INVICTUS Phase 3 Top-line Results Conference Call

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decīphera

CORPORATE PRESENTATION

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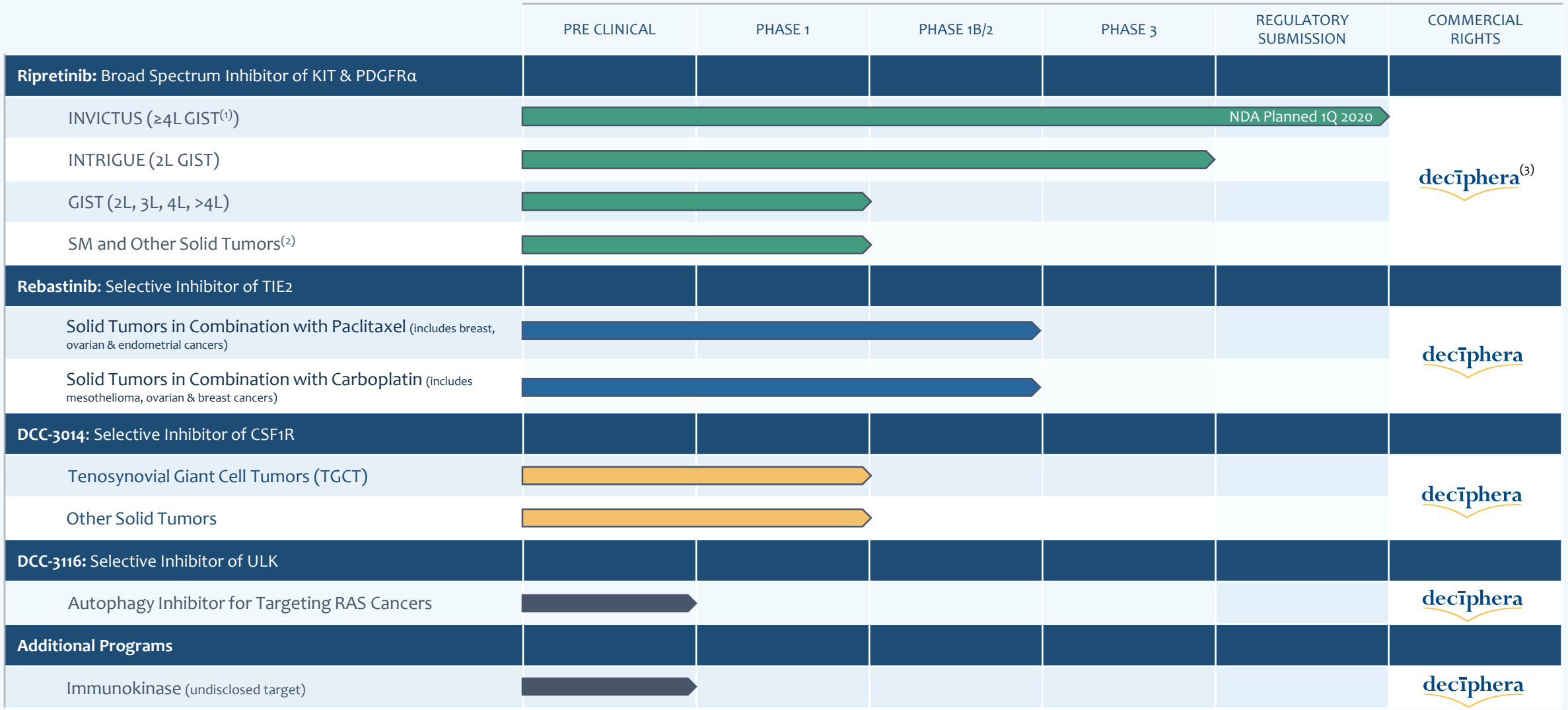
Agenda

- Introduction
- INVICTUS Phase 3 Top-line Results
- Updated Results from Phase 1 Study in GIST Patients
- Closing Remarks
- Q & A

Strong Clinical Stage Oncology Pipeline of Novel Kinase Inhibitors



Notes: (1) GIST=gastrointestinal stromal tumors; (2) SM = systemic mastocytosis; (3) Development and commercialization partnership with Zai Labs in Greater China.

Ripretinib Designed to Address Broad Range of Mutations in GIST

Ripretinib Overview

Highly Potent Small Molecule KIT and PDGFRα Inhibitor

- Designed to inhibit the full spectrum of known KIT and PDGFRα mutations

Positive Results in INVICTUS Phase 3 Clinical Study

- Randomized, placebo-controlled, pivotal study in ≥4th line GIST

NDA Submission for the Treatment of Patients with Advanced GIST who Have Received Prior Treatment with Imatinib, Sunitinib and Regorafenib Expected 1Q 2020

Ongoing INTRIGUE Phase 3 Clinical Study

- Pivotal study in 2nd line GIST vs. sunitinib

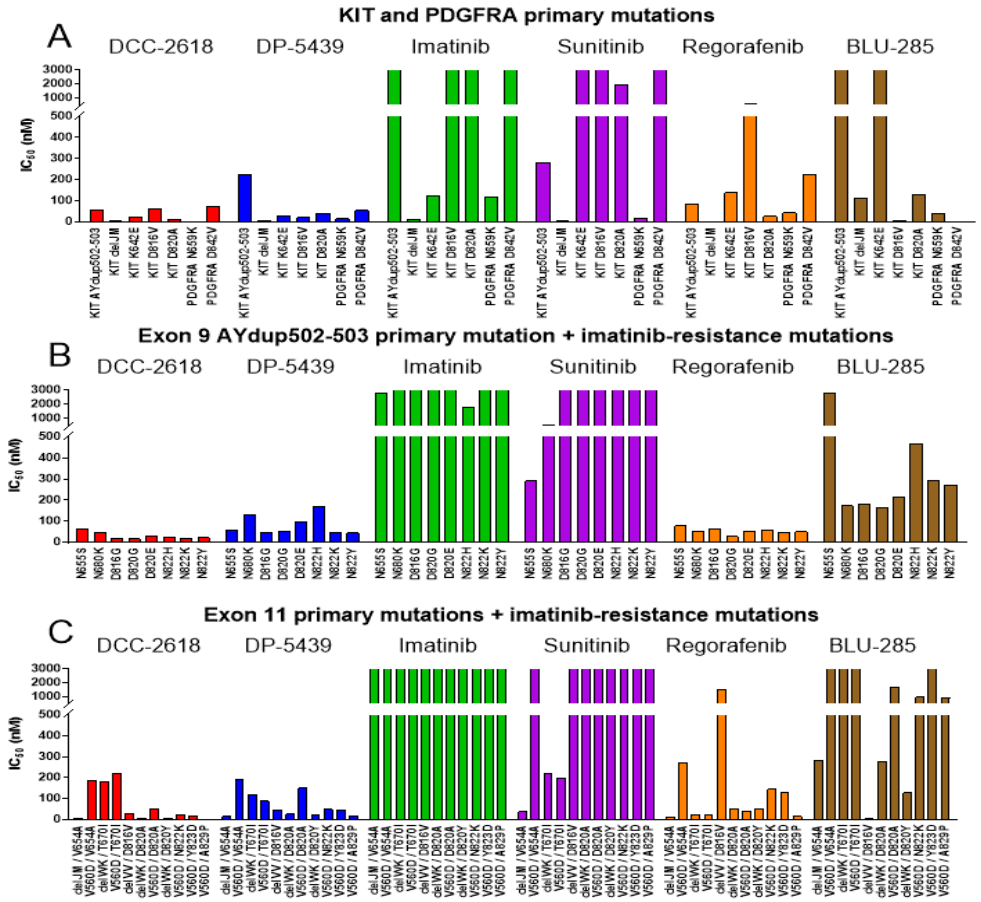
Clinical Proof-of-Concept Demonstrated in 178 GIST Patients in Phase 1

Favorable Tolerability Profile

IP: Composition and Method of Use (2032)

Source: Hemming M et al. Translational insights into gastrointestinal stromal tumors and current clinical advances. Annals of Oncology; 0:1-9, 2018.

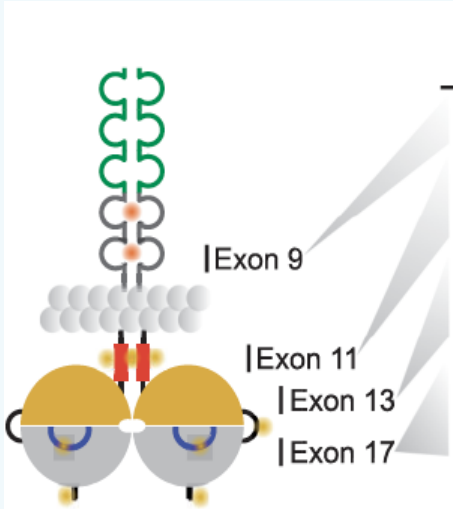
Ripretinib: Broad Mutational Coverage in KIT and PDGFRα



Source: AACR 2018
Notes: (A) GIST primary mutations; or imatinib-resistant KIT mutations with (B) exon 9 or (C) exon 11 primary mutations.

GIST: Disease Overview

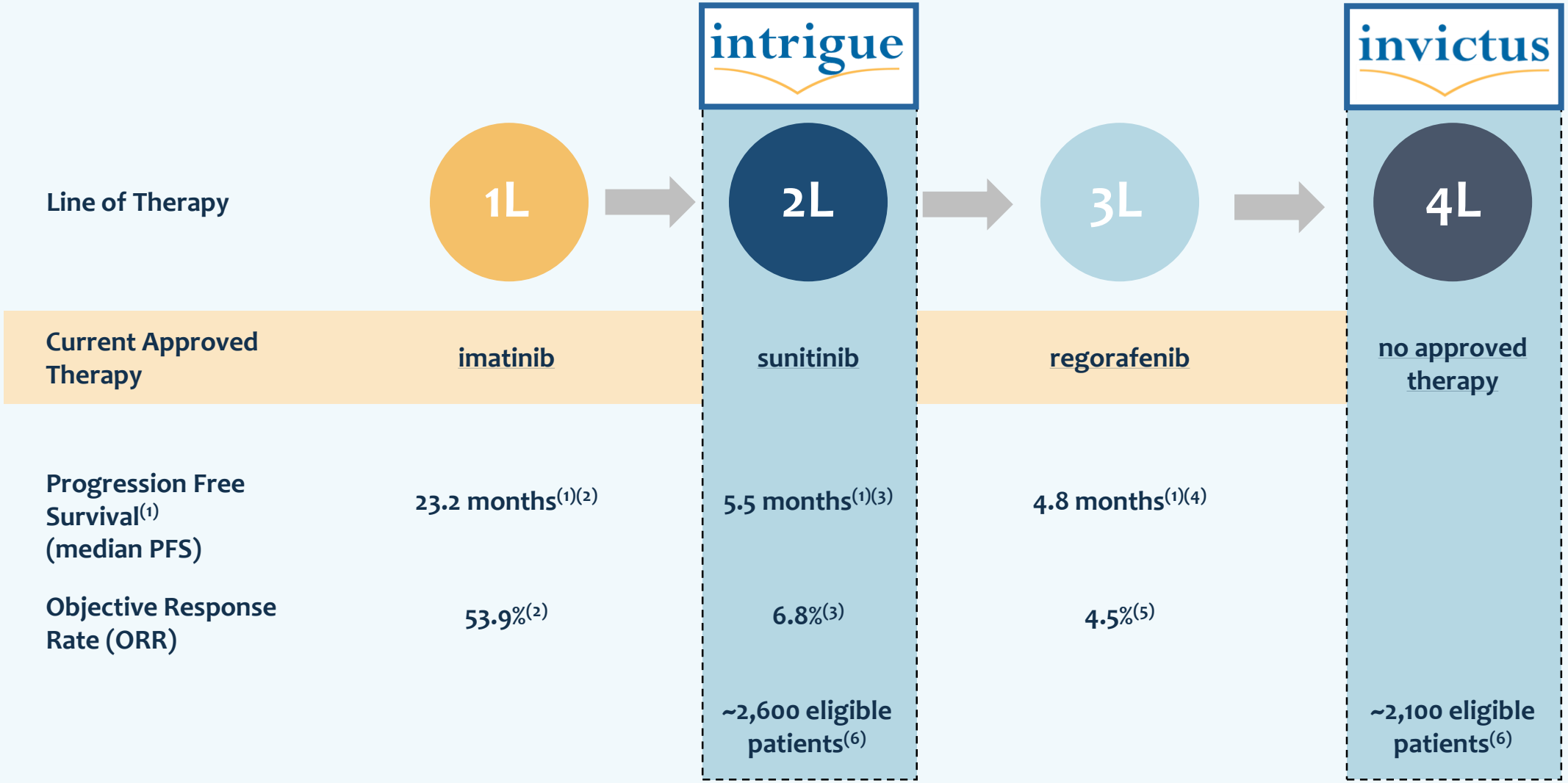
- Gastrointestinal stromal tumors (GIST) are the most common sarcoma of the gastrointestinal tract (frequently found in the stomach or small intestine)[1]
- ~4,000-6,000 new GIST cases in the U.S. each year[2]
- GIST is driven by a spectrum of mutations that can cause drug resistance and limits efficacy of existing therapies[3]
  - Mutations in KIT Drive ~80% of GIST
  - Resistance develops most commonly due to secondary mutations in KIT
  - Multiple drug-resistant mutations often arise in individual tumors
- Response to medications can vary by mutation type (KIT, PDGFRα, other mutations) and mutation location (exon 9, 11, etc.)[3]
  - Majority of patients with KIT primary mutations respond to 1st line imatinib
  - Approved 2nd and 3rd line agents (sunitinib and regorafenib, respectively) confer modest clinical benefit compared to imatinib



Domain	Gene	1° Mutation Frequency	2° Mutation Frequency
D5	*KIT*	10%	
JM	*KIT*	67	
	PDGFRA	1	
TK1	*KIT*	1	56
	PDGFRA	1	
A-Loop	*KIT*	1	41
	PDGFRA D842V	5	
	PDGFRA	1	3

Sources: (1) National Comprehensive Care Network NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines), Soft Tissue Sarcoma (v2 2019), Accessed July 17, 2019; (2) American Cancer Society, Key Statistics for Gastrointestinal Stromal Tumors, Accessed July 17, 2019; (3) Antonescu CR, DeMatteo RP. CCR 20th Anniversary Commentary: A Genetic Mechanism of Imatinib Resistance in Gastrointestinal Stromal Tumor – Where Are We a Decade Later? Clin Cancer Res. 2015;12(15)363-3365.

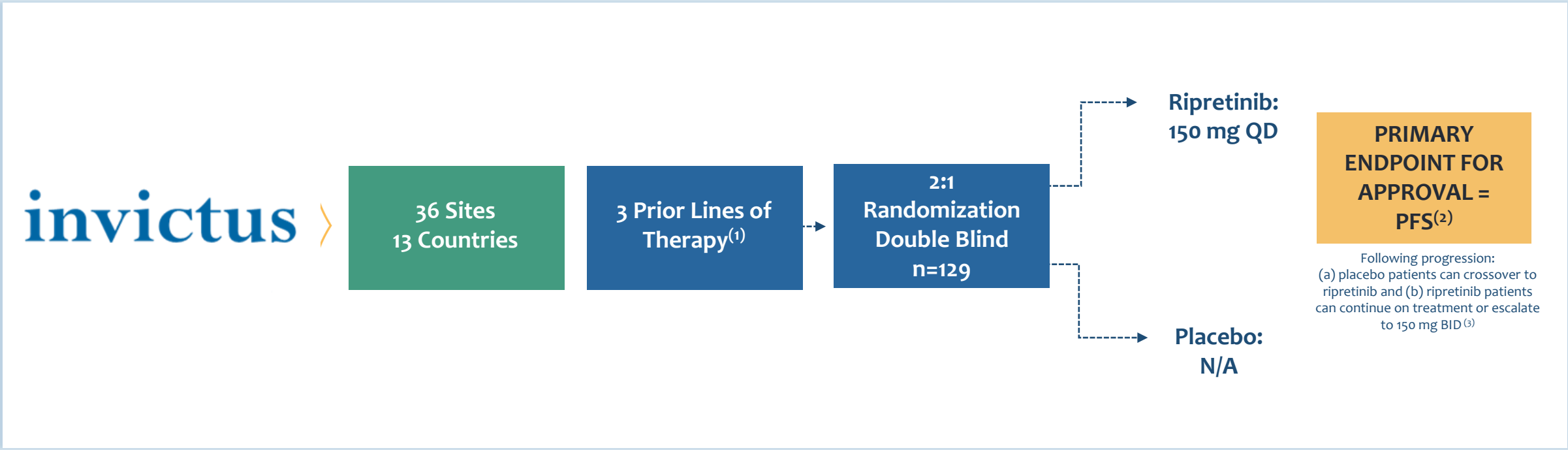
Ripretinib Opportunity in GIST



Notes: (1) Includes progression free survival and time to progression converted to weeks; (2) Gleevec [package insert]. Stein, Switzerland: Novartis; 2008; (3) Sutent [package insert]. New York, NY: Pfizer; 2011; (4) Stivarga [package insert]. Germany: Bayer Healthcare; 2013; (5) Demetri, George D et al. "Efficacy and safety of regorafenib for advanced gastrointestinal stromal tumours after failure of imatinib and sunitinib (GRID): an international, multicentre, randomised, placebo-controlled, phase 3 trial." Lancet. 2013; 381(9863):295–302; (6) Internal Deciphera estimates for annual incidence of treatment eligible new patients with KIT mutation per line based on applying epidemiology data reported in the following publications to population estimates for US: Zhao et al. J Gastrointest Oncol 2012;3(3):189-208; Metaxas Y, et al. ESMO Open 2016.

INVICTUS: Positive Top-line Results in Patients with ≥4th line GIST

INVICTUS: Global Pivotal Phase 3 Study in ≥4th Line GIST



Notes: (1) Phase 3 pivotal study in patients with ≥4th line GIST who previously received at least imatinib, sunitinib, and regorafenib; (2) PFS = progression free survival; (3) BID = twice daily.

INVICTUS Achieved Primary Endpoint of Progression Free Survival

	Ripretinib (n = 85)	Placebo (n = 44)[1]	p-value
mPFS[2]	6.3 months (27.6 weeks)	1.0 month (4.1 weeks)	< 0.0001
ORR[3]	9.4%	0%	0.0504
mOS[4]	15.1 months	6.6 months	Nominal p-value = 0.0004[5]

Significantly reduced the risk of disease progression or death by 85% (Hazard Ratio of 0.15, p-value < 0.0001) compared to placebo

NDA filing for the treatment of patients with advanced GIST who have received prior treatment with imatinib, sunitinib and regorafenib expected 1Q 2020

Notes: (1) One patient was randomized to placebo but did not receive study drug; (2) mPFS = median progression free survival; (3) ORR = objective response rate; (4) mOS = median overall survival; (5) According to the pre-specified hierarchical testing procedure of the endpoints, the hypothesis testing of mOS cannot be formally conducted unless the test of ORR is statistically significant. Because statistical significance was not achieved for ORR, the hypothesis testing of OS was not formally performed.

Ripretinib Was Generally Well Tolerated

TEAEs in >15% of Patients

Treatment Emergent Adverse Event (TEAE)	Placebo (N=43)[1]	Ripretinib 150mg Daily (N=85)
Any event	42 (98%)	84 (99%)
Alopecia	2 (5%)	44 (52%)
Fatigue	10 (23%)	36 (42%)
Nausea	5 (12%)	33 (39%)
Abdominal pain	13 (30%)	31 (36%)
Constipation	8 (19%)	29 (34%)
Myalgia	5 (12%)	27 (32%)
Diarrhea	6 (14%)	24 (28%)
Decreased appetite	9 (21%)	23 (27%)
Palmar-plantar erythrodysaesthesia syndrome	0	18 (21%)
Vomiting	3 (7%)	18 (21%)
Headache	2 (5%)	16 (19%)
Weight decreased	5 (12%)	16 (19%)
Arthralgia	2 (5%)	15 (18%)
Blood bilirubin increased	0	14 (16%)
Oedema peripheral	3 (7%)	14 (16%)
Muscle spasms	2 (5%)	13 (15%)

Notes: (1) One patient was randomized to placebo but did not receive study drug and, therefore, was not included in the safety population.

- Grade 3 or 4 TEAEs >5% of patients in the ripretinib arm were anemia (9%; n=8), abdominal pain (7%; n=6) and hypertension (7%; n=6)
- Grade 3 or 4 TEAEs >5% of patients in the placebo arm were anemia (14%; n=6)

Summary of Top-line Results for INVICTUS Phase 3 Study

Ripretinib achieved Primary Endpoint:
median PFS of 6.3 Months vs. Placebo of 1.0 Month;
Hazard Ratio of 0.15, p<0.0001

Ripretinib was generally well tolerated

Additional results expected to be presented at an upcoming medical meeting

NDA submission for the treatment of patients with advanced GIST who have received prior treatment with imatinib, sunitinib and regorafenib expected 1Q 2020

Updated Phase 1 Data in GIST Patients

Phase 1: Positive Updated Results Across All Lines of Treatment ≥100 mg/d (n=178)

Data cut-off of March 1, 2019 is ~6 months from data cut-off at ESMO 2018

Line of Therapy[1]	**Objective Response Rate by Best Response** Includes Unconfirmed (Confirmed Only)[2]	Disease Control Rate at 3 Months[2]	Median Progression Free Survival (mPFS)[2]	Censored Patients for mPFS[2]	Mean Treatment Duration[3][4]
2nd Line (n=37)	30% (22%)	81%	42 weeks	38%	43 weeks
3rd Line (n=31)	23% (13%)	80%	40 weeks	32%	48 weeks
4th Line (n=60)	15% (8%)	73%	30 weeks	30%	49 weeks
≥4th Line (n=110)[4]	11% (7%)	66%	24 weeks	22%	41 weeks

(1) Overall number of patients (n=178) remains the same as prior data presented at ESMO 2018; based on additional data cleaning, one patient from each of 2nd line and 4th/≥4th line were reclassified as 3rd line patients; (2) RECIST data per investigator assessment; (3) Median treatment durations were: 2nd line = 44 weeks, 3rd line = 48 weeks, 4th line = 46 weeks and ≥4th line = 29 weeks (4) Includes 60 patients who elected for intra-patient dose escalation from 150 mg QD to 150 mg BID; (4) Number of patients in ≥4th line includes 60 patients from 4th line.

Key Updates from Phase 1 GIST Patients ≥100 mg/d

Supports ripretinib's potential across the broad range of KIT and PDGFRα mutations known to occur in patients with GIST post-imatinib

Updated ≥4th line data support potential commercial opportunity

- Encouraging clinical activity in 4th line GIST
- Extended treatment duration in ≥4th line GIST

Updated 2nd line data support ongoing INTRIGUE Phase 3 study

- mPFS sustained with 6 months of additional data maturity
- ORR and DCR increased since last data cut

Ripretinib was generally well tolerated

- Updated adverse events were consistent with previously presented Phase 1 data
- Most common treatment-emergent grade 3/4 adverse events ≥5% patients were lipase increase, anemia, hypertension and abdominal pain

INTRIGUE: Ongoing Global Pivotal Phase 3 Study in 2nd Line GIST

Notes: (1) Number of open sites current as of August 12, 2019; (2) Phase 3 pivotal study in 2nd line patients who previously received imatinib; (3) PFS = progression free survival.

Strength of Data Reinforces Potential of Ripretinib in GIST

COMPELLING TOPLINE RESULTS IN INVICTUS

NDA SUBMISSION EXPECTED 1Q 2020

INTRIGUE STUDY SUPPORTED BY UPDATED PHASE 1 DATA

Significant 2019 Milestones Across the Pipeline

Ripretinib	✓ Top-line INVICTUS Data (≥4th Line GIST: Pivotal Phase 3 Results) ✓ Phase 1 Data Update INVICTUS Data Presented at Medical Meeting (2H 2019) Phase 1 Data Presented at Medical Meeting (2H 2019)
Rebastinib	✓ Phase 1b/2 Carboplatin Combination Initiated (1H 2019) ✓ Part 1 of the Phase 1b/2 Paclitaxel Combination Completed Enrollment (1H 2019) Part 1 of the Phase 1b/2 Paclitaxel Combination Data Presented at Medical Meeting (2H 2019)
DCC-3014	✓ Phase 1 Dose Escalation Presentation (1H 2019) Phase 1 Escalation Data Update Presented at Medical Meeting (2H 2019)
Discovery Platform	✓ New Clinical Candidate - DCC-3116: Selective ULK Inhibitor. Potential First-in-Class Autophagy Inhibitor to Treat mRAS Cancers (1H 2019) ✓ Initiate IND-enabling Studies (1H 2019)


THANK YOU.