FivePrime®

1Q17 Earnings Update

May 4, 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" 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 from these forward-looking statements. Forward-looking statements contained in this presentation include statements about (i) the timing of initiation, progress and scope of clinical trials for our product candidates; (ii) the potential use of our product candidates to treat patients; (iii) the extent of gene amplification and protein overexpression in and the size of certain patient populations; (iv) the prevalence of certain diseases; (v) the timing of the filing of INDs; (vi) the timing of data disclosures; and (vii) our estimated 2017 net cash used in operating activities and estimated year-end balance of cash, cash equivalents and marketable securities.

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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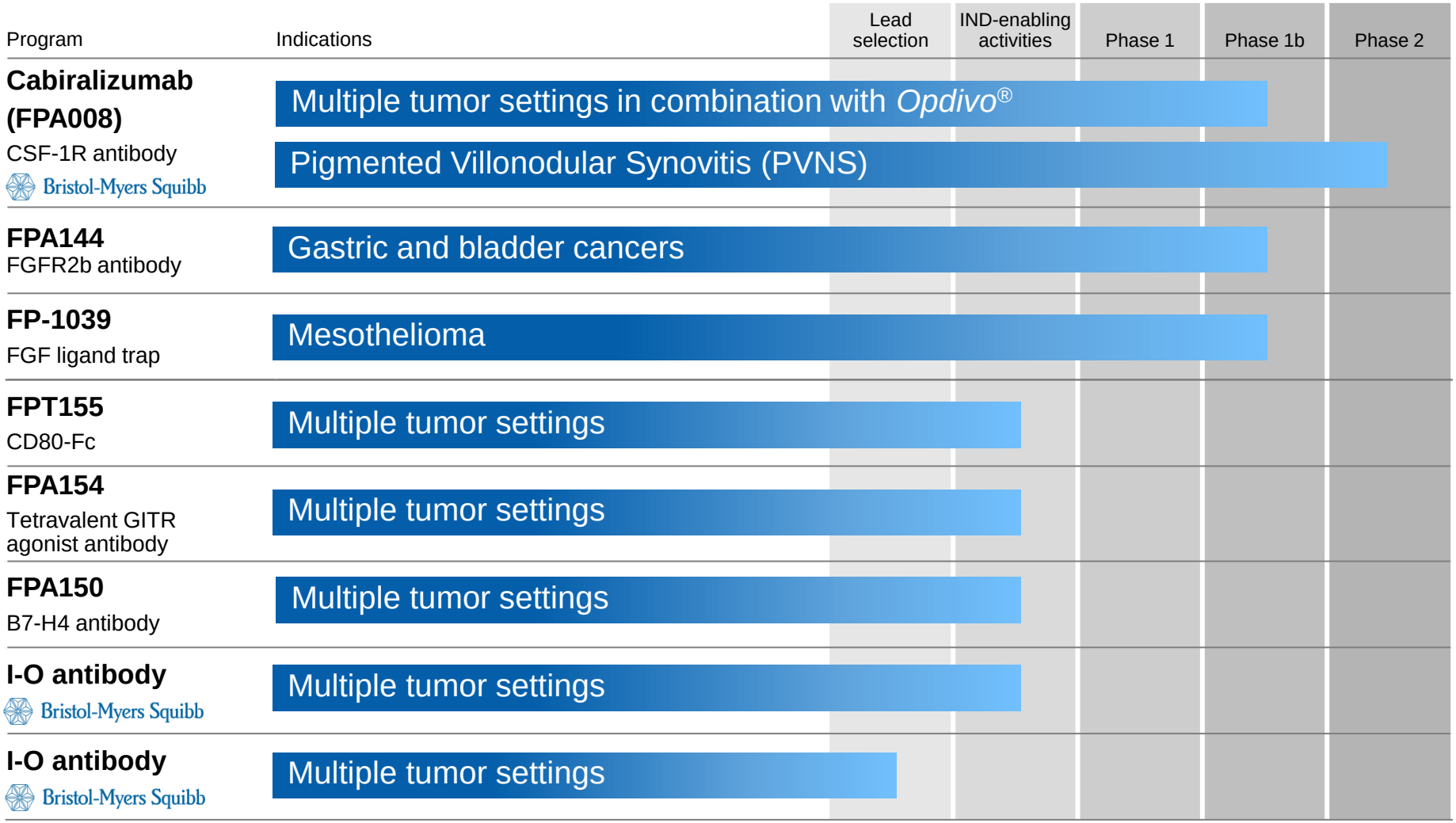
Oncology-Focused Pipeline with Multiple Clinical Candidates



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Five Prime First Quarter Highlights

- Cabiralizumab
  - Completed enrollment in the Phase 2 part of the PVNS trial
  - Completed enrollment in some of the Phase 1b I-O cohorts and are on track to complete enrollment in all 7 Phase 1b cohorts by end of 2017
- FPA144
  - Received clearance for the Japan Phase 1 monotherapy trial in gastric cancer
  - Primed for pivotal trial in front-line gastric cancer
  - Enrolled more bladder cancer patients in new cohort
- Early Research Programs
  - Advanced three preclinical therapeutic candidates in IND-enabling activities
  - Initiated therapeutic antibody campaigns to new targets

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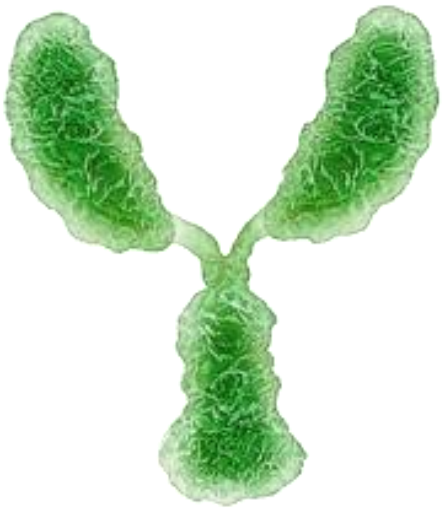
FPA150: Novel B7-H4 Antibody is Designed for Two Mechanisms of Action

FPA150



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

IND planned 4Q17

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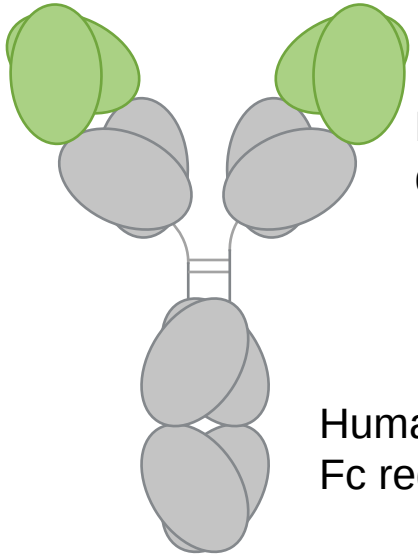
FPA154 (anti-GITR): Increased Valency Leads to Stronger Activation Versus Conventional Antibodies

Conventional Antibody

Two GITR binding sites

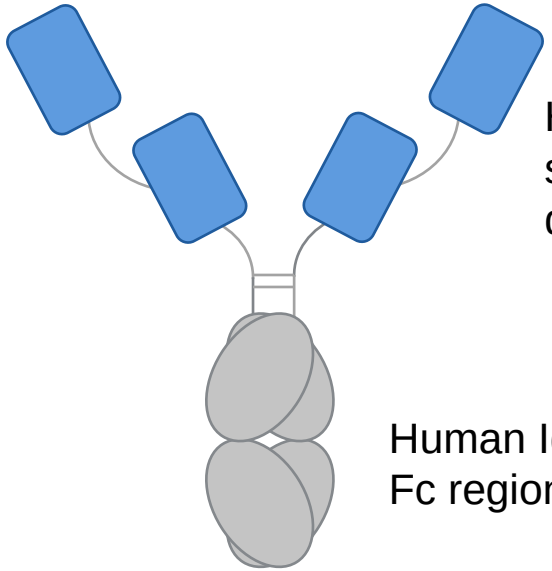


Fab variable domains

Human IgG1 Fc region

FPA154

Four GITR binding sites



Humanized sdAb variable domains

Human IgG1 Fc region

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

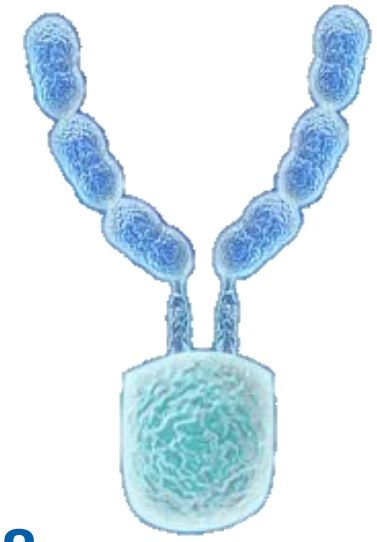
- Co-stimulatory molecule expressed on antigen presenting cells
- Binds to the T cell activating receptor CD28, the T cell inhibitory receptor CTLA4, and PD-L1

FPT155 (CD80-Fc) Can Activate 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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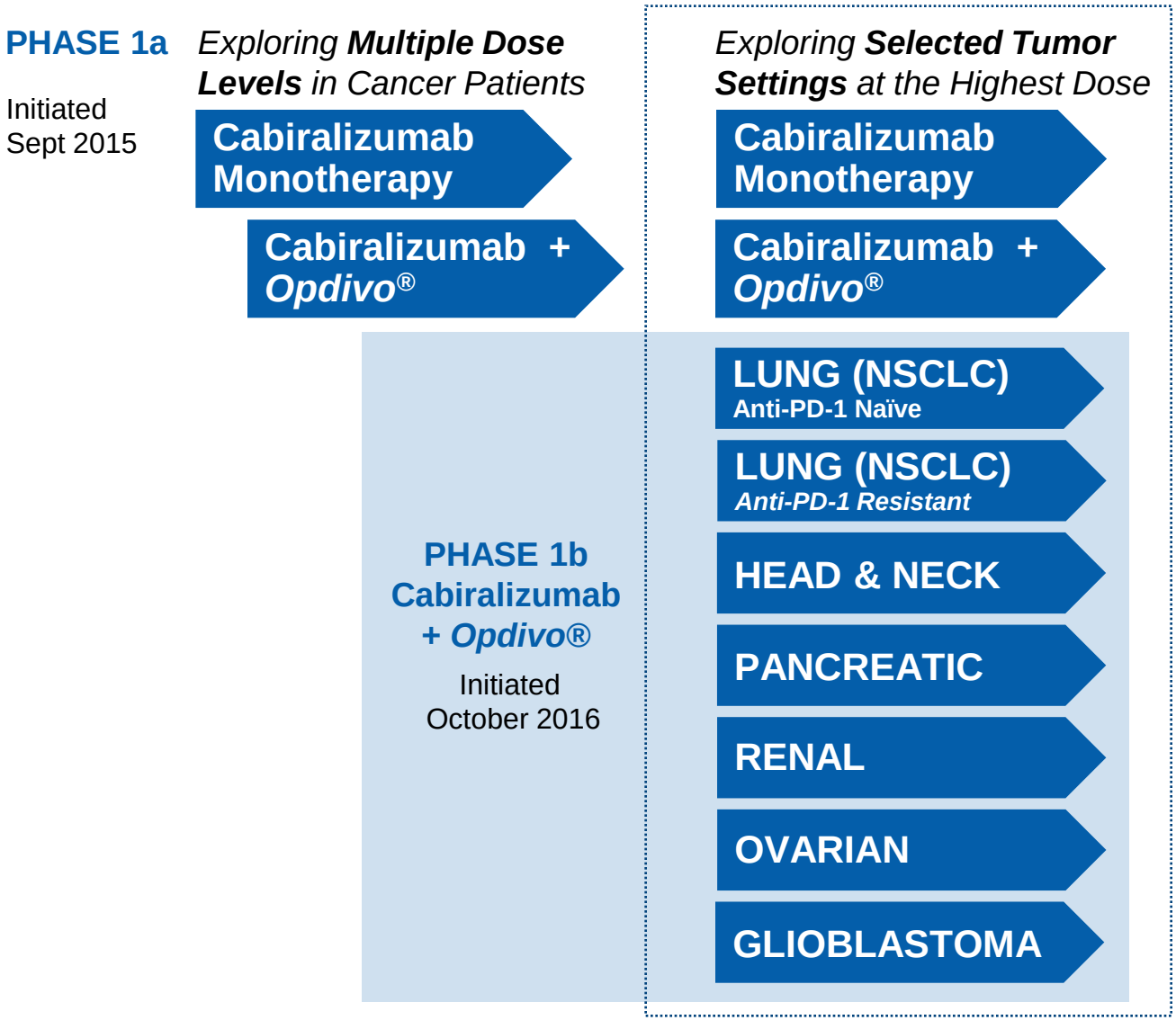
Cabiralizumab/Opdivo® Combination Trial in Multiple Tumor Settings Remains on Track



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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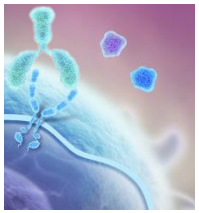
Cabiralizumab Immuno-Oncology Highlights



- An investigational antibody that inhibits CSF1R
- Advanced the 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
  - head and neck
  - pancreatic
  - glioblastoma
  - renal cell carcinoma
  - ovarian
- Assessing multiple tissue biomarkers, including on tumors, TAMs and T cells
- 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: Current Five Prime-Sponsored Phase 2 Trial in PVNS

Phase 2: ~ 30 patients

Initiated Phase 2
May 2016

Completed Enrollment
April 2017

Study Objectives

- Objective response
- Pain
- Range of motion

Seeking regulatory agency guidance on pivotal trial

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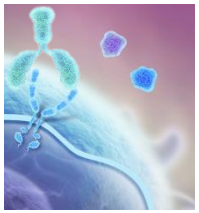
Cabiralizumab PVNS Highlights



- Completed enrollment in the initially planned 30-patient cohort of the Phase 2 part of the trial in patients with tenosynovial giant cell tumor (TGCT), also known as pigmented villonodular synovitis (PVNS)
- 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 disclose initial clinical trial data at ASCO 2017
- Seeking regulatory guidance to initiate a pivotal trial studying cabiralizumab in diffuse PVNS to begin in 2018

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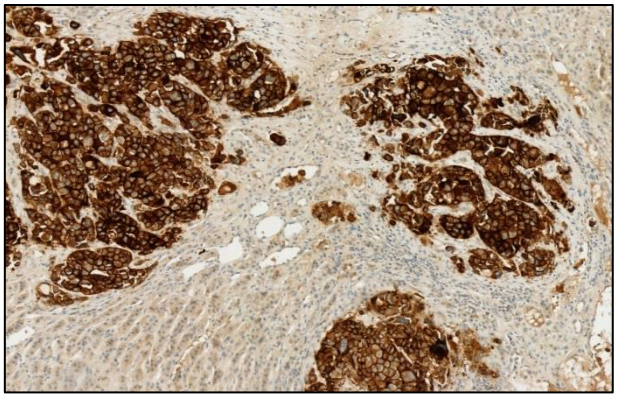
Ongoing Phase 1 Study of FPA144

Monotherapy, 15 mg/kg every two weeks, FGFR2b+ by IHC

Metastatic gastric or GEJ cancer –
up to 30 patients with high FGFR2b expression

Metastatic bladder cancer -
up to 30 patients with FGFR2b expression

IHC staining of gastric cancer sample with proprietary IHC antibody:



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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FPA144 Highlights

- An isoform-selective antibody in development as a targeted immuno-therapy for tumors that overexpress FGFR2b
- Advanced the Phase 1 trial in patients with gastric cancer whose tumors highly overexpress FGFR2b
- Plan to disclose updated gastric cancer clinical trial data at ASCO
- Plan to launch a Phase 1 gastric cancer trial in Japan in 3Q17
  - Received clinical trial notification (CTN) approval from the Pharmaceuticals and Medical Devices Agency (PMDA) in Japan
- Plan to seek regulatory guidance on a registrational path for FPA144 in combination with chemotherapy as a front-line gastric cancer therapy
  - Preclinical data suggest combination with chemotherapy is additive
- Advanced the Phase 1 monotherapy trial in patients with bladder cancer
  - Opened for enrollment additional Phase 1 cohort in bladder cancer patients whose tumors overexpress FGFR2b, as assessed by IHC
  - Adding sites that specialize in bladder cancer

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Clinical Development Strategy is to Move FPA144 into Front-Line Treatment of FGFR2b+ Gastric Cancer

Drug-Treatable Metastatic Gastric and Gastroesophageal Junction Adenocarcinoma Patients

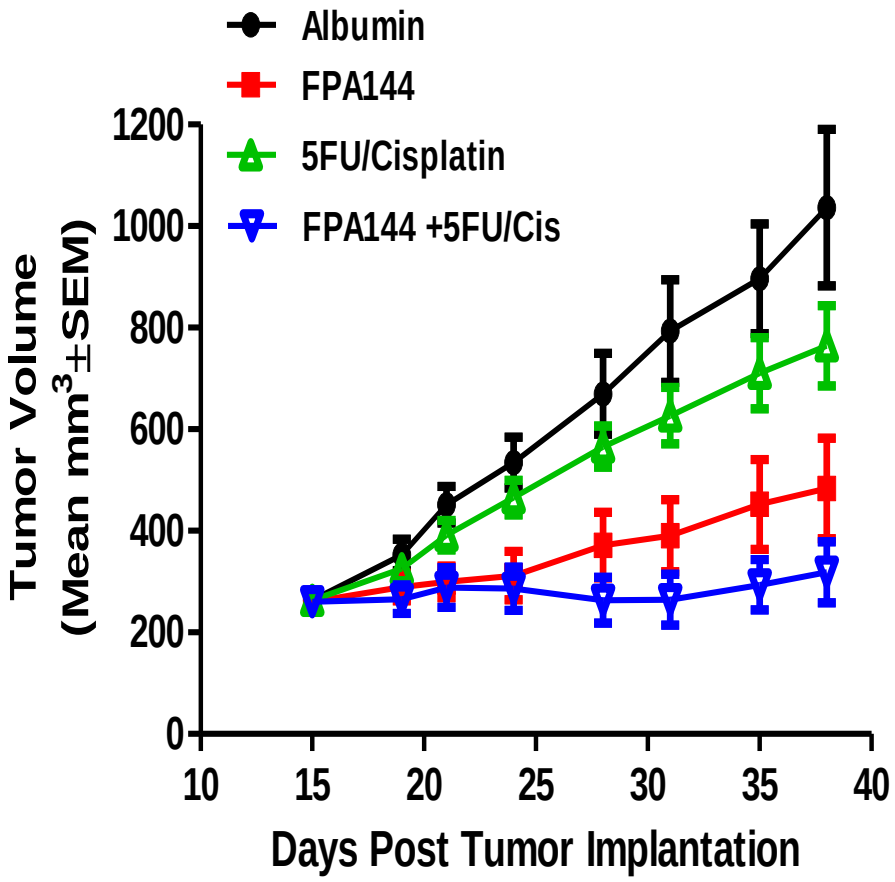
2017	US	EU5*	Japan
1st line	16,630	38,700	72,800
3rd line	5,650	11,680	21,420
1st/3rd line	294%	331%	340%

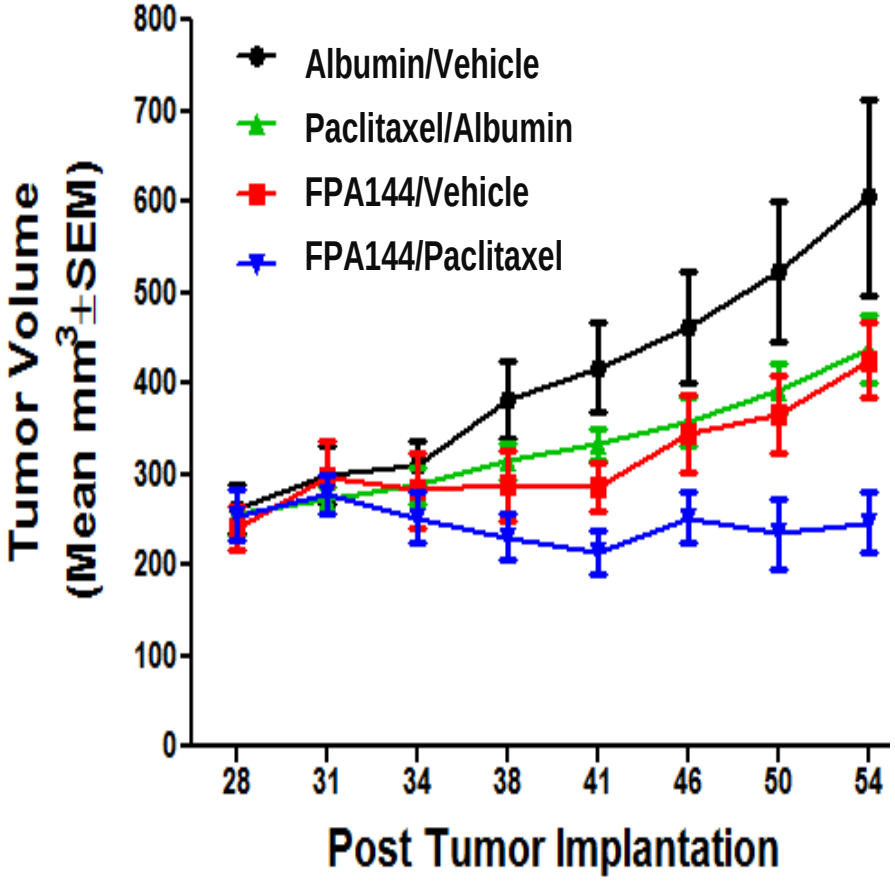
***EU5 = France, Germany, Italy, Spain, UK**

According to a forecast by GlobalData in Dec 2015, the number of 1st-line drug-treatable patients in urban China is approximately 225% of the number of patients in Japan.

* Source: Decision Resources, Oct 2016. Drug-Treatable Populations of Gastric and Gastroesophageal Junction Adenocarcinoma in the Major Pharmaceutical Markets, 2015-2025 © 2017 DR/Decision Resources, LLC.

Preclinical Data: FPA144 Has Additive Activity in Combination with Chemotherapy

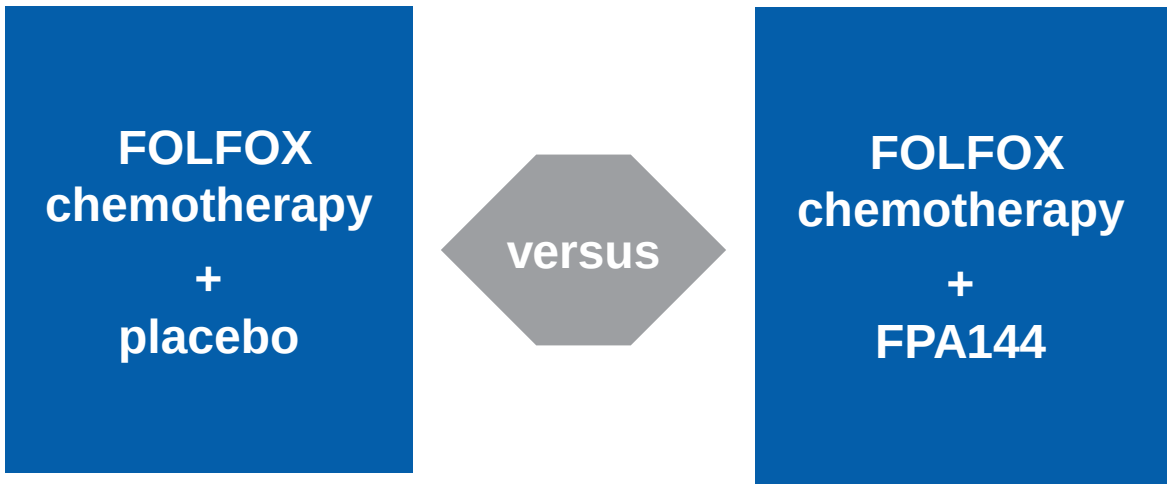




* From Abigael T. Gemo, et al., AACR, April 2014

Pivotal Trial Planning for FPA144 for Front-Line Treatment of FGFR2b+ Gastric Cancer

- Select biomarker positive patients by ctDNA (blood-based) or IHC (tumor sample) tests
- Will seek regulatory guidance this year on a registration-enabling pivotal trial plan
- Likely a randomized, controlled trial, for example:



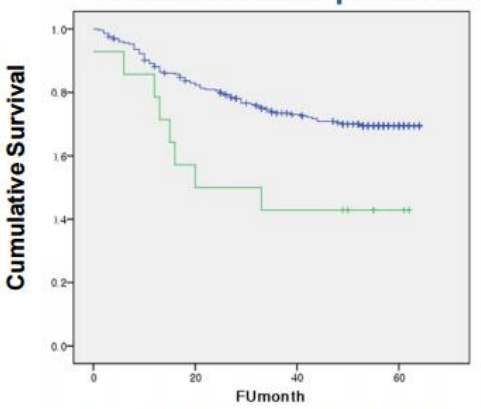
Study Objectives

- PFS
- OS
- ORR

Companion Diagnostic Strategy for Front-Line Gastric Cancer:
Select Patients Based on Protein Overexpression or Gene Amplification

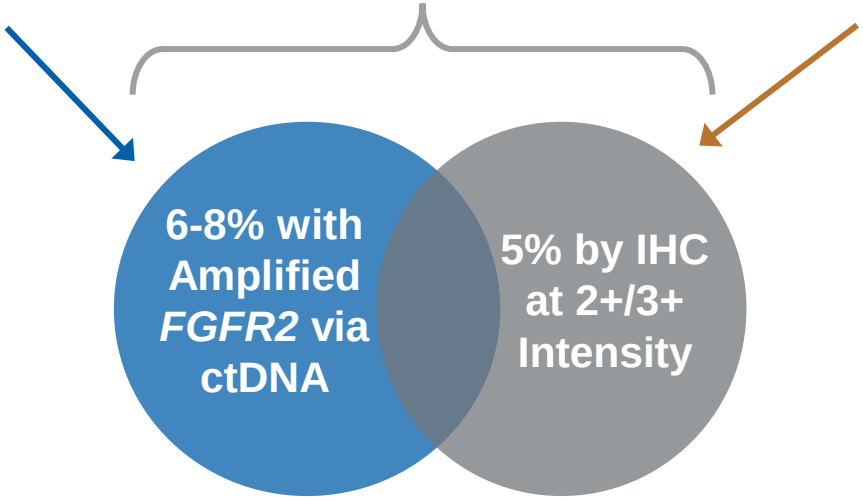
- *FGFR2* gene amplification and FGFR2b protein overexpression correlate with reduced survival
- Can detect gene amplification in circulating tumor DNA and protein overexpression by IHC
- Tumor heterogeneity: metastases may be positive for FGFR2b when primary tumor is not; metastasis correlates with lethality

***FGFR2* Gene Amplification**

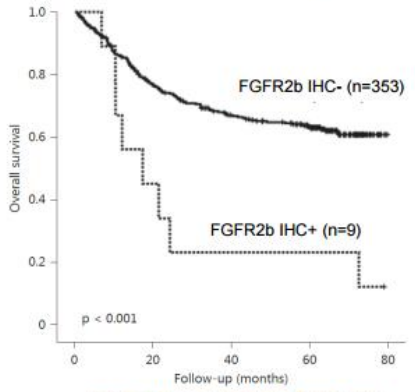


Jung *et al.* 2009; FGFR2 FISH; P=0.012

8-9% of gastric cancer patients likely to be positive by either companion diagnostic



FGFR2b Protein Over Expression



Pathobiology 2015; 82:269-279

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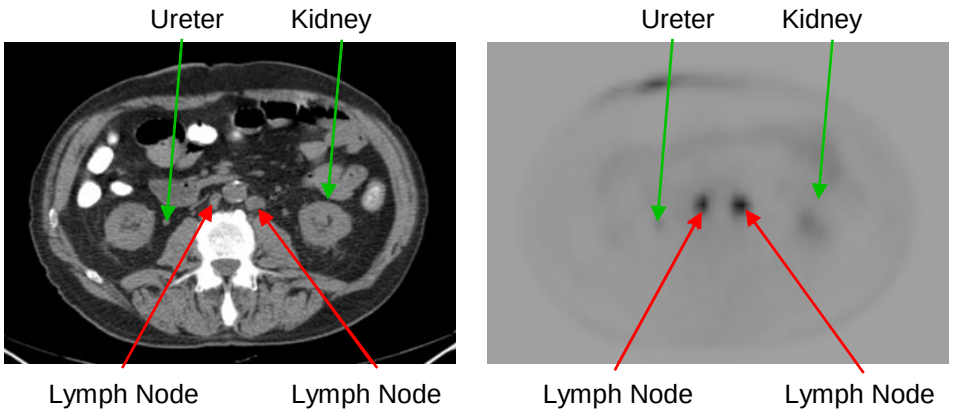
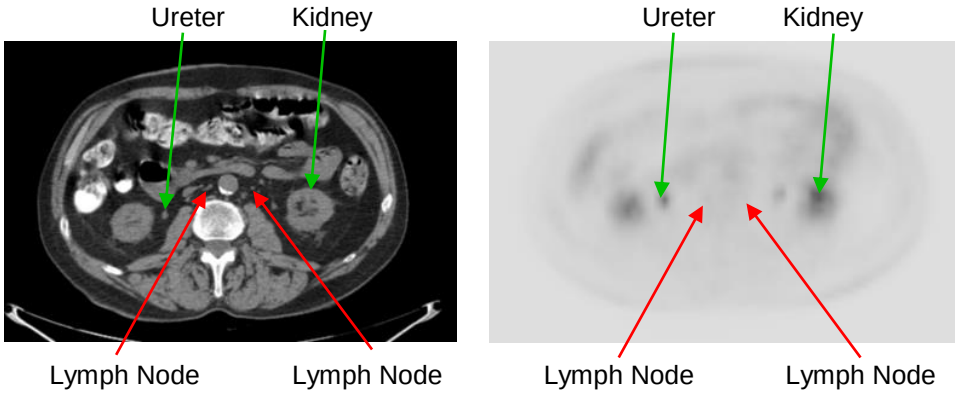
Complete Response in a Patient with Metastatic Bladder Cancer Treated with FPA144 During Dose Escalation

- 76-year-old male with metastatic bladder cancer
- Dosed with FPA144 at 3 mg/kg q2w
- Durable, confirmed complete response
- Patient remains on treatment since April 15, 2015

Screening (Day -5)



Cycle 8 Day 15 (Day 213)

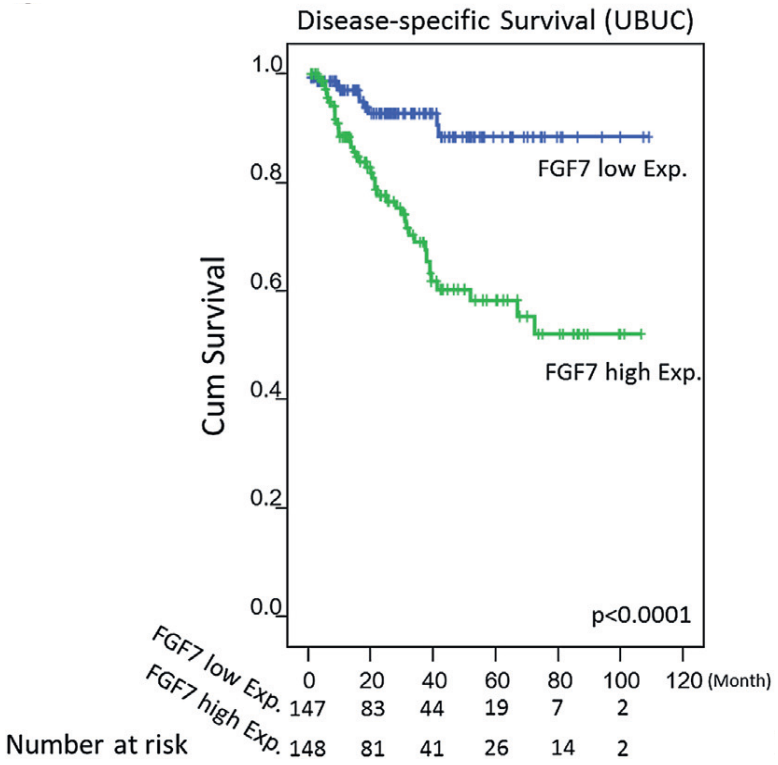


FGFR2b Pathway in Bladder Cancer

IHC analysis of 387 archival primary UC samples showed that FGFR2b is overexpressed in >10% of samples with intensity level of at least 1+

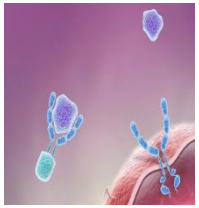
Tumor Sample	Percent Positive
Primary	11.6%
Metastasis	14.2%

Also, FGF7 (a ligand that binds to FGFR2b) overexpression correlates with poorer outcome:



From Fan, et al. *J. Urol* 2015

FP-1039 Highlights



- A protein drug designed to block FGF signaling
- Mesothelioma often overexpresses FGF-2, and FP-1039 blocks FGF-2
- GSK completed enrollment of 25 previously untreated malignant pleural mesothelioma patients in combination with pemetrexed/cisplatin
- Awaiting mature objective 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

$380.3 million as of March 31, 2017

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 March 31, 2017)

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Summary of Financial Results

(as of March 31, 2017; In Millions Except Per Share Amounts)

	1Q17	1Q16
Revenue	$10.1	$6.5
R&D	$33.8	$18.9
G&A	$10.5	$8.1
Net Income / (loss)	($33.4)	$13.0
EPS Basic & Diluted	($1.21)	$(0.49)

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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 2H17

PVNS (Monotherapy)

- Completed Phase 2 enrollment in April
- Plan to disclose initial clinical trial data at ASCO
- Seek regulatory agency guidance on 2018 pivotal trial

FPA144 Gastric Cancer

- Plan to disclose updated monotherapy data at ASCO
- Chemo combination trial in front-line therapy
- Seek regulatory agency guidance on pivotal trial
- Prepare to launch safety trial in Japan in 3Q17

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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