FivePrime®

3Q16 Earnings Update

November 3, 2016

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" and similar expressions (as well as other words or expressions referencing future events or circumstances) are intended to identify forward-looking statements. These forward-looking statements reflect FivePrime's current beliefs and expectations. 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; (iii) Five Prime's full-year 2016 net cash used in operating activities and the portion of net cash used in operating activities attributable to tax payments; and (iv) the amount of Five Prime's cash, cash equivalents and marketable securities at the end of 2016.

Many factors may cause differences between current expectations and actual results, including unexpected safety or efficacy data observed during preclinical or clinical studies, clinical site activation rates or clinical trial enrollment rates that are lower than expected, changes in expected or existing competition, failure of our collaborators to support or advance collaborations or product candidates and unexpected litigation or other disputes. Other factors that may cause our actual results to differ from current expectations are discussed in FivePrime's filings with the U.S. Securities and Exchange Commission, including the "Risk Factors" sections contained therein. Except as required by law, we assume 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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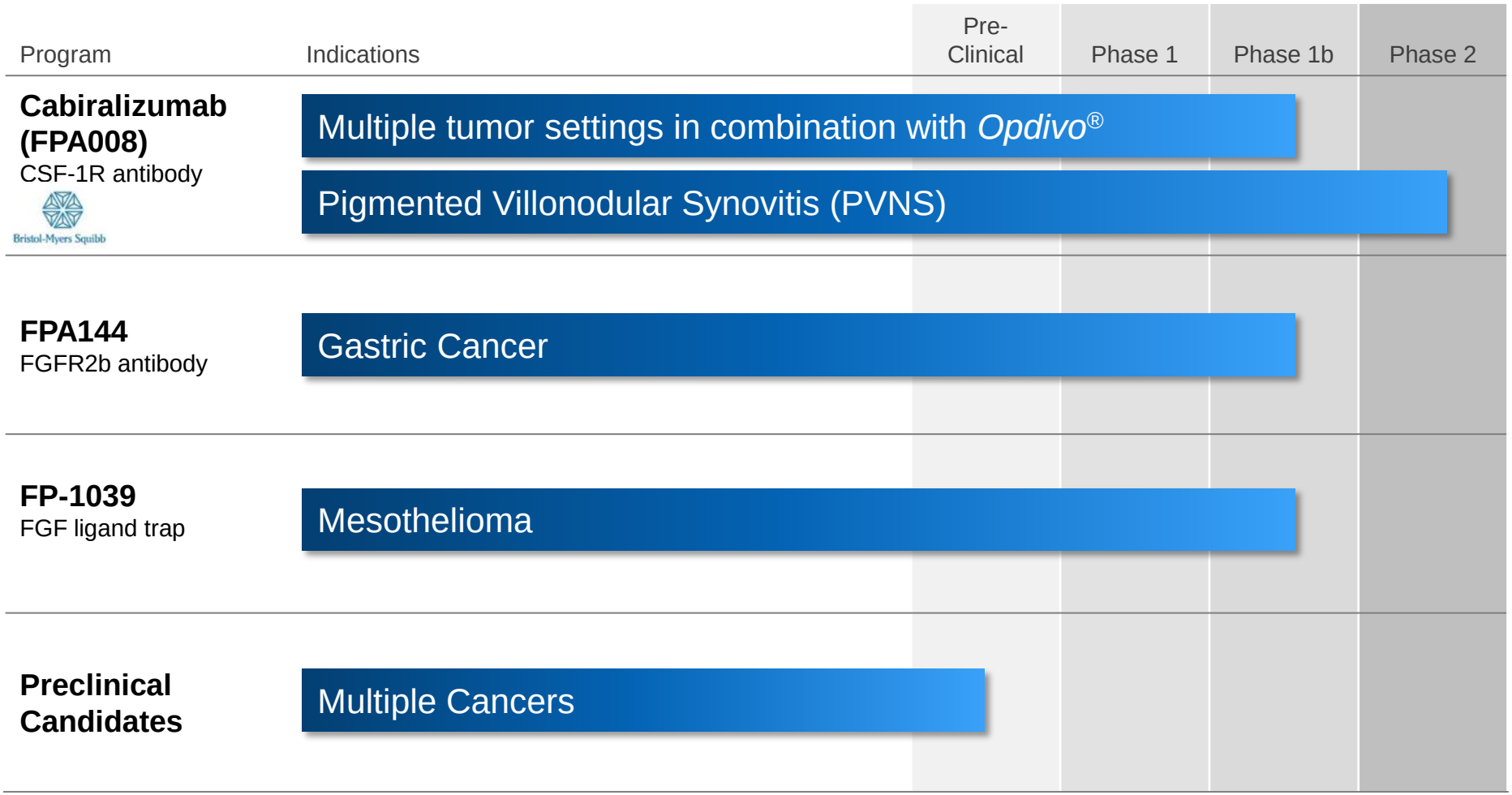
Oncology-Focused Pipeline with Multiple Clinical Candidates



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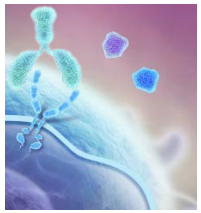
Cabiralizumab (FPA008) Third Quarter 2016 and Recent Highlights



Immuno-oncology

- Cabiralizumab is 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
- The Phase 1a/1b trial expected to enroll ~280 patients

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Cabiralizumab (FPA008)/*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 **Multiple Tumor Settings** at Selected Dose*

- Cabiralizumab Monotherapy
- Cabiralizumab + *Opdivo*®

PHASE 1b
Cabiralizumab (FPA008)+ *Opdivo*
Initiated October 2016

- LUNG (NSCLC) Anti-PD-1 Naïve; 2nd-line
- LUNG (NSCLC) *Anti-PD-1 Resistant;* 2nd-line
- HEAD & NECK 2nd-line
- PANCREATIC 2nd-line
- RENAL 3rd-line
- OVARIAN 3rd-line
- GLIOBLASTOMA 2nd-line

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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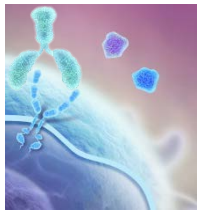
Cabiralizumab (FPA008) Third Quarter 2016 and Recent Highlights



PVNS

- Continued enrollment and dosing in ongoing Phase 2 trial in PVNS, a CSF-1 driven tumor
- Phase 2 portion of trial evaluates clinical measures including response rate, pain and range of motion in approximately 30 PVNS patients
- FDA has 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

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Cabiralizumab (FPA008) – Phase 2 Trial in PVNS

Phase 1:
Dose Escalation

Select dose for Phase 2

Phase 2:
~ 30 patients

May 2016
Initiated Phase 2

Study Objectives

- Objective response
- Pain
- Range of motion

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FPA144 Third Quarter 2016 and Recent Highlights

FPA144:

- FPA144 is an isoform-selective antibody in development as a targeted immuno-therapy for tumors that overexpress FGFR2b
- Enrollment continues in the expansion portion of the Phase 1 trial, 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
- In June, received US Orphan Drug Designation for the treatment of gastric cancer and cancer of the gastroesophageal junction in patients whose tumors overexpress FGFR2b
- Reported encouraging initial single-agent efficacy and safety data at the 2016 American Society of Clinical Oncology (ASCO) Annual Meeting

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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

*** 6 dose cohorts ranging from 0.3 to 15 mg/kg**

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

Active

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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Summary of Initial Monotherapy Antitumor Activity of FPA144 in FGFR2b+ Gastric Patients*

Outcome	FPA144 Treated (N=9)
ORR ** (95% CI)	33% (7%, 70%)
Best Objective Response (%)	
Complete Response	0 (0%)
Partial Response	3* (33%)
Stable Disease	4 (44%)
Progressive Disease	2 (23%)
Disease Control Rate (95% CI)	77% (40%, 97%)
12-Week PFS (95% CI)	67% (30%, 93%)
Median Duration of Treatment, days (Range)	112 (42-182)

* ASCO 2016. Data cutoff was April 1, 2016.

** Pooled across all dosing cohorts (1 at 6 mg/kg, 1 at 10 mg/kg and 1 at 15 mg/kg). All responses were confirmed (one after the data cutoff with the patient still on treatment). Investigator review used for assessments.

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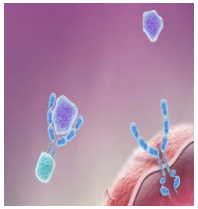
FP-1039 Third Quarter 2016 and Recent Highlights



FP-1039

- FP-1039 is a protein drug designed to intervene in FGF signaling
- Five Prime regained full rights to FP-1039 from GlaxoSmithKline's (GSK) in September 2016
- GSK is completing the ongoing Phase 1b trial of FP-1039 in combination with 1st-line pemetrexed and cisplatin in untreated, unresectable mesothelioma
  - Trial recruitment has concluded with 25 patients enrolled at the 15 mg/kg dose
  - GSK continues to dose and follow patients
- Five Prime plans to make decisions on potential future development of FP-1039 in mesothelioma after objective response rate, disease control rate and progression-free survival data are sufficiently mature
- GSK presented data in mesothelioma patients from the ongoing trial of FP-1039 at the 2016 ASCO Annual Meeting

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Summary of Cash and Cash Guidance

CASH, CASH EQUIVALENTS & MARKETABLE SECURITIES

~$440.7 million as of September 30, 2016

FY 2016 ESTIMATED NET CASH USED IN OPERATIONS

<$120 million comprising:

- <$90 million from operations, plus
- <$30 million used for tax payments

ESTIMATED CASH, CASH EQUIVALENTS & MARKETABLE SECURITIES

Estimate ending 2016 with more than $400 million

SHARES OUTSTANDING

28.4 million (as of September 30, 2016)

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Summary of Financial Results

(as of September 30, 2016; In Millions Except Per Share Amounts)

	3Q16	3Q15
Revenue	$6.7	$5.9
R&D Expenses	$23.9	$24.7
G&A Expenses	$9.1	$5.2
Net Loss	$19.4	$24.0
EPS Basic and Diluted	$(0.72)	$(0.93)

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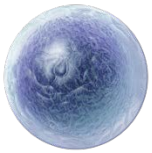
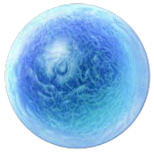
A Productive R&D Engine

Research

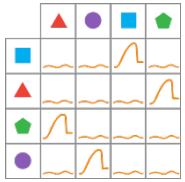
Treg cell screen



CD8 T cell screen



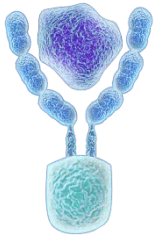
Immunome by Immunome



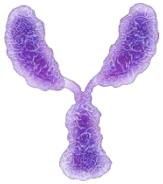
In vivo screens

Preclinical Programs

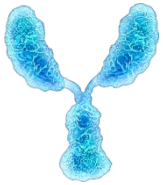
T cell modulator
(lead selected)



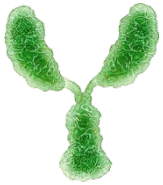
Anti-GITR
(lead selected)



T cell redirector
(lead selection underway)

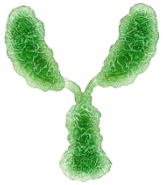


Immune modulator
(lead selected)

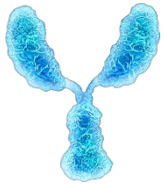


Clinical

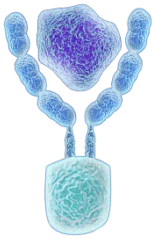
FPA008
(anti-CSF-1R)



FPA144
(anti-FGRF2b)



FP-1039
(FGF ligand trap)



Candidates planned for 1 new IND in 2017 and 1 yearly thereafter

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2016 News Flow and Anticipated Milestones

FPA008

PVNS
- Began Phase 2 in **May**

MULTIPLE I-O TUMOR SETTINGS
- Initiated Phase 1b dose expansion in **October**

Research

- Advance 2 programs into IND-enabling activities

1Q **2Q** **3Q** **4Q**

FPA144

GASTRIC CANCER
- Reported data from Part 1 at **ASCO GI in January** and preclinical data at **AACR in April**
- Oral presentation with Part 1 data presented at **ASCO in June**

FP-1039

MESOTHELIOMA
- Ongoing trial
- GSK presented data at **ASCO in June**

R&D Day NYC
December 8

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THANK YOU

www.fiveprime.com

NASDAQ:FPRX