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): **January 8, 2018**

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:

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

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Item 7.01 Regulation FD Disclosure.

Blueprint Medicines Corporation (the "Company") from time to time presents and/or distributes to the investment community at various industry and other conferences slide presentations to provide updates and summaries of its business. The Company is posting to the "Investors" portion of its website at http://ir.blueprintmedicines.com/ a copy of its current corporate slide presentation. These slides are attached to this Current Report on Form 8-K as Exhibit 99.1. The Company undertakes no obligation to update, supplement or amend the materials attached hereto as Exhibit 99.1.

The information in Item 7.01 of this Current Report on Form 8-K, including Exhibit 99.1 attached hereto, is intended to be furnished and shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as expressly set forth by specific reference in such filing.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits.

Exhibit No.	Description
99.1	Corporate slide presentation of Blueprint Medicines Corporation dated January 8, 2018

EXHIBIT INDEX

Exhibit No.	Description
99.1	Corporate slide presentation of Blueprint Medicines Corporation dated January 8, 2018

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: January 8, 2018

By: /s/ Tracey L. McCain
Tracey L. McCain
Chief Legal Officer


blueprint MEDICINES
A blueprint for a healthier tomorrow
January 8, 2018

Forward-looking statements

This presentation contains forward-looking statements as defined in the Private Securities Litigation Reform Act of 1995, as amended. 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.

In this presentation, forward-looking statements include, without limitation, statements about plans and timelines for the development of avapritinib (formerly known as BLU-285), BLU-554, BLU-667 and BLU-782 and the ability of Blueprint Medicines Corporation (the "Company") to implement those clinical development plans; the potential benefits of the Company's current and future drug candidates in treating patients; plans and timelines for regulatory submissions, filings or discussions; plans and timelines for the development and commercialization of companion diagnostics for the Company's current or future drug candidates; plans and timelines for current or future discovery programs; plans and timelines for any current or future collaborations with strategic partners; expectations regarding the Company's existing cash, cash equivalents and investments or the future financial performance of the Company; expectations regarding potential milestones; and the Company's strategy, business plans and focus. The Company has based these forward-looking statements on management's current expectations, assumptions, estimates and projections. While the Company believes these expectations, assumptions, estimates and projections are reasonable, such forward-looking statements are only predictions and involve known and unknown risks, uncertainties and other important factors, many of which are beyond the Company's control and may cause actual results, performance or achievements to differ materially from those expressed or implied by any forward-looking statements. These risks and uncertainties include, without limitation, risks and uncertainties related to the delay of any current or planned clinical trials or the development of the Company's drug candidates, including avapritinib, BLU-554, BLU-667 and BLU-782; the Company's advancement of multiple early-stage efforts; the Company's ability to successfully demonstrate the efficacy and safety of its drug candidates; the preclinical and clinical results for the Company's drug candidates, which may not support further development of such drug candidates; actions or decisions of regulatory agencies or authorities, which may affect the initiation, timing and progress of clinical trials; the Company's ability to obtain, maintain and enforce patent and other intellectual property protection for any drug candidates it is developing; the Company's ability to develop and commercialize companion diagnostic tests for its current and future drug candidates, including companion diagnostic tests for BLU-554 for FGFR4-driven HCC, avapritinib for PDGFRα D842V-driven GIST and BLU-667 for RET-driven non-small cell lung cancer; and the success of the Company's 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 under "Risk Factors" in the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2017, as filed with the Securities and Exchange Commission ("SEC") on October 31, 2017, and any other filings the Company has made or may make with the SEC in the future. The Company cannot guarantee future results, outcomes, levels of activity, performance, developments, or achievements, and there can be no assurance that the Company's expectations, intentions, anticipations, beliefs, or projections will result or be achieved or accomplished. The forward-looking statements in this presentation are made only as of the date hereof, and except as required by law, the Company undertakes no obligation to update any forward-looking statements contained in this presentation as a result of new information, future events or otherwise.

This presentation also contains estimates, projections and other statistical data made by independent parties and by the Company relating to market size and growth and other data about the Company's industry. These data involve a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. In addition, projections, assumptions and estimates of the Company's future performance and the future performance of the markets in which the Company operates are necessarily subject to a high degree of uncertainty and risk.

A new way of looking at kinase medicines

Highly selective kinase medicines offer potential for improved potency, less off-target activity and increased probability of clinical success

SELECTIVE

AVAPRITINIB (FORMERLY BLU-285)

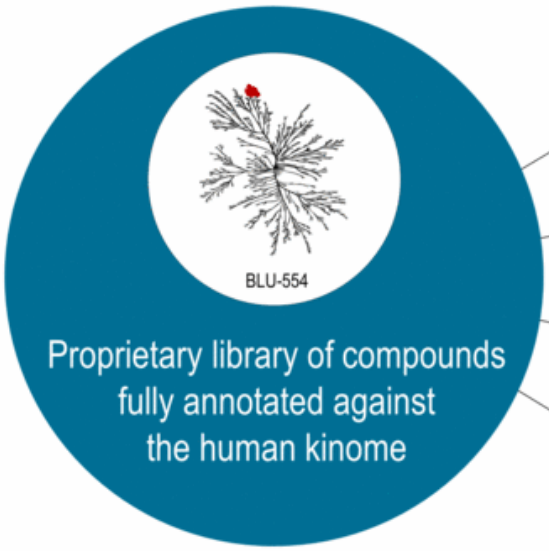
NON-SELECTIVE

SUNITINIB

MIDOSTAURIN

Kinome illustration reproduced courtesy of Cell Signaling Technology, Inc. (www.cellsignal.com) (CSTI). The foregoing website is maintained by CSTI, and Blueprint Medicines is not responsible for its content.

Proprietary library rapidly delivers transformative medicines



- Identify highly selective inhibitors of difficult to target disease drivers
- Eliminate inefficient drug discovery screening processes
- Accelerate time to development candidate selection
- Continuously enhance library to enable future discovery

Kinome illustration reproduced courtesy of Cell Signaling Technology, Inc. (www.cellsignal.com) (CSTI). The foregoing website is maintained by CSTI, and Blueprint Medicines is not responsible for its content.

Clinical strategy to rapidly bring transformative medicines to patients

GENOMIC DRIVER OF DISEASE ❯ **HIGHLY SELECTIVE KINASE MEDICINE** ❯ **SELECTED PATIENT POPULATION** ❯ **TARGET OUTCOMES**

- Achieve rapid clinical proof-of-concept
- Early go/no-go decisions
- Expedited development & regulatory approval
- Clear commercial value proposition

Kinome illustration reproduced courtesy of Cell Signaling Technology, Inc. (www.cellsignal.com) (CSTI). The foregoing website is maintained by CSTI, and Blueprint Medicines is not responsible for its content.

Realizing our vision for Blueprint Medicines

Deliver transformational genomically targeted medicines to patients

2014 – 2015

- STRATEGY
- LIBRARY
- TEAM

2016 – 2017

3 CLINICAL CANDIDATES WITH PROOF-OF-CONCEPT

2018 – 2019

- **4** CLINICAL CANDIDATES
- **6+** TUMOR TYPES & RARE DISEASES
- **2** TUMOR AGNOSTIC CLINICAL TRIALS
- **8+** RESEARCH PROGRAMS*

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* Includes up to 5 programs under the cancer immunotherapy collaboration with Roche.

Robust pipeline of diverse clinical and preclinical stage assets

DRUG CANDIDATE (TARGET)	DISCOVERY	PRECLINICAL	PHASE 1-2	PIVOTAL	COMMERCIAL RIGHTS
avapritinib (KIT & PDGFRα)	Phase 1 – Advanced PDGFRα-driven GIST				
	Phase 1 – Advanced 3L+ (KIT-driven) GIST				
	Phase 3 – Advanced 3L GIST (planned 1H 2018)				
	Phase 1 – Advanced systemic mastocytosis				
	Phase 2 – Advanced systemic mastocytosis (planned 1H 2018)				
	Phase 2 – Indolent and smoldering systemic mastocytosis (planned 2H 2018)				
BLU-554 (FGFR4)	Phase 1 – Advanced hepatocellular carcinoma				
BLU-667 (RET)	Phase 1 – Advanced NSCLC, thyroid and other cancers[1]				
BLU-782 (ALK2)	Fibrodysplasia ossificans progressiva				
2 undisclosed kinase targets					
Immunokinase targets	Up to 5 cancer immunotherapy programs; development stage undisclosed[2]				Roche

NSCLC, non-small cell lung cancer.
[1] Phase 1 trial includes a basket cohort that consists of other advanced solid tumors with RET alterations.
[2] Blueprint Medicines has U.S. commercial rights for up to two programs. Roche has worldwide commercialization rights for up to three programs and ex-U.S. commercialization rights for up to two programs.

2018 key priorities and expected milestones

avapritinib

- Complete enrollment of registration-enabling trial in PDGFRα-driven GIST by mid-2018
- Initiate Phase 3 trial versus regorafenib in 3L GIST in 1H 2018
- Initiate registration-enabling Phase 2 trial in advanced systemic mastocytosis in 1H 2018
- Initiate Phase 2 trial in indolent and smoldering systemic mastocytosis in 2H 2018

Portfolio

- Initiate TKI-naïve expansion cohort in Phase 1 trial of BLU-554 in hepatocellular carcinoma in 1Q 2018
- Present dose escalation data and initiate expansion portion of Phase 1 trial of BLU-667 in RET-altered cancers in 1H 2018

Research

- Initiate IND-enabling studies for BLU-782 in fibrodysplasia ossificans progressiva in 1H 2018
- Nominate at least 2 additional discovery programs in 2018

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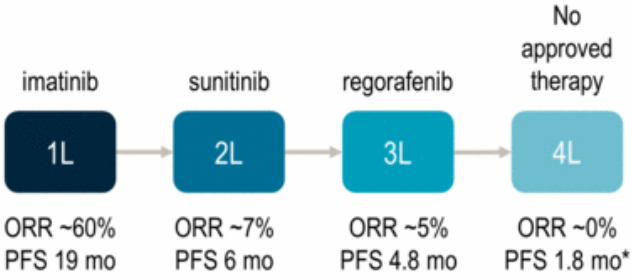
GIST, gastrointestinal stromal tumors.

Avapritinib is a potential pipeline within a single investigational medicine

SM, systemic mastocytosis.

Potent and selective KIT and PDGFRα inhibition with avapritinib has the potential to address important medical needs in GIST

No highly effective therapies beyond imatinib



- Approved agents are ineffective against PDGFRα D842V GIST

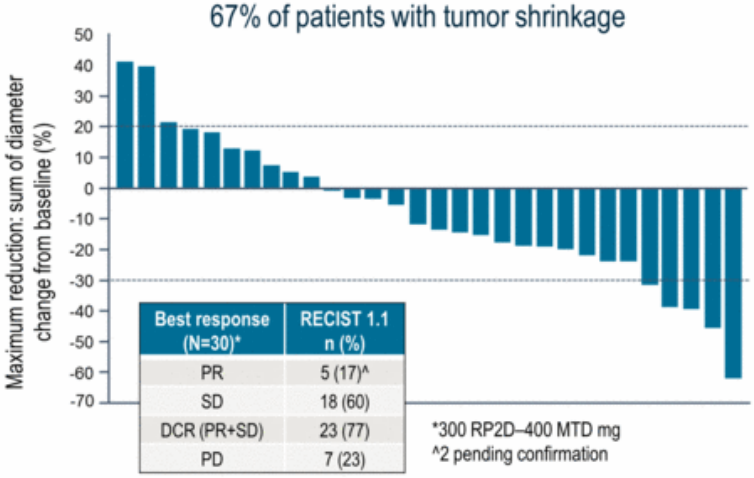
Significant global opportunity

Number of patients in major countries (US, EU5, Japan)**

ORR, objective response rate; PFS, progression free survival.
* Imatinib re-challenged. ** Represents estimated incidence of GIST patients (regardless of alteration) and PDGFRα D842V-driven GIST patients in major countries (US, EU5 and Japan). 3L+ GIST includes estimated incidence for 3L and 4L GIST.

Tumor reduction and prolonged PFS observed in GIST patients with multiple KIT genotypes[1] via central radiology review

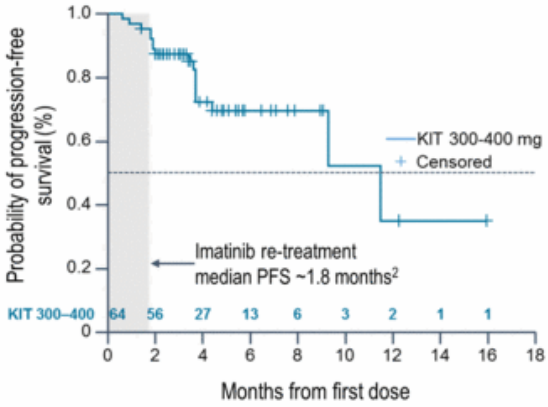
67% of patients with tumor shrinkage



Best response (N=30)*	RECIST 1.1 n (%)
PR	5 (17)^
SD	18 (60)
DCR (PR+SD)	23 (77)
PD	7 (23)

*300 RP2D–400 MTD mg
^2 pending confirmation

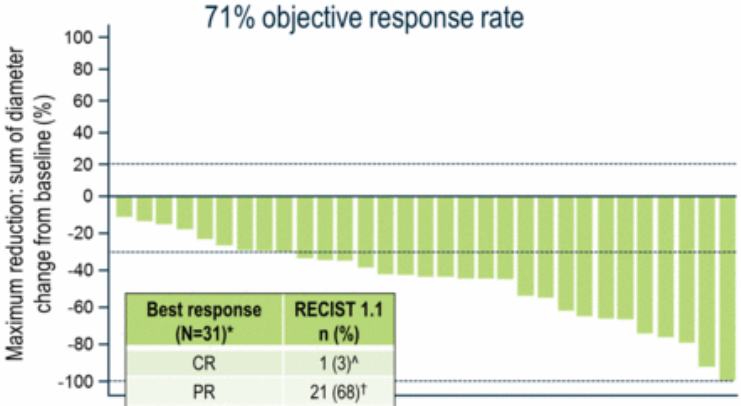
Median PFS 11.5 months; PFS at 6 months 69%



[1] KIT genotypes assessed by archival tumor and ctDNA.[2] Kang et al. Lancet Oncol. 2013;14(12):1175–82.
DCR, disease control rate; MTD, maximum tolerated dose; PD, progressive disease; PR, partial response; RP2D, recommended part 2 dose; SD, stable disease.
Data previously presented in November 2017 at the Connective Tissue Oncology Society (CTOS) Annual Meeting. Data cutoff: October 11, 2017.

Remarkable activity in PDGFRα D842-mutant GIST via central radiology review

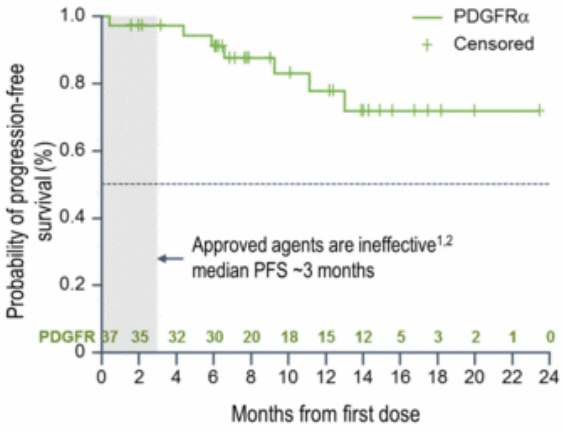
71% objective response rate



Best response (N=31)*	RECIST 1.1 n (%)
CR	1 (3)^
PR	21 (68)†
CR+PR	22 (71)
SD	9 (29)
DCR (CR+PR+SD)	31 (100)
PD	0

*All dose levels included
^PR from C3 to C13, CR at C16, CR pending confirmation
†3 pending confirmation

Median PFS not reached; PFS at 12 months 78%



[1] Cassier et al. Clin Cancer Res. 2012;18(16):4458–64. [2] Yoo et al. Cancer Res Treat. 2016;48(2):546–52
CR, complete response.
Data previously presented in November 2017 at the CTOS Annual Meeting. Data cutoff: October 11, 2017.

Safety results showed avapritinib was well-tolerated in patients with GIST

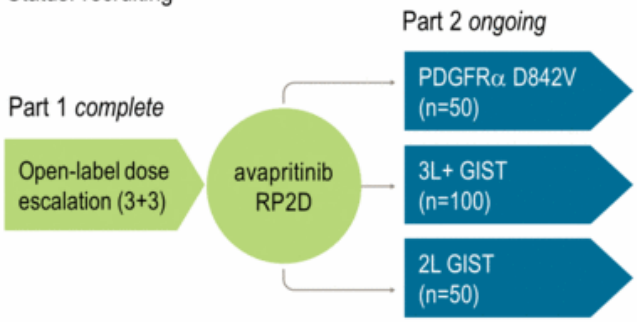
- Most adverse events (AEs) were Grade 1 or 2
- Across all grades, the most common AEs included nausea (56%), fatigue (53%), periorbital edema (43%), vomiting (41%), peripheral edema (34%), anemia (31%), diarrhea (31%), increased lacrimation (30%), cognitive effects (30%), decreased appetite (28%), dizziness (23%), constipation (22%), and hair color changes (22%)
- Investigators reported treatment-related Grade ≥3 AEs in 39 patients (34%), including anemia (9%), fatigue (7%), hypophosphatemia (4%), nausea (4%) and cognitive effects (3%)
- Six patients (5%) discontinued treatment with avapritinib due to AEs

Data previously presented in November 2017 at the CTOS Annual Meeting. Data cutoff: October 11, 2017.
Cognitive effects are an aggregated category of individual cognitive events, each of which was observed in fewer than 20% of patients.

Ongoing and planned avapritinib clinical trials in patients with GIST

Phase 1 clinical trial

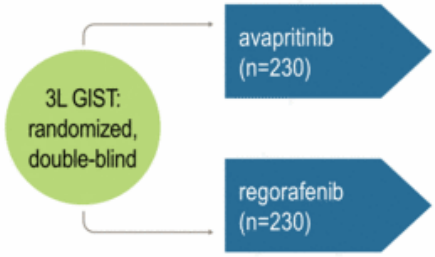
Status: recruiting



Key Part 2 goals: safety, ORR, duration of response

Phase 3 clinical trial

Status: plan to initiate in 1H 2018



Key goals: PFS, ORR, safety

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Avapritinib clinical development program in GIST is rapidly advancing

Program Status

- ✓ *Favorable tolerability profile*
- ✓ *Strong clinical activity across multiple genotypes*
- ✓ *Breakthrough Therapy Designation in PDGFRα D842V-driven GIST*
- ✓ *Registration-enabling trials (ongoing or planned)*
- ● *NDA submission in PDGFRα-driven GIST*

Key Next Steps

- Complete enrollment of registration-enabling Phase 1 trial in PDGFRα-driven GIST by mid-2018
- Initiate Phase 3 trial versus regorafenib in 3L GIST in 1H 2018
- Explore expedited clinical development pathways for 3L+ (KIT-driven) GIST with regulatory authorities
- Continue enrollment of Phase 1 trial cohorts in 3L+ and 2L GIST throughout 2018

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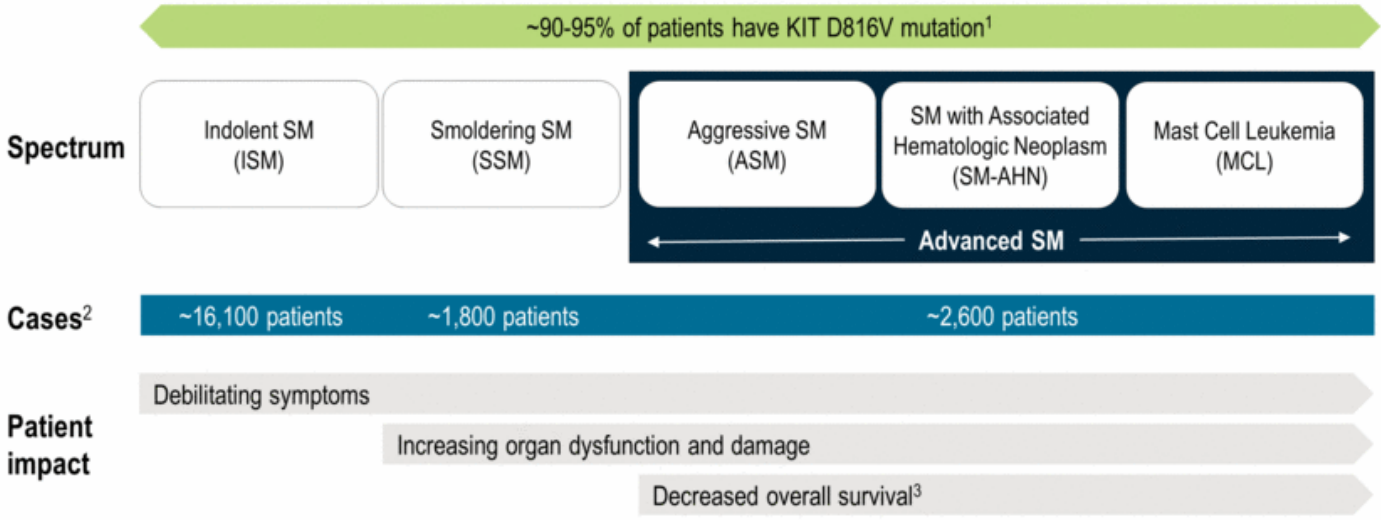
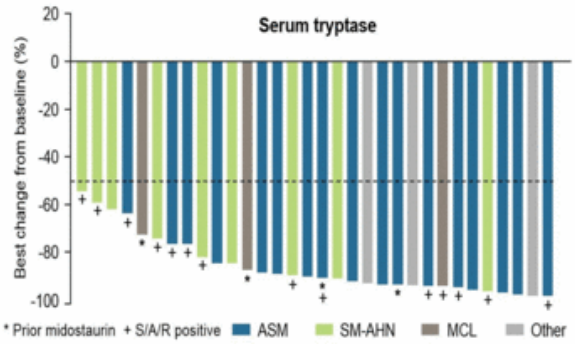
NDA, new drug application.
Data previously presented in November 2017 at the CTOS Annual Meeting. Data cutoff: October 11, 2017.

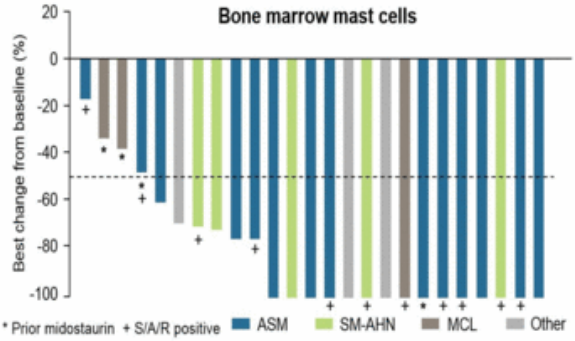
Highly selective inhibition of D816V mutant KIT with avapritinib has broad potential applications across all subtypes of SM



[1]Garcia-Montero AC et al, 2006.
[2]Represents estimated prevalence regardless of alteration in major countries (US, EU5 and Japan).
[3]Based on published natural history data.

Consistent clinical activity in systemic mastocytosis across outcome measures regardless of dose, disease subtype, prior midostaurin or presence of additional mutations





- Serum tryptase at baseline: median 124 µg/L, range 14 to 1414 µg/L
- All 32 patients achieved >50% reduction from baseline

- Bone marrow mast cell burden at baseline: median 20%, range 1.5 to 95%
- n=25 evaluable patients with baseline bone marrow mast cells ≥5%
- 15/25 (60%) patients achieved bone marrow CR

All evaluable patients had decreases in serum tryptase, bone marrow mast cell burden and spleen volume

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Data previously presented in December 2017 at the American Societyy of Hematology (ASH) Annual Meeting. Data cutoff: October 4, 2017.

72% objective response rate and 100% disease control rate observed in patients with systemic mastocytosis per rigorous IWG-MRT-ECNM consensus criteria[1]

Best response[2] n (%) (confirmed and unconfirmed)	ASM (n=7)	SM-AHN[3] (n=8)	MCL (n=3)	Overall (n=18)
Overall response rate (CR + PR + CI)	6 (86)	5 (63)	2 (67)	13 (72)
CR + PR	5 (71)	4 (50)	1 (33)	10 (56)
Complete response (CR)	2 (29)	0	0	2 (11)
Partial response (PR)	3 (43)	4 (50)	1 (33)	8 (44)
Clinical improvement (CI)	1 (14)	1 (13)	1 (33)	3 (17)
Stable disease (SD)	1 (14)	3 (38)	1 (33)	5 (28)
Progressive disease (PD)	0	0	0	0

- 17 of 18 patients remain on treatment with median duration 9 months (range: 4–19)

[1] Gotlib J et al Blood (2013) 121:2393.
[2] Pending confirmation: ASM, 2 CR; SM-AHN, 3 PR.
[3] Mastocytosis response.
Data previously presented in December 2017 at the ASH Annual Meeting. Data cutoff: October 4, 2017.

Safety results showed avapritinib was well-tolerated in patients with systemic mastocytosis

- Most adverse events (AEs) reported by investigators were Grade 1 or 2
- The most common treatment-emergent AEs reported by investigators (≥20%) across all grades included periorbital edema (59%), fatigue (41%), peripheral edema (34%), nausea (28%), anemia (28%), thrombocytopenia (28%), abdominal pain, diarrhea, respiratory tract infection, dizziness and headache (22% each)
- Investigators reported treatment-related Grade ≥3 AEs in 16 patients (50%), with only one treatment-related AE occurring in more than 10% of patients (neutropenia, 13%)
- No patients discontinued treatment due to treatment-related AEs

Data previously presented in December 2017 at the ASH Annual Meeting. Data cutoff: October 4, 2017.

A strong foundation for development of avapritinib in systemic mastocytosis

Program Status

- ✓ *Favorable tolerability profile*
- ✓ *Strong clinical activity*
- ✓ *Input from SM experts on clinical strategies*
- ● *Feedback from global regulatory authorities*
- ● *Registration-enabling clinical trials*

Key Next Steps

- Plan to engage global regulatory authorities on registration pathways in 1H 2018
- Pending regulatory feedback, plan to initiate:
  - Registration-enabling trial in patients with advanced SM in 1H 2018
  - Dose escalation and proof-of-concept trial in patients with indolent and smoldering SM in 2H 2018
- Continue enrollment of Phase 1 trial throughout 2018

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Data previously presented in December 2017 at the ASH Annual Meeting. Data cutoff: October 4, 2017.

Growing portfolio of highly selective investigational kinase medicines

BLU-554

- Hepatocellular carcinoma

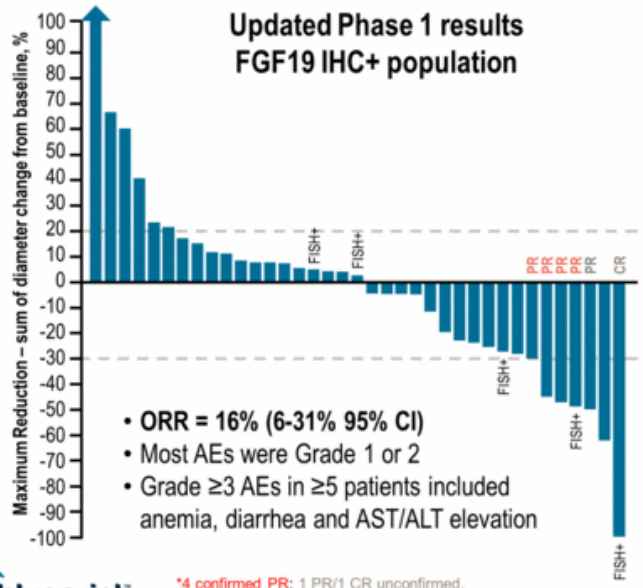
BLU-667

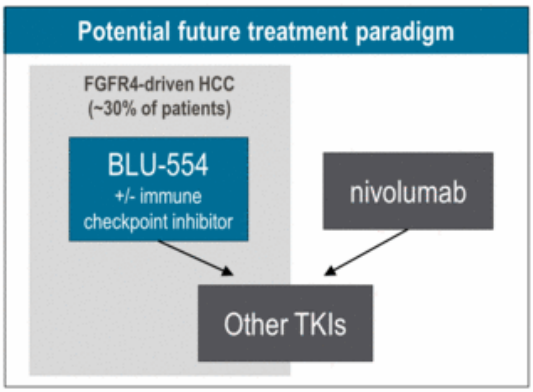
- Non-small cell lung cancer
- Medullary thyroid cancer
- Other RET-altered solid tumors

BLU-782

- Fibrodysplasia ossificans progressiva

Significant opportunity for selective FGFR4 inhibition with BLU-554 in evolving hepatocellular carcinoma landscape





Planned next steps

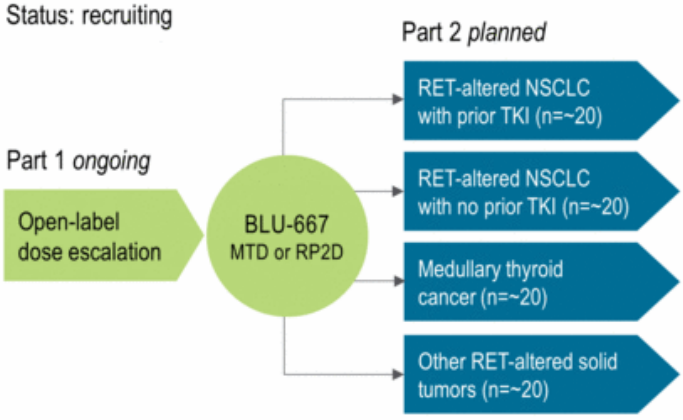
- Initiate TKI-naïve cohort in ongoing Phase 1 trial in Q1 2018
- Consider options for combo trial with checkpoint inhibitor

*4 confirmed PR; 1 PR/1 CR unconfirmed.
CI, confidence interval; HCC, hepatocellular carcinoma; IHC, immunohistochemistry; TKI, tyrosine kinase inhibitor.
Data previously presented in September 2017 at European Society for Medical Oncology (ESMO) 2017 Congress. Data cutoff: August 18, 2017.

Preliminary Phase 1 trial results expected in 1H 2018 for BLU-667, a highly selective inhibitor of RET fusions and mutations

Phase 1 clinical trial

Status: recruiting



As of December 1, 2017

- 30 patients have been enrolled in dose escalation, with enrollment ongoing
- BLU-667 has been generally well-tolerated
- Majority of AEs reported by investigators were Grade 1
- MTD and RP2D have not been identified
- Preliminary evidence of clinical activity observed in patients with NSCLC (including KIF5B and other RET fusions) and RET-altered MTC

Planned next steps

- Present preliminary clinical data in 1H 2018
- Initiate expansion portion of Phase 1 trial in 1H 2018

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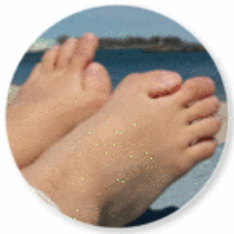
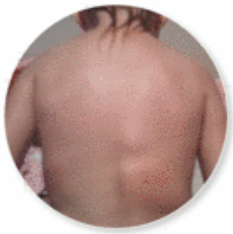
BLU-782 selected as development candidate for potential treatment of fibrodysplasia ossificans progressiva



MALFORMED BIG TOES



TUMOR-LIKE SWELLINGS

EXTRASKELETAL BONE

PROGRESSIVE INCAPACITATION

- Devastating, ultra-rare genetic disease caused by mutant ALK2
- Characterized by abnormal transformation of skeletal muscle, ligaments and tendons into bone
- Progressive loss of mobility and respiratory function, with median age of death of ~40 years
- Differentiated approach targets underlying cause of disease
- Plan to initiate IND-enabling studies in 1H 2018

Cash to fund operating expenses and capital expenditures into mid-2020*

SHARES OUTSTANDING AS OF 9/30/17	CASH, CASH EQUIVALENTS AND INVESTMENTS AS OF 9/30/17
39.2 million (basic) *42.5 million (fully diluted)*	*$390.7 million*

DECEMBER 2017 PUBLIC OFFERING

SHARES ISSUED	ESTIMATED NET PROCEEDS
4.3 million shares issued	*~$325.5 million*

* Cash guidance gives effect to estimated net proceeds received upon closing of underwritten public offering on December 15, 2017 but excludes any potential option fees and milestone payments under the existing collaboration with Roche.

Full summary of expected 2018 milestones

Program	Milestone	Anticipated Timing
avapritinib GIST	Initiate Phase 3 trial in 3L GIST for avapritinib compared to regorafenib	1H 2018
	Explore expedited clinical development pathways for KIT-driven GIST with regulatory authorities	1H 2018
	Complete enrollment of registration-enabling trial in PDGFRα-driven GIST	Middle of 2018
	Present updated Phase 1 data for PDGFRα, 3L+ and 2L GIST patient populations	2018
avapritinib SM	Define registration strategy in SM with global regulatory authorities	1H 2018
	Initiate registration-enabling trial in advanced SM	1H 2018
	Initiate dose escalation and proof-of-concept trial in indolent and smoldering SM	2H 2018
	Present expansion data from ongoing Phase 1 trial in advanced SM	2018
BLU-554 HCC	Initiate Phase 1 trial cohort in TKI-naïve HCC	Q1 2018
	Present updated expansion data from ongoing Phase 1 trial in advanced HCC	2H 2018
	Present initial data from Phase 1 trial cohort in TKI-naïve HCC	2H 2018
BLU-667 RET	Present data from ongoing Phase 1 trial in RET-altered NSCLC, MTC and other advanced solid tumors	1H 2018
	Initiate expansion portion of the Phase 1 trial in RET-altered NSCLC, MTC and other advanced solid tumors	1H 2018
BLU-782 FOP	Present preclinical data on ALK2 program	2018
	Initiate IND-enabling studies	1H 2018
Corporate	Explore potential strategic collaborations	2018
	Nominate at least two additional discovery programs	2018


blueprint MEDICINES
Thank you