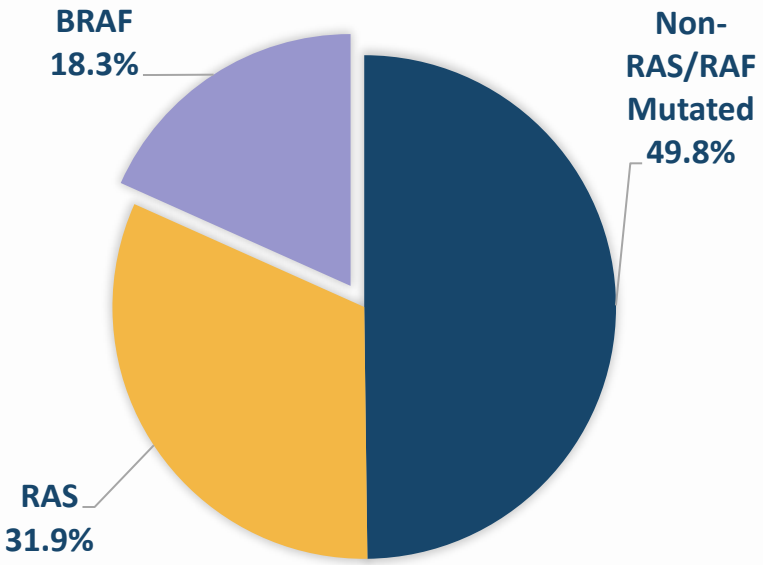
DCC-3116

SIGNIFICANT POTENTIAL OPPORTUNITY EXISTS AS MUTATIONS IN RAS/RAF/RTK SIGNALING OCCURS IN ~70% OF HUMAN CANCERS

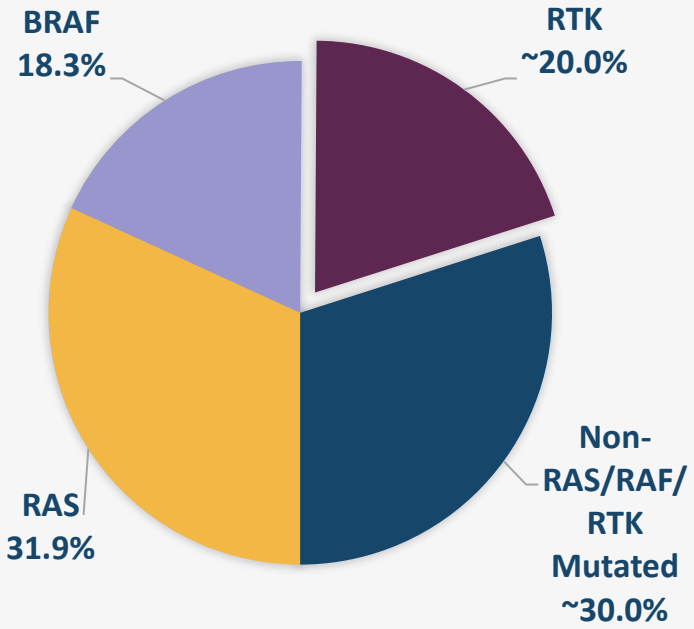
RAS Mutations
~32% of Human Cancers



RAF Mutations
~18% of Human Cancers



RTK Mutations
~20% of Human Cancers



RTK Known Tumor Driver Mutations

- EGFR
- HER2
- HER3
- KIT
- PDGFRa
- FLT3
- TRK A
- TRK B
- TRK C
- ALK
- ROS
- RET
- FGFR 2
- FGFR 3
- FGFR 4
- BCR-ABL
- BTK
- cMET exon 14 skipping

Source: COSMIC (Catalogue of Somatic Mutations in Cancer) Database, v90. **Notes:** RAF=rapidly accelerated fibrosarcoma serine/threonine protein kinase; RAS=rat sarcoma gene; RTK=receptor tyrosine kinase; KRAS=kirsten rat sarcoma virus; ; BRAF=proto-oncogene b-RAF; HRAS=Harvey rat sarcoma gene; NRAS=neuroblastoma RAS viral oncogene homolog; EGFR=epidermal growth factor receptor; HER2=human epidermal growth factor receptor 2= HER3=human epidermal growth factor receptor 3; PDGFRa=platlet derived growth factor receptor alpha; FLT3=fms-like tyrosine kinase 3; TRK A=Tropomyosin receptor kinase A; TRK B= Tropomyosin receptor kinase B; TRK C= Tropomyosin receptor kinase C; ALK=Anaplastic lymphoma kinase; RET=Rearranged during transfection; FGFR 2=Fibroblast growth factor receptor 2; FGFR 3= Fibroblast growth factor receptor 3; FGFR 4= Fibroblast growth factor receptor 4; BTK= Bruton tyrosine kinase; cMET=tyrosine-protein kinase Met.

DCC-3116 | PHASE 1 STUDY

MULTICENTER, OPEN-LABEL, FIRST-IN-HUMAN STUDY AS A SINGLE AGENT AND IN COMBINATION WITH A MEK INHIBITOR

Part 1

Dose Escalation Phase (3 + 3 design)

DCC-3116
Single agent dose escalation cohorts

→ **RP2D or MTD** of DCC-3116 as a single agent

DCC-3116 + MEK inhibitor *(trametinib)*
Combination dose escalation cohorts

→ **RP2D** of the combination

Dose Escalation Phase Inclusion Criteria

- Histologically confirmed diagnosis of an advanced or metastatic solid tumor with a documented RAS or RAF mutation

KRAS G12C inhibitor combination in NSCLC planned, subject to feedback from regulatory authorities

Part 2

Dose Expansion Phase

Cohort 1 (n=20)
Pancreatic ductal adenocarcinoma[1]

Cohort 2 (n=20)
Non-small cell lung cancer[2]

Cohort 3 (n=20)
Colorectal cancer[2]

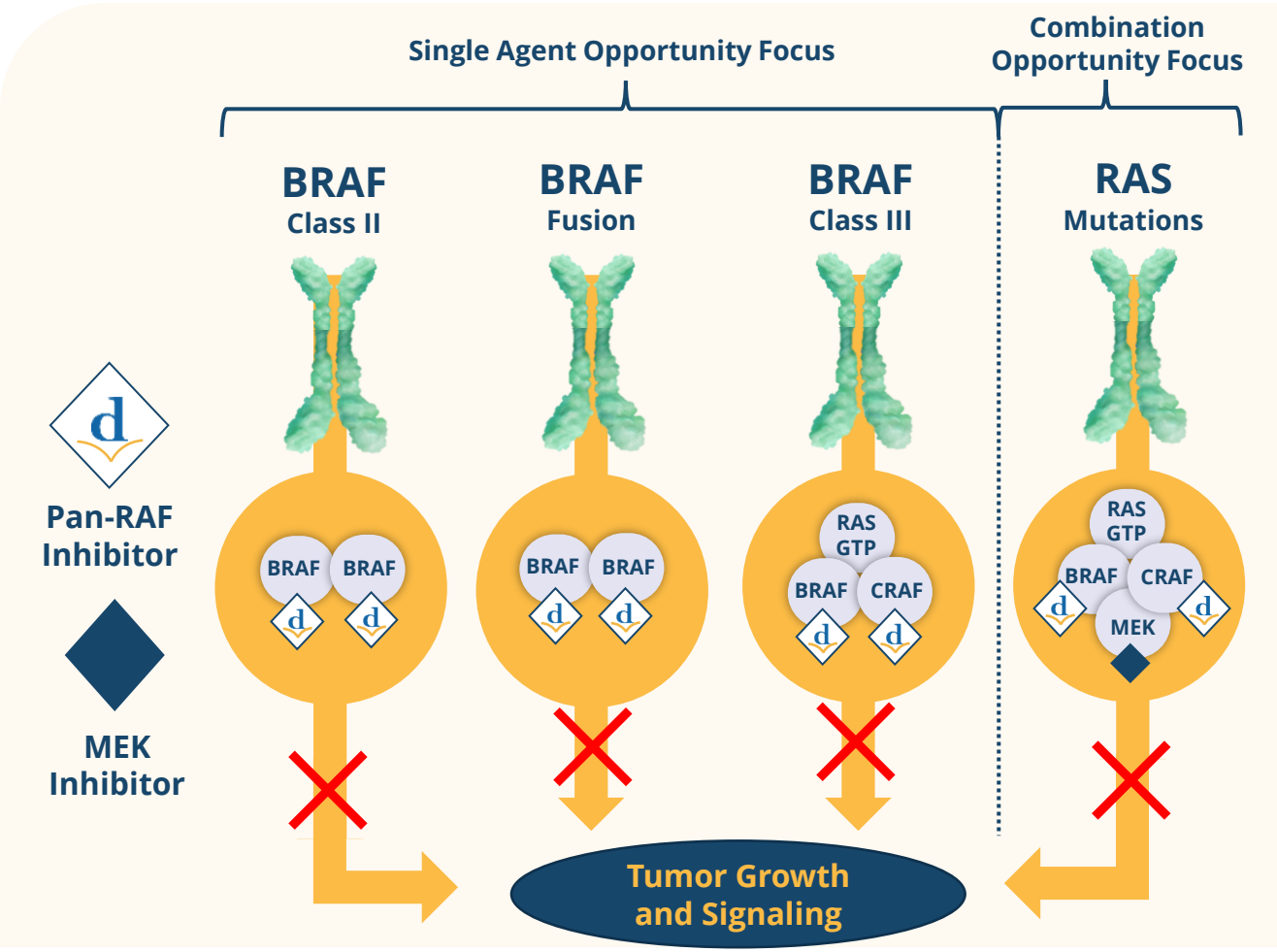
Cohort 4 (n=20)
Melanoma[3]

decīphera®

Notes: G12C=single point mutation with a glycine-to-cysteine substitution at codon 12; KRAS=kirsten rat sarcoma virus; MEK=MAPK/ERK kinase; MTD=maximum tolerated dose; NSCLC=non–small-cell lung cancer; RAF=rapidly accelerated fibrosarcoma serine/threonine protein kinase; RAS=rat sarcoma gene; RP2D=recommended Phase 2 dose; (1) with a documented mutation in KRAS or BRAF; (2) with a documented mutation in KRAS, NRAS, or BRAF; (3) with a documented mutation in NRAS or BRAF.

PAN-RAF PROGRAM

PAN-RAF INHIBITION FOR THE TREATMENT OF MAPK-DRIVEN TUMORS



- Program targets inhibition of BRAF and CRAF kinases, including potential synergy with other inhibitors of the MAPK pathway
- Target profile includes inhibition of Class I, II, and III BRAF mutations as well as BRAF fusions
- BRAF and CRAF inhibition profile will potentially target a large unmet need in mutant RAS cancers
- Goal is to identify a best-in-class pan-RAF inhibitor from a composite of *in vitro*, *in vivo*, and pharmaceutical properties
- Developing inhibitors with long residency times by leveraging our switch-control kinase inhibitor platform

Nomination of development candidate for pan-RAF program planned for later this year

Notes; BRAF=proto-oncogene b-RAF; CRAF=proto-oncogene c-RAF; GTP=guanosine triphosphate; MAPK=mitogen-activated protein kinase; MEK=mitogen-activated extracellular signal-regulated kinase; RAF=rapidly accelerated fibrosarcoma serine/threonine protein kinase; RAS=rat sarcoma gene.

DECIPHERA

SIGNIFICANT EXPECTED MILESTONES ACROSS THE PIPELINE IN 2022

QINLOCK® (ripretinib) 50 mg tablets

- ✓ Launch QINLOCK in Germany
- Transition to post-approval paid access program in France (1H 2022)
- Present INTRIGUE data at ASCO Plenary Series Session (January 2022)

Vimseltinib

- Update Phase 1/2 data in TGCT patients (2H 2022)

DCC-3116

- Present Phase 1 dose escalation data (2H 2022)
- Initiate Phase 1 study dose expansion (2H 2022)
- Present additional preclinical data (2022)

PROPRIETARY DRUG DISCOVERY PLATFORM

- Nominate development candidate for pan-RAF program (2022)

deciphera®

Notes: ASCO=American Society of Clinical Oncology; RAF=rapidly accelerated fibrosarcoma serine/threonine protein kinase; TGCT= tenosynovial giant cell tumor.

DECIPHERA

FINANCIAL HIGHLIGHTS

As of September 30, 2021

Shares Outstanding

58.3 MM

(basic)

65.6 MM

(fully-diluted)

Cash, Cash Equivalents & Marketable Securities

$392 MM

Cash Expected to Fund Operating Expenses and CapEx into 2024

THANK YOU