FivePrime®

FY16 Earnings Update

February 23, 2017

NASDAQ:FPRX

Forward-Looking Statements Disclaimer

This presentation contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as "may," "will," "expect," "plan," "anticipate," "estimate," "intend" and similar expressions (as well as other words or expressions referencing future events, conditions or circumstances) are intended to identify forward-looking statements. These forward-looking statements are based on Five Prime's expectations and assumptions as of the date of this press release. Each of these forward-looking statements involves risks and uncertainties. Actual results may differ materially from these forward-looking statements. Forward-looking statements contained in this press release include statements about (i) the timing of IND filings; (ii) the timing of initiation, progress and scope of clinical trials for Five Prime's product candidates, including regarding the completion of enrollment; (iii) Five Prime's full-year 2017 net cash used in operating activities; and (iv) the amount of Five Prime's cash, cash equivalents and marketable securities at the end of 2017.

Many factors may cause differences between current expectations and actual results including unexpected safety or efficacy data observed during preclinical or clinical studies, clinical trial site activation or enrollment rates that are lower than expected, changes in expected or existing competition, changes in the regulatory environment, failure of Five Prime's collaborators to support or advance collaborations or product candidates, and unexpected litigation or other disputes. Other factors that may cause Five Prime's actual results to differ from those expressed or implied in the forward-looking statements in this press release are discussed in Five Prime's filings with the U.S. Securities and Exchange Commission, including the "Risk Factors" sections contained therein. Except as required by law, Five Prime assumes no obligation to update any forward-looking statements contained herein to reflect any change in expectations, even as new information becomes available.

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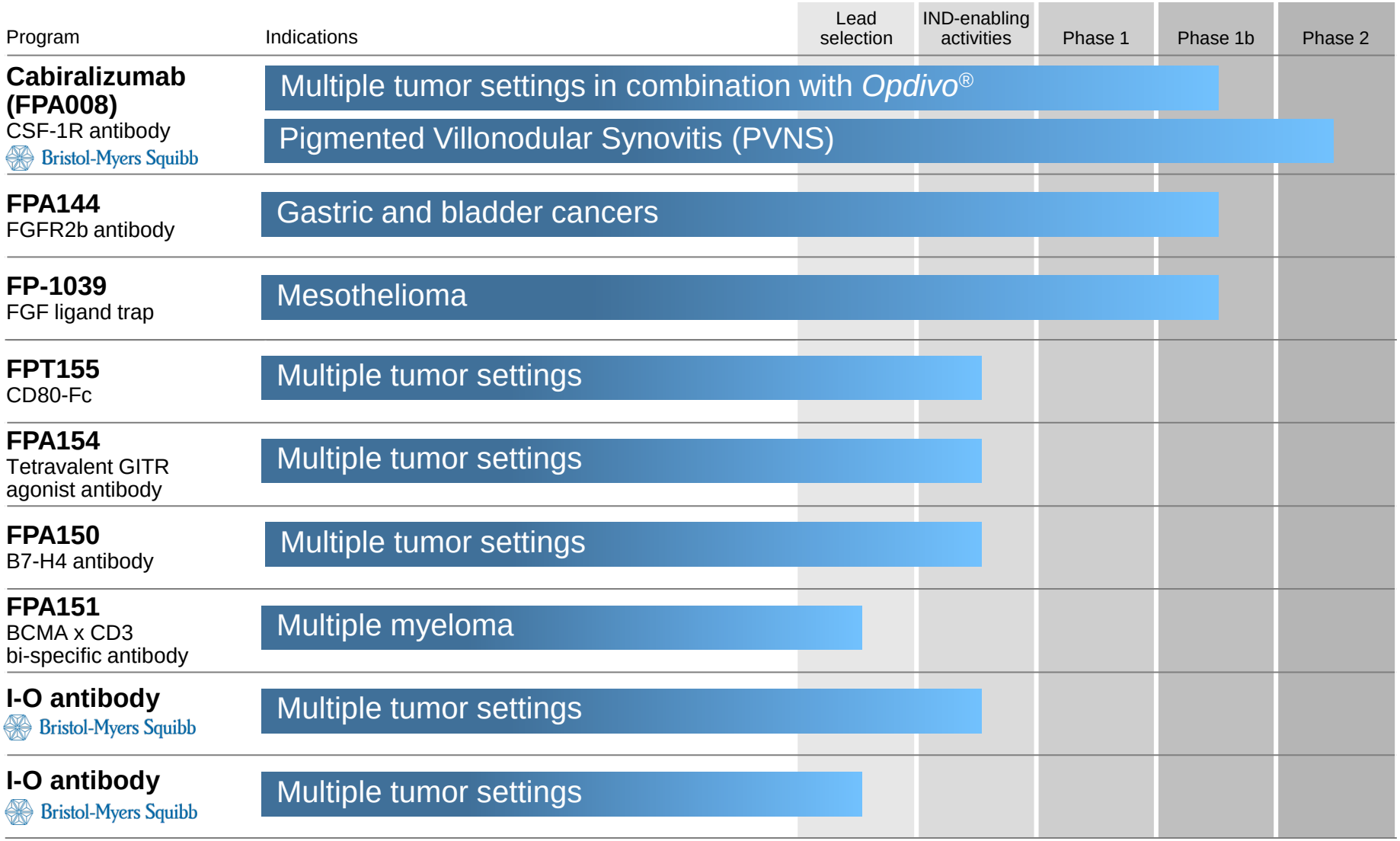
Oncology-Focused Pipeline with Multiple Clinical Candidates



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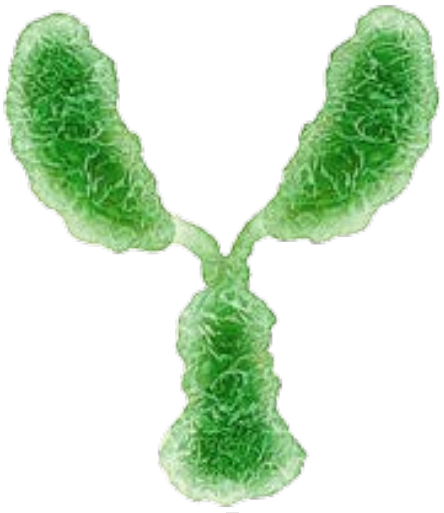
FPA150: Novel B7-H4 Antibody is Designed for Two Mechanisms of Action

FPA150



- Blocks a T cell checkpoint pathway
- Engineered to enhance ADCC against B7-H4-expressing tumor cells

IND planned 4Q17

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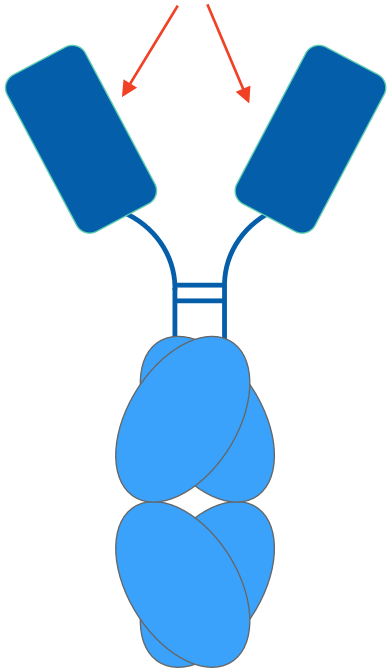
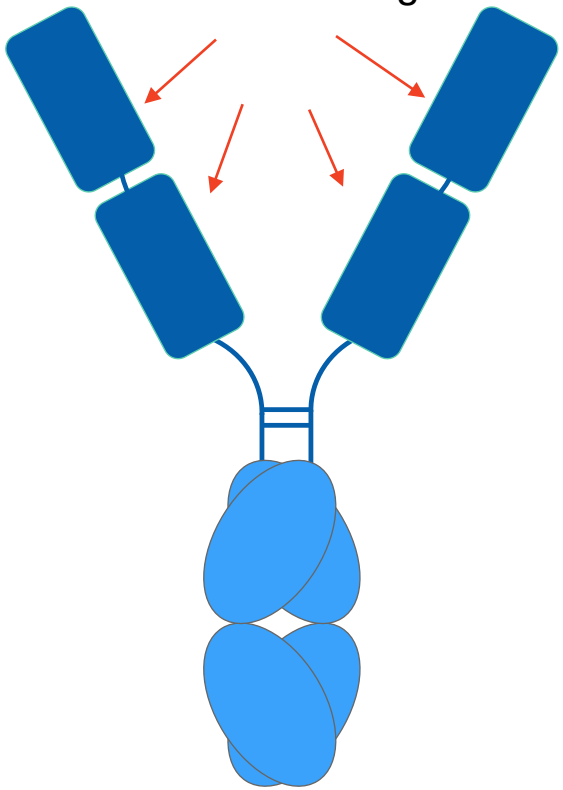
FPA154 (anti-GITR): Increased Valency Leads to Stronger Activation Versus Conventional Antibodies

Conventional Antibody
Two GITR binding sites



FPA154
Four GITR binding sites



Designed for improved CD8 T cell agonistic activity with potent Treg depletion activity

IND planned 4Q17

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FPT155 is One of Most Potent Tumor Inhibitors Identified in Our *In Vivo* Screens of More Than 500 Immunome Proteins

CD80

- Co-stimulatory molecule expressed on antigen presenting cells
- Binds to the T cell activating receptor CD28, the T cell inhibitory receptor CTLA4, and PD-L1

FPT155 (CD80-Fc) Activates T Cells Through Three Pathways

CD28 Activation (activates T cells without superagonism)

CTLA4 Blockade (activates T cells)

PD-L1 Blockade (prevents checkpoint inhibition)

IND planned 2018

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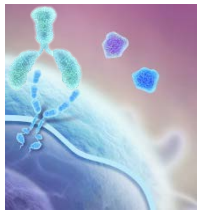
Cabiralizumab Immuno-Oncology Highlights



- An investigational antibody that inhibits CSF1R
- In October 2016, initiated Phase 1b portion of immunotherapy clinical trial in combination with PD-1 immune checkpoint inhibitor, OPDIVO® (nivolumab), in multiple tumor types
  - non-small cell lung cancer
  - head and neck
  - pancreatic cancer
  - glioblastoma
  - renal cell carcinoma
  - ovarian cancer
- Selected cohorts in the Phase 1a portion of the trial continue in parallel with those in 1b
- Expect to complete Phase 1b enrollment in 2H17
  - The Phase 1a/1b trial expected to enroll ~280 patients
- Plan to disclose initial clinical trial data in 2H17

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Cabiralizumab/*Opdivo*® Combination Trial in Multiple Tumor Settings Remains on Track

PHASE 1a

Initiated Sept 2015

*Exploring **Multiple Dose Levels** in Cancer Patients*

- **Cabiralizumab Monotherapy**
- **Cabiralizumab + *Opdivo*®**

*Exploring **Selected Tumor Settings** at the Highest Dose*

- **Cabiralizumab Monotherapy**
- **Cabiralizumab + *Opdivo*®**

PHASE 1b Cabiralizumab + *Opdivo*®

Initiated October 2016

- **LUNG (NSCLC)** Anti-PD-1 Naïve
- **LUNG (NSCLC)** *Anti-PD-1 Resistant*
- **HEAD & NECK**
- **PANCREATIC**
- **RENAL**
- **OVARIAN**
- **GLIOBLASTOMA**

N ~280 patients

Study Objectives

- Safety
- Objective response rate and duration
- Survival
- Baseline and on-treatment biopsies to assess monotherapy and combination

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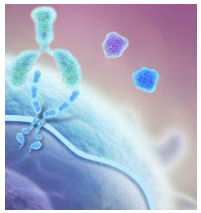
Cabiralizumab PVNS Highlights



- Expect to complete enrollment in the Phase 2 trial in approximately 30 PVNS patients in 1H17
  - Evaluating clinical measures including response rate, pain and range of motion
- FDA and European Commission have granted cabiralizumab Orphan Drug Designation for the treatment of PVNS
  - Estimated U.S. prevalence for diffuse PVNS patients may be as high as 25,000 patients
- Plan to seek regulatory agency guidance on pivotal trial design
- Plan to disclose initial clinical trial data at ASCO 2017

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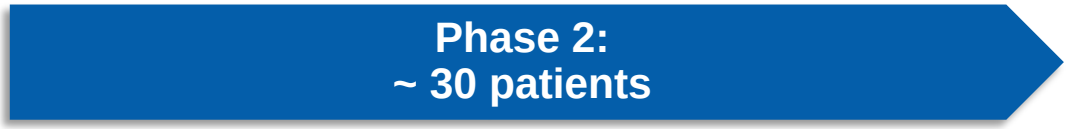
Cabiralizumab: Current Five Prime-Sponsored Phase 2 Trial in PVNS



May 2016
Initiated Phase 2

Expect to Complete
Enrollment 1H17

Study Objectives

- Objective response
- Pain
- Range of motion

Plan to seek regulatory agency guidance on pivotal trial

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FPA144 Highlights

- An isoform-selective antibody in development as a targeted immuno-therapy for tumors that overexpress FGFR2b
- Phase 1 trial is evaluating the safety, PK and efficacy of FPA144 in patients with gastric cancer whose tumors highly overexpress FGFR2b
- New cohorts added to evaluate FPA144 in:
  - Patients with gastric cancer whose tumors express moderate or low levels of FGFR2b
  - Patients with bladder cancer whose tumors overexpress FGFR2b
- Received US Orphan Drug Designation for the treatment of gastric cancer in patients whose tumors overexpress FGFR2b
- Announced Phase 1 clinical data at ASCO GI and at ASCO 2016
- Plan to provide a clinical trial data update at ASCO 2017
- Plan to pursue combination studies and a Phase 1 trial in Japan
- Seeking regulatory agency guidance on pivotal trial

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FPA144 Phase 1 Study is Currently Enrolling FGFR2b+ Patients in Defined Cohorts

PART 1
Dose Escalation

PART 1A:
Dose Escalation* in Solid Tumors

PART 1B:
Gastric Cancer

PART 2
Selected Patients (up to 30/arm)

All at 15 mg/kg q2w

- **IHC High Gastric**
- **IHC Moderate Gastric**
- **IHC Low Gastric**
- **IHC Negative Gastric**
- **IHC Positive Bladder**

Study Objectives

- Safety
- PK
- Objective response rate and duration
- Baseline and on-treatment biopsies to evaluate changes in the tumor microenvironment

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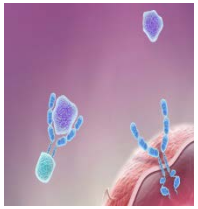
FP-1039 Highlights



- A protein drug designed to block FGF signaling
- GSK completed enrollment of 25 previously untreated malignant pleural mesothelioma patients in combination with pemetrexed/cisplatin
- Presented initial data at ASCO 2016
- Awaiting mature overall response rate, duration of response and progression-free survival data
- Plan to release updated clinical trial data at ESMO 2017

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Summary of Cash and Cash Guidance

CASH, CASH EQUIVALENTS & MARKETABLE SECURITIES

$421.7 million as of December 31, 2016

FY 2017 ESTIMATED NET CASH USED IN OPERATIONS

<$120 million

ESTIMATED CASH, CASH EQUIVALENTS & MARKETABLE SECURITIES

Estimate ending 2017 with approximately $300 million

SHARES OUTSTANDING

28.6 million (as of December 31, 2016)

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Summary of Financial Results

(In Millions Except Per Share Amounts)

	4Q16	4Q15		FY16	FY15
Revenue	$8.3	$363.3		$30.7	$379.8
R&D	$29.1	$21.0		$94.1	$70.2
G&A	$10.5	$8.6		$35.8	$22.6
Net Income / (loss)	($20.1)	$296.1		($65.7)	$249.6
EPS Basic	($0.73)	$11.37		($2.44)	$9.73
EPS Diluted	($0.73)	$10.63		($2.44)	$9.23

2017 News Flow and Anticipated Milestones

Cabiralizumab

Bristol-Myers Squibb

Multiple I-O Tumor Settings

- Expect to complete Phase 1b (7 settings) enrollment 2H17
- Plan to disclose initial clinical trial data in 2017

PVNS (Monotherapy)

- Expect to complete Phase 2 enrollment 1H17
- Plan to disclose initial clinical trial data at ASCO
- Seek regulatory agency guidance on pivotal trial

FPA144 Gastric Cancer

- Plan to disclose updated monotherapy data at ASCO
- Combination trials to advance into earlier lines of therapy
- Seek regulatory agency guidance on pivotal trial
- Prepare to launch safety trial in Japan

FP-1039 Mesothelioma

- Plan to disclose updated clinical trial data at ESMO

Research

- 2 IND filings planned by 4Q17

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THANK YOU

www.fiveprime.com

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