UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT
Pursuant to Section 13 or 15(d)
of the Securities Exchange Act of 1934

Date of Report (Date of Earliest Event Reported): **December 1, 2016**

Blueprint Medicines Corporation
(Exact name of registrant as specified in its charter)

Delaware	**001-37359**	**26-3632015**
(State or other jurisdiction of incorporation)	(Commission File Number)	(I.R.S. Employer Identification No.)

38 Sidney Street, Suite 200 **Cambridge, Massachusetts**	**02139**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **(617) 374-7580**

(Former name or former address, if changed since last report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Item 8.01 Other Items.

On December 1, 2016 in an oral presentation at the 28th EORTC-NCI-AACR Symposium on Molecular Targets and Cancer Therapeutics in Munich, Germany (the "EORTC-NCI-AACR Symposium"), Blueprint Medicines Corporation (the "Company") presented initial data from the dose escalation stage of its ongoing Phase 1 clinical trial evaluating BLU-285 for the treatment of advanced gastrointestinal stromal tumors ("GIST"). BLU-285 is an orally available, potent and highly selective inhibitor that targets D842V mutant PDGFRα and Exon 17 mutant KIT. A copy of the slide presentation is filed as Exhibit 99.1 to this Current Report on Form 8-K and incorporated herein by reference.

Cautionary Note Regarding Forward-Looking Statements

This Current Report on Form 8-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including, without limitation, statements regarding plans and timelines for the clinical development of BLU-285; and the Company's ability to implement its clinical development plans for BLU-285 for the treatment of advanced GIST. The words "may," "will," "could," "would," "should," "expect," "plan," "anticipate," "intend," "believe," "estimate," "predict," "project," "potential," "continue," "target" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Any forward-looking statements in this Current Report on Form 8-K are based on management's current expectations and beliefs and are subject to a number of risks, uncertainties and important factors that may cause actual events or results to differ materially from those expressed or implied by any forward-looking statements contained in this Current Report on Form 8-K, including, without limitation, risks and uncertainties related to the delay of any current or planned clinical trials or the development of BLU-285; the Company's advancement of multiple early-stage efforts; the Company's ability to successfully demonstrate the efficacy and safety of its drug product candidates; the preclinical and clinical results for the Company's drug product candidates, which may not support further development of such drug product candidates; and actions of regulatory agencies, which may affect the initiation, timing and progress of clinical trials; the Company's ability to develop and commercialize companion diagnostics for its current and future drug candidates, including companion diagnostics for BLU-285 with QIAGEN Manchester Limited; and the success of the Company's rare genetic disease collaboration with Alexion Pharma Holding and its cancer immunotherapy collaboration with F. Hoffmann-La Roche Ltd and Hoffmann-La Roche Inc. These and other risks and uncertainties are described in greater detail in the section entitled "Risk Factors" in the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2016, as filed with the Securities and Exchange Commission ("SEC") on November 10, 2016, and other filings that Blueprint Medicines may make with the SEC in the future. Any forward-looking statements contained in this Current Report on Form 8-K represent the Company's views only as of the date hereof and should not be relied upon as representing its views as of any subsequent date. The Company explicitly disclaims any obligation to update any forward-looking statements.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits.

Exhibit No.	Description
99.1	Slide presentation by Blueprint Medicines Corporation on December 1, 2016 at the EORTC-NCI-AACR Symposium

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

BLUEPRINT MEDICINES CORPORATION

Date: December 1, 2016

By: /s/ Jeffrey W. Albers
Jeffrey W. Albers
Chief Executive Officer

EXHIBIT INDEX

Exhibit No.	Description
99.1	Slide presentation by Blueprint Medicines Corporation on December 1, 2016 at the EORTC-NCI-AACR Symposium

Preliminary safety and activity in a first-in-human Phase 1 study of BLU-285, a potent, highly selective inhibitor of KIT and PDGFRα activation loop mutants in advanced gastrointestinal stromal tumor (GIST)

Michael Heinrich[1], Robin Jones[2], Patrick Schoffski[3], Sebastian Bauer[4], Margaret von Mehren[5], Ferry Eskens[6], Philippe Cassier[7], Olivier Mir[8], Hongliang Shi[9], Terri Alvarez-Diez[9], Mary Ellen Healy[9], Beni Wolf[9], Suzanne George[10]

[1]Oregon Health & Sciences University, Oregon, USA; [2]Royal Marsden Hospital/Institute of Cancer Research, London, UK; [3]Leuven Cancer Institute, Leuven, Belgium; [4]University of Essen, Essen, Germany; [5]Fox Chase Cancer Center, Pennsylvania, USA; [6]Erasmus MC Cancer Institute, Rotterdam, Netherlands; [7]Centre Leon Berard, Lyon, France; [8]Institut Gustave Roussy, Paris, France; [9]Blueprint Medicines Corporation, Massachusetts, USA; [10]Dana-Farber Cancer Institute, Massachusetts, USA

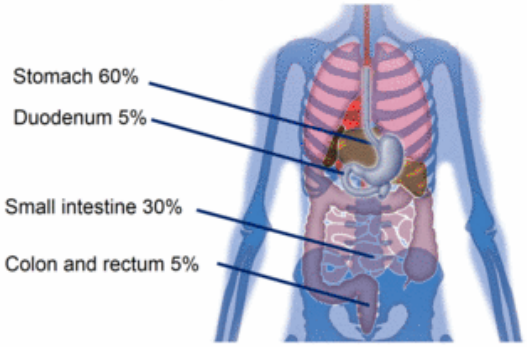
EORTC-NCI-AACR Molecular Targets and Cancer Therapeutics Symposium,
Munich, Germany,
01 Dec 2016

Disclosures

- BLU-285 is an investigational agent currently in development by Blueprint Medicines Corporation (Blueprint Medicines)
- Dr. Michael Heinrich is an investigator for Blueprint Medicines' ongoing Phase 1 study in unresectable gastrointestinal stromal tumor
- Dr. Michael Heinrich has the following disclosures:
  - Consultant: Blueprint Medicines, Novartis, MolecularMD
  - Equity interest: MolecularMD
  - Research funding: Blueprint Medicines, Deciphera, Ariad
  - Expert testimony: Novartis
  - Patents: four patents on diagnosis and treatment of PDGFRα-mutant GIST

Gastrointestinal Stromal Tumor (GIST)

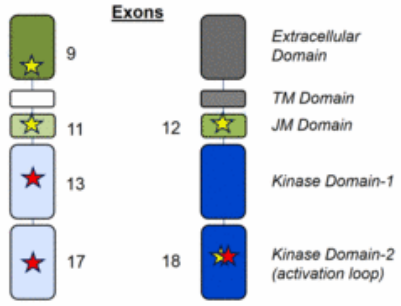
Most common GI sarcoma



- Cancer of the interstitial cells of Cajal
- Primary tumor usually presents as a stomach or intestinal mass
- Metastatic recurrences spread to liver, peritoneum, and other distant sites
- Chemotherapy has no impact

Activating RTK mutations drive metastatic GIST

KIT ~ 80% PDGFRα ~ 8%

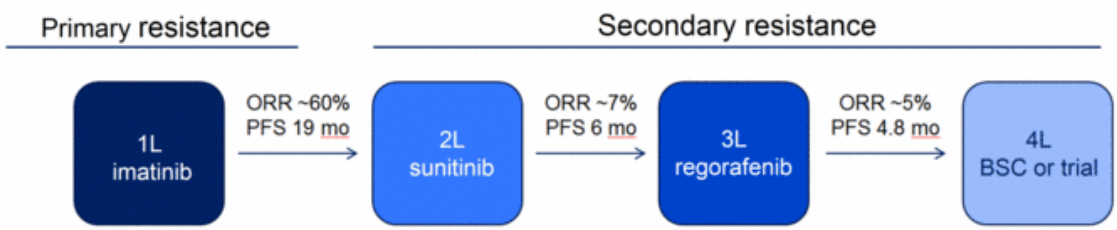


- Primary mutational hotspots ☆
  - KIT Exons 9 or 11
  - PDGFRα D842V Exons 12 and 18
- Resistance mutations ★
  - KIT Exons 13 and 17
  - PDGFRα D842V Exon 18

GI, gastrointestinal; JM, juxtamembrane; KIT, receptor tyrosine kinase protein; PDGFRα, platelet-derived growth factor receptor; RTK, receptor tyrosine kinase; TM, transmembrane

Barnett & Heinrich (2012) Am Soc Clin Oncol Educ Book;663; Nowain et al (2005) J Gastroen Heptol;20:818; Dematteo et al (2000) Ann Surg;231:51;
Plumb et al (2013) Clin Radiol;68:770; Joensuu (2006) 17 Suppl 10:x280

Advanced GIST has high medical need



	Prevalence	
Resistance mutation	**Primary**	**Secondary**
KIT Exon 17	~ 1%	2L ~ 20% 3L ~ 90%
PDGFRα D842V	~ 5-6%	rare

- Activation loop mutations are associated with resistance to therapy
- Approved agents are ineffective against PDGFRα D842V
  - ORR ~ 0%
  - mPFS ~ 3 months

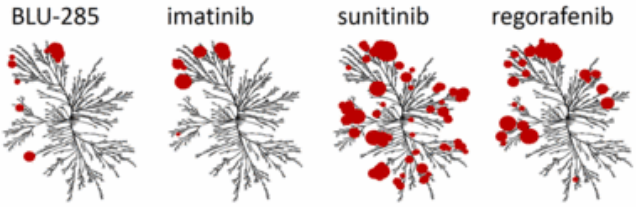
mPFS, median progression-free survival; ORR, objective response rate; PFS, progression-free survival

Cassier (2012) CCR;*18:4458*; Yoo (2016) Can Res Treat;48:546; Corless (2005) JCO;*23:5357*; Barnett and Heinrich (2012) Am Soc Clin Onc Ed Book: 663; Demetri (2006) Lancet;*368:1329*; Demetri (2013) Lancet;*381:295-302*

BLU-285 is a highly potent and selective inhibitor of KIT and PDGFRα activation loop mutants

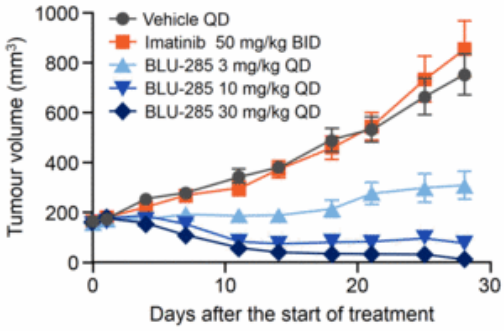
Biochemical profiles

	Activation loop		JM domain/ activation loop
	Exon 18	Exon 17	Exon 11/17
Compound	**PDGFRα D842V IC_{50} nM**	**KIT D816V IC_{50} nM**	**KIT V560G/D816V IC_{50} nM**
BLU-285	0.24	0.27	0.10
imatinib	759	8150	6145
sunitinib	120	207	97.2
regorafenib	810	3640	1685



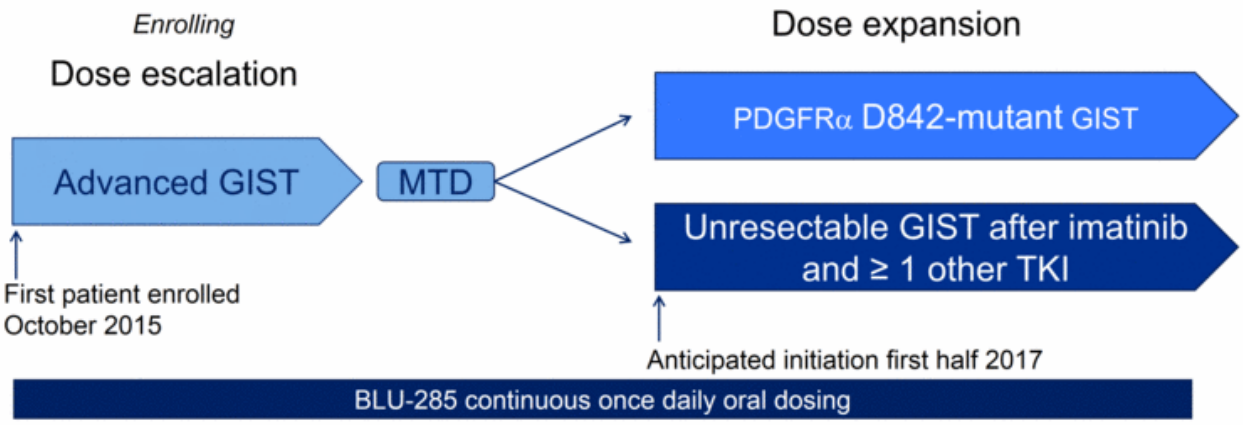
BID, twice daily; IC_{50}, half maximal inhibitory concentration; PDX, patient derived xenograft; QD, once daily
Kinome illustration reproduced courtesy of Cell Signaling Technology, Inc. (www.cellsignal.com)

Tumor regression in KIT exon 11/17* mutant GIST PDX



*del556-558/Y823D

BLU-285 Phase 1 study



- Primary objectives – determine the MTD and RP2D, and assess safety and tolerability
- Secondary objectives – PK, mutational status, anti-tumor activity

MTD, maximum tolerated dose; PK, pharmacokinetics; RP2D, recommended Phase 2 dose; TKI, tyrosine-kinase inhibitor
NCT02508532

Demography and baseline patient characteristics

Parameter	All patients, N = 36
Age (years), median (range)	61 (41 – 77)
	n (%)
GIST subtype	
KIT mutant	18 (50)
PDGFRα mutant	18 (50)
Metastatic Disease	35 (97)
Largest target lesion size (cm)	
≤ 5	8 (22)
> 5 – ≤ 10	12 (33)
> 10	14 (39)
pending	2 (6)
#Prior TKI, median (range)	3.5 (0 – 12)
≤ 2	12 (33)
> 2	24 (67)

Data are preliminary and based on a cut off date of 1 November 2016

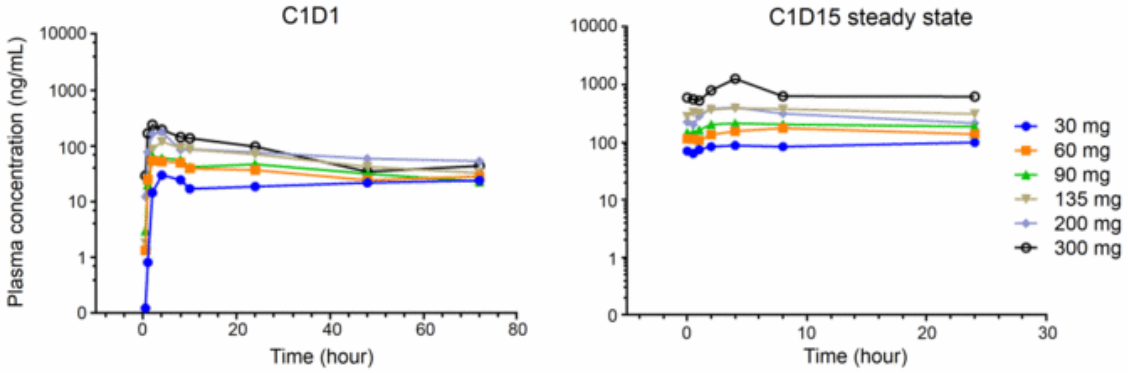
Initial dose escalation results

- Patients with unresectable GIST
  - Prior imatinib and ≥ 1 TKI
  - PDGFRα D842 mutation regardless of prior therapy
- 3 + 3 dose escalation with additional accrual to dose levels declared safe at a dose escalation meeting
- 36 patients enrolled over 12 months
- MTD has not been reached

BLU-285 mg/day	Patients treated by dose N = 36
30	3 + 2 enrichment
60	3 + 3 enrichment
90	3 + 3 enrichment
135	3 + 3 enrichment
200	3 + 2 enrichment
300	3 + 1 enrichment
400	4

- 75% (n=27) of patients remain on treatment, range 0.8 – 12.3 months
- All PDGFRα patients remain on treatment
- 9 patients off treatment (all due to progressive disease)

BLU-285 pharmacokinetics support once daily dosing

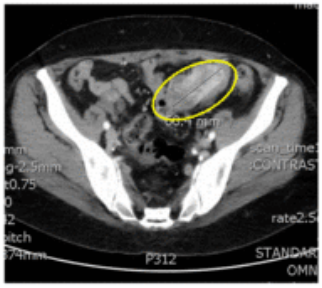


- Half-life > 24 hour, supporting QD dosing
- Relatively rapid absorption: T_{max} ~ 2 – 8 hr
- Accumulation in plasma: 2.5 – 4.7 -fold after 15 days
- Exposure at 300 mg is at low end of predicted therapeutic range based on KIT Exon 17 mutant xenograft studies

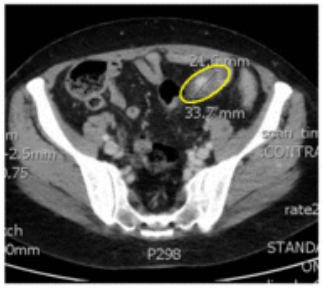
C1D1, Cycle 1 Day 1; C1D15, Cycle 1 Day 15; T_{max}, time at which C_{max} is observed; QD, once daily

Radiographic response per RECIST 1.1 in PDGFRα D842V GIST (dose level 1, 30 mg)

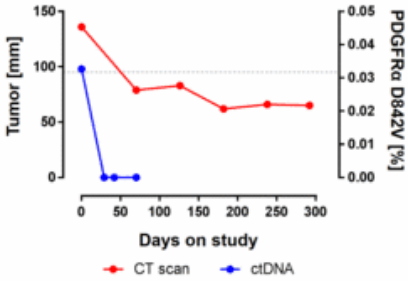
Baseline



After 8 weeks, partial response (-42%)



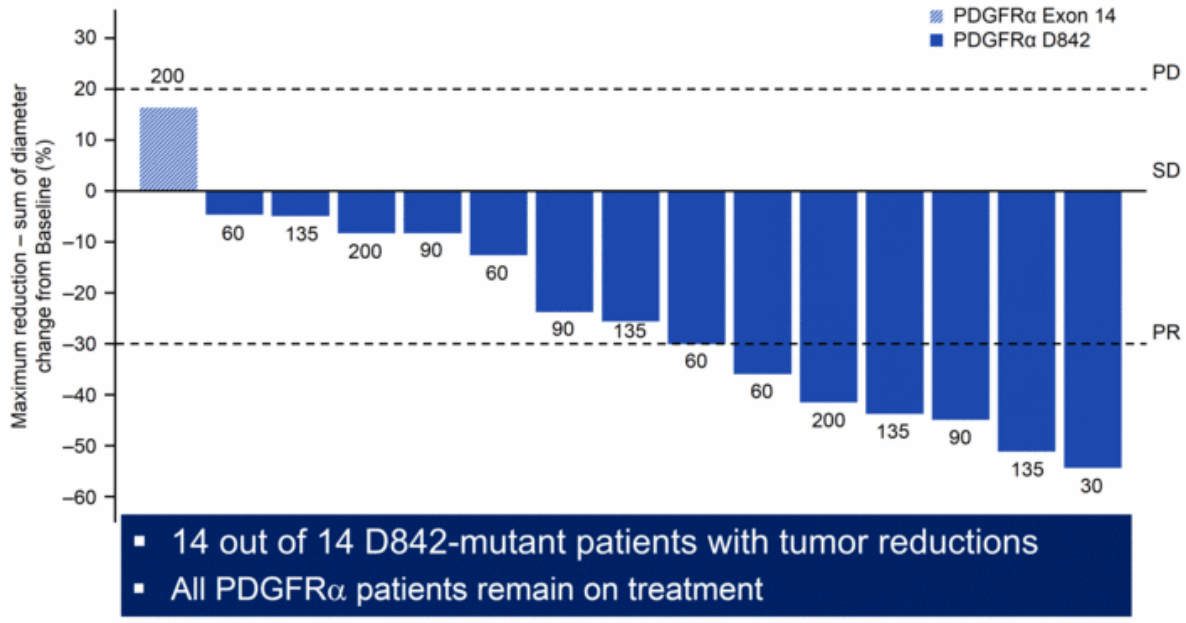
Rapid PDGFRα D842V ct-DNA decline



- *65 yo female, Primary Gastric GIST, PDGFRα D842V*
  - Previous surgical de-bulking: stomach; peritoneal metastases x 2; colon
  - Prior response to crenolanib followed by progression
  - Progression on prior dasatinib (no response)
  - Ongoing at Cycle 13 with confirmed partial response (-52% per RECIST 1.1)

CT, computerized tomography; ct-DNA, circulating tumor DNA; PR, partial response; RECIST, Response Evaluation Criteria in Solid Tumors

Strong clinical activity against PDGFRα D842-mutant GIST at all dose levels

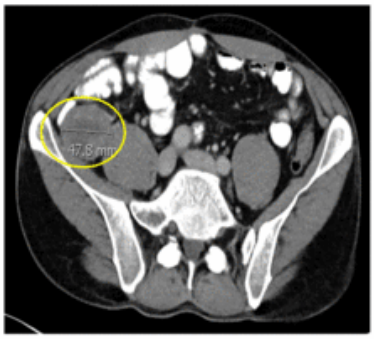


- 14 out of 14 D842-mutant patients with tumor reductions
- All PDGFRα patients remain on treatment

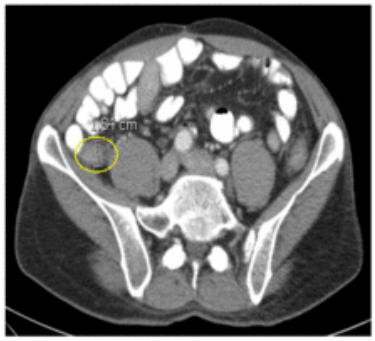
The values above/below the bars denote the dose level (mg) QD received by each patient
SD, stable disease; PD, progressive disease; PR, partial response

Radiographic response per RECIST 1.1 in heavily pretreated KIT Exon 11/17 GIST (dose level 4, 135 mg)

Baseline

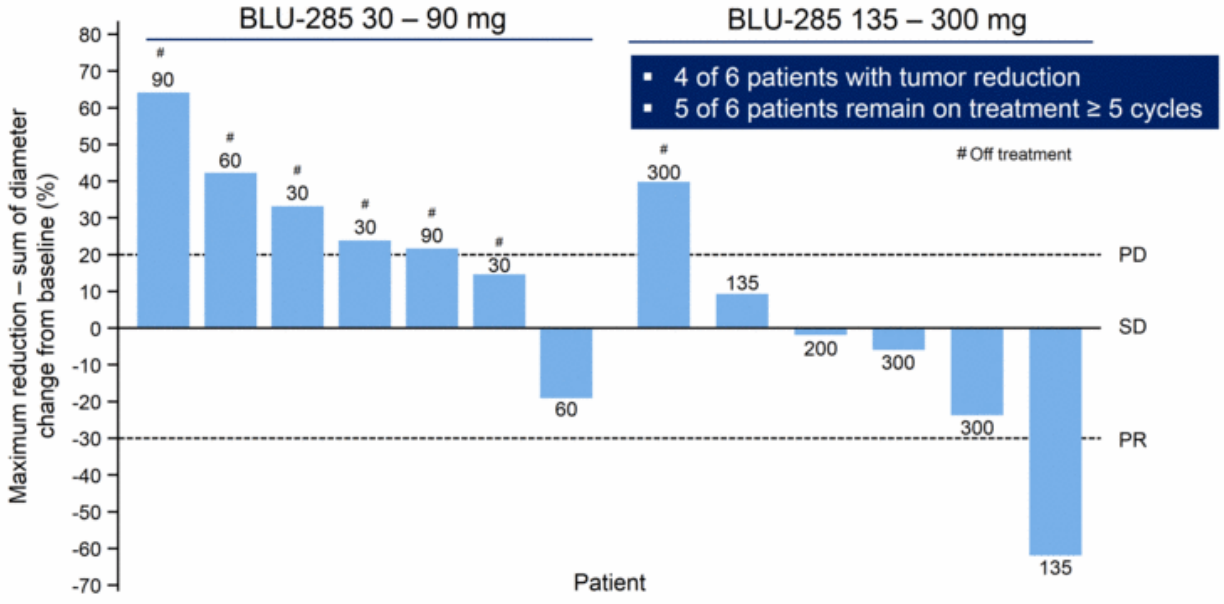


After 24 weeks,
partial response (-62%)



- 57 year old male, KIT Exon 11 (delWK557-8)/Exon 17 (D816V) mutations
  - Prior imatinib, sunitinib, nilotinib, sorafenib, imatinib + BKM120
  - Ongoing at Cycle 8 with confirmed partial response per RECIST 1.1

KIT GIST - early dose-response relationship



NB: The values above/below the bars denote the dose level (mg) QD received by each patient

Best radiographic response with BLU-285 per RECIST 1.1

Best response (per investigator)	PDGFRα N=15 n (%)	KIT N=13 n (%)	Total N=28 n (%)
PR	6 (40)	1 (8)	7 (25)
SD	9 (60)	6 (46)	15 (54)
DCR (PR +SD)	15 (100)	7 (54)	22 (79)
PD	0	6 (46)	6 (21)

- Of 7 partial responses, 6 confirmed; 1 pending (still on treatment)

DCR, disease control rate

Adverse events associated with BLU-285

- No DLTs or treatment-related Grade 4 – 5 AEs
- No patient discontinued BLU-285 due to treatment-related toxicity
- 11 (31%) patients had Grade 3 or higher AEs; of these, 3 were considered treatment-related:
  - 1 patient with Grade 3 nausea and vomiting
  - 1 patient with Grade 3 anemia and intratumoral hemorrhage
  - 1 patient with Grade 3 hypophosphatemia
- AEs occurring in ≥ 20% of patients
  - Nausea (42%)
  - Vomiting (33%)
  - Peripheral edema (31%)
  - Fatigue (28%)
  - Constipation (22%)

AE, adverse event; DLT, dose limiting toxicity

Summary

- BLU-285 has been well tolerated on a QD schedule at doses of 30 – 400 mg
- Half-life > 24 hours, supports QD dosing
- BLU-285 demonstrates strong clinical activity in PDGFRα D842-mutant GIST at all dose levels
- Significant anti-tumor activity in TKI-resistant, KIT-mutant GIST observed at doses ≥ 135 mg with tumor reduction in 4 of 6 patients, including 1 PR
- Dose escalation continues with the goal of maximizing clinical activity in KIT-mutant GIST and to define the MTD and RP2D
- Anticipate initiation of expansion cohorts in first half of 2017

Acknowledgments

- We thank the participating patients, their families, all study co-investigators, and research coordinators at the following institutions:
  - Oregon Health & Sciences University
  - Royal Marsden Hospital/Institute for Cancer Research
  - Leuven Cancer Institute
  - University of Essen
  - Fox Chase Cancer Center
  - Erasmus MC Cancer Institute
  - Centre Leon Berard
  - Institut Gustave Roussy
  - Dana-Farber Cancer Institute