FivePrime®

3Q17 Earnings Update

November 6, 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 and incidence 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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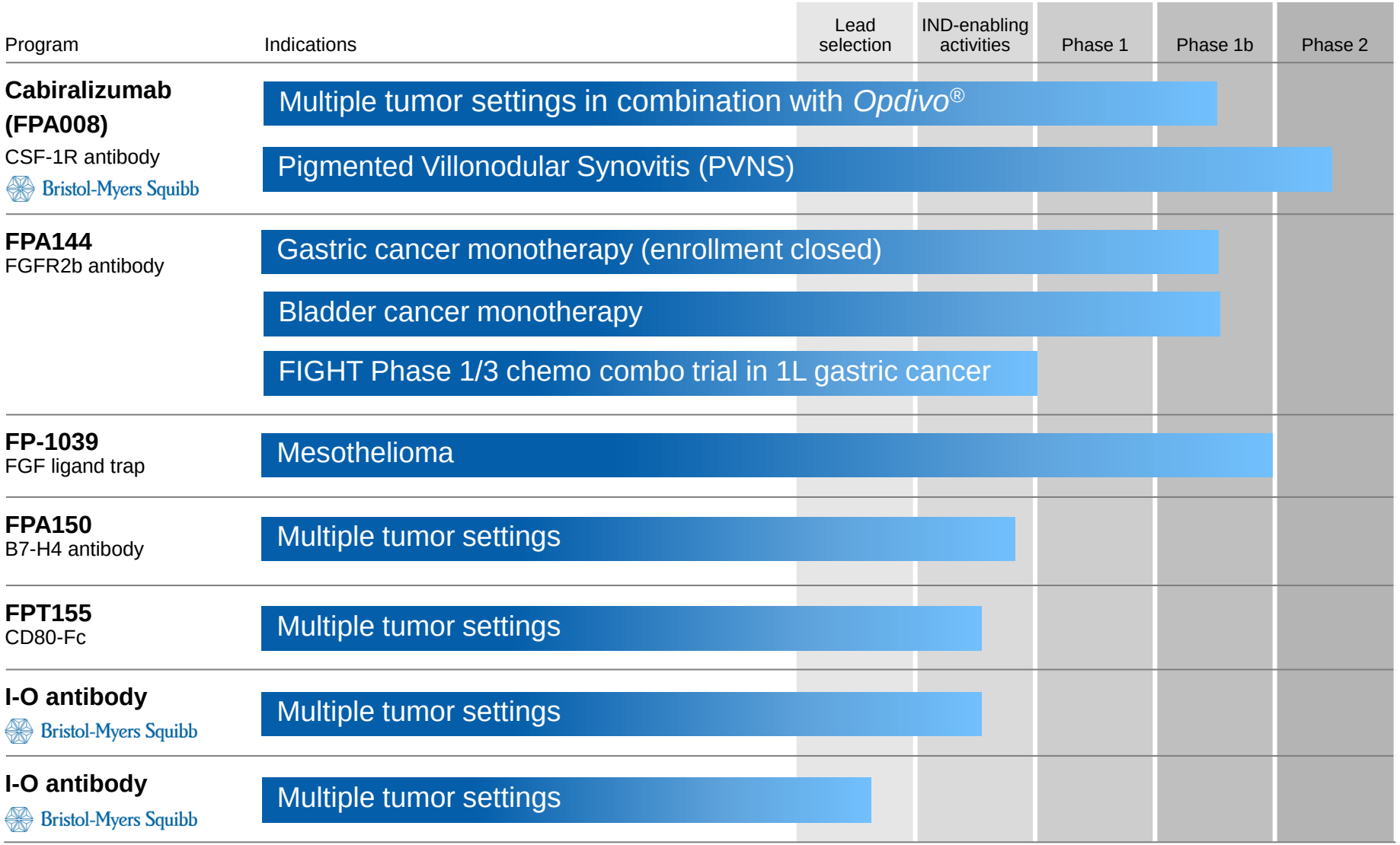
Oncology-Focused Pipeline with Multiple Clinical Candidates



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Five Prime Third Quarter Highlights

- **Leadership**
  - Aron Knickerbocker selected to succeed Dr. Rusty Williams as President and CEO effective Jan. 1, 2018
  - Bryan Irving, Ph.D. appointed Senior Vice President, Research
- **Cabiralizumab**
  - Completed enrollment in most of the Phase 1b I-O cohorts; on track to complete enrollment in all seven Phase 1b cohorts by end of 2017
  - Initial clinical trial data accepted for late-breaking oral presentation Nov 11 at the SITC meeting
  - Preparing to enroll additional patients in Phase 2 portion of PVNS trial to support pivotal trial
- **FPA144**
  - Preparing for Phase 1/3 chemotherapy combination trial in front-line gastric cancer in the 10% of patients whose tumors are FGFR2b positive; initial Phase 1 patient dosing anticipated by end of 2017
  - Enrolling patients in Phase 1 safety trial patients with gastric cancer in Japan
  - Enrolling patients in ongoing Phase 1 monotherapy cohort testing in patients with bladder cancer whose tumors overexpress FGFR2b
  - FGFR2b expression and baseline immune signature data in bladder cancer to be presented in poster session Nov 10 at SITC meeting
- **Early Research Programs**
  - FPA150 (anti-B7-H4) – IND application planned in December 2017
  - FPT155 (CD80-Fc) – preclinical data featured in poster presentation at 2017 AACR-NCI-EORTC conference in October; on track for IND application in mid-2018

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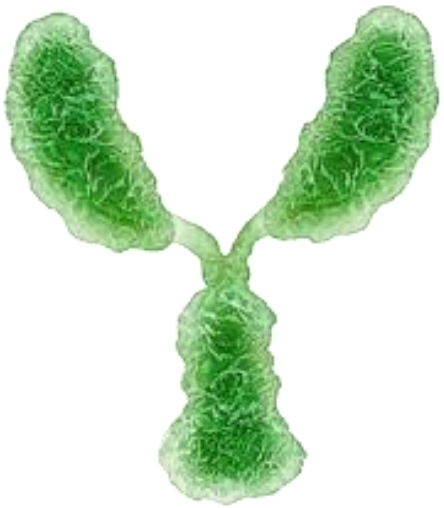
FPA150: Novel B7-H4 Antibody is Designed for Two Mechanisms of Action

FPA150



- Blocks a T cell checkpoint pathway expressed on tumor cells
- Engineered to enhance ADCC against B7-H4-expressing tumor cells
- B7-H4 is overexpressed in breast, ovarian and endometrial cancers
- Presented at an oral poster discussion at ESMO

IND planned December 2017

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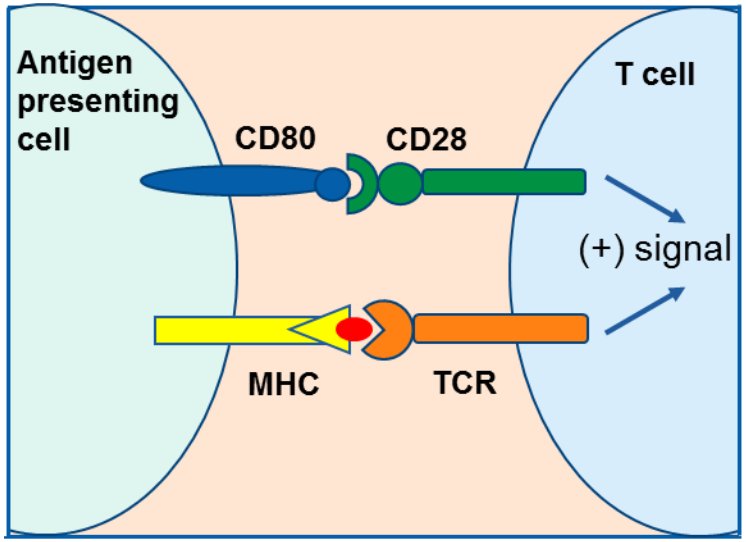
FPT155 is a CD80-Fc Fusion Protein Engineered to Activate T cells Through Multiple Pathways

Normal T cell activation via CD80



CD80 is a co-stimulatory molecule expressed on antigen presenting cells

FPT155 uses the binding interactions of Soluble CD80 to modulate 3 pathways

CD28
Activation
(activates T cells without superagonism)

CTLA4
Engagement

PD-L1
Blockade

IND planned mid 2018

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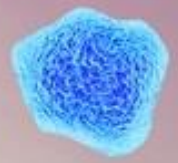
Cabiralizumab, a Product of the Five Prime Platform Blocks Survival of Macrophages

Cabiralizumab (FPA008) is an antibody to **CSF-1R**

CSF-1



IL-34

Five Prime discovered **IL-34**, one of the two ligands for CSF-1R that **cabiralizumab (FPA008)** blocks

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Cabiralizumab/OPDIVO® Combination Trial in Multiple Tumor Settings

PHASE 1a *Dose escalation*

- **Cabiralizumab Monotherapy**
- **Cabiralizumab + *OPDIVO***

*Expansion in **Selected Tumors***

- **Cabiralizumab Monotherapy**
- **Cabiralizumab + *OPDIVO***

PHASE 1b
Cabiralizumab + *OPDIVO*®

Initiated October 2016

Anticipate completing enrollment by end of 2017

- **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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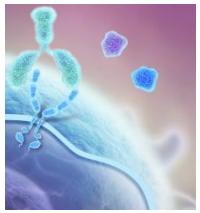
Cabiralizumab Immuno-Oncology Highlights



- 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
- Phase 1a/1b trial expected to enroll ~280 patients
  - Anticipate completion of Phase 1b enrollment by year end 2017
- Five Prime and BMS initial Phase 1a/1b trial data accepted as late breaking oral presentation at SITC on November 11th
  - Preliminary safety, pharmacokinetic and pharmacodynamic data
  - Initial efficacy from one of the expansion cohorts that enrolled quickly

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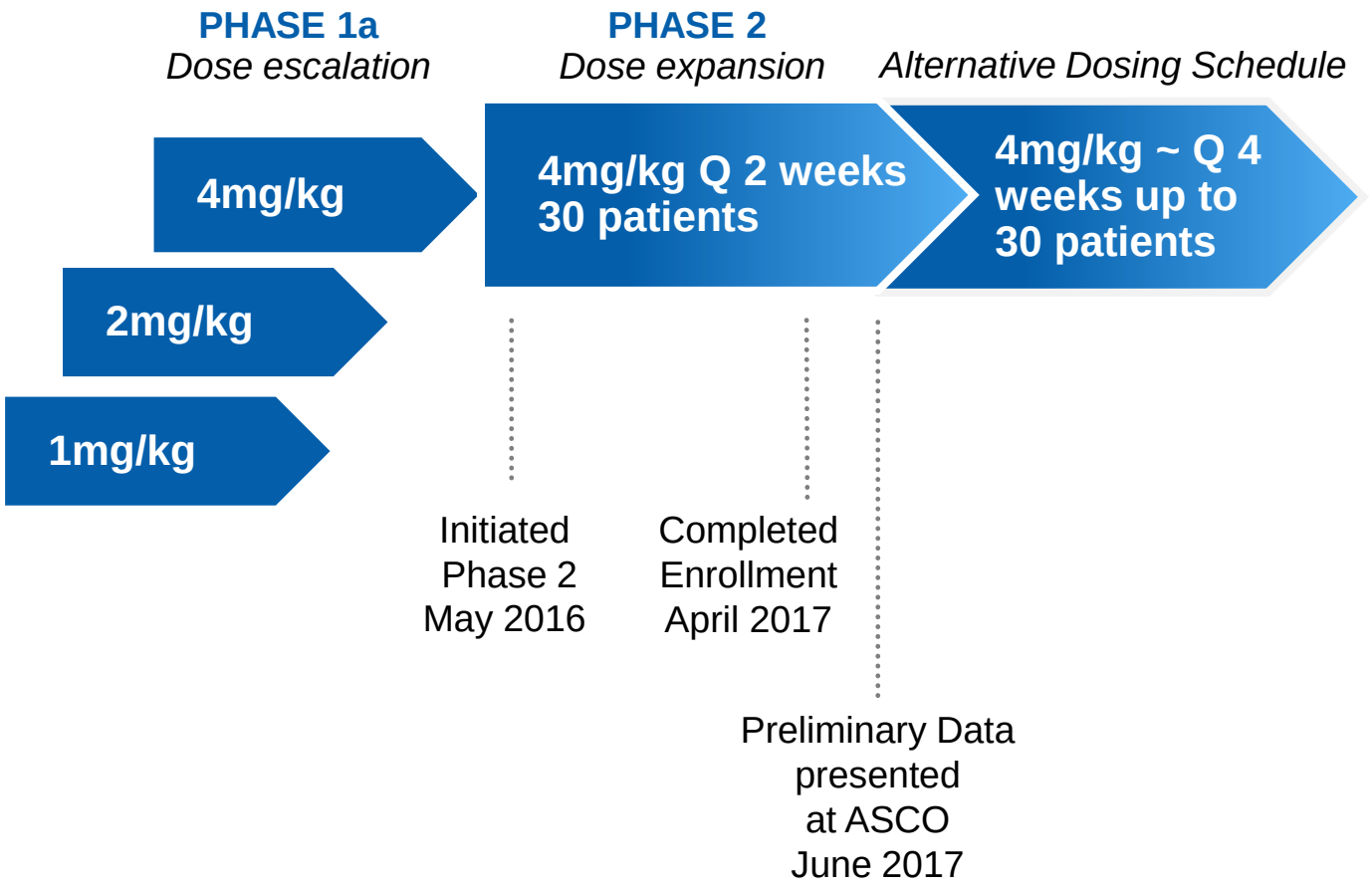
Cabiralizumab: Current Five Prime-Sponsored Phase 2 Trial in PVNS



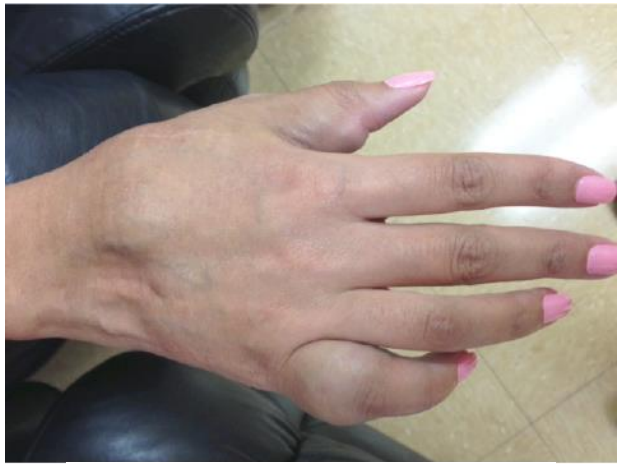
Study Objectives

- Objective response
- Pain
- Range of motion

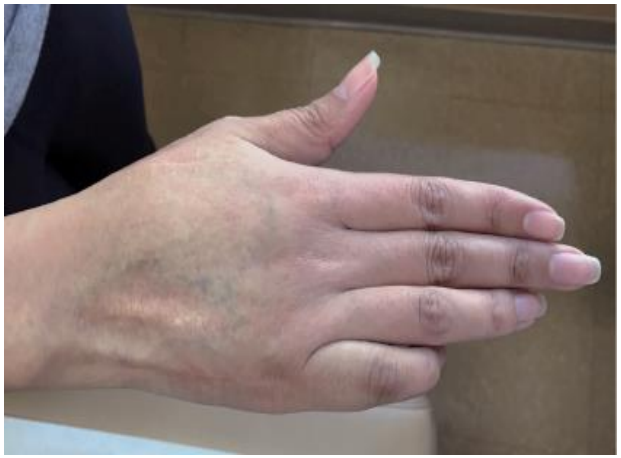
Preliminary Data Support Continued Development of Cabiralizumab in PVNS

- **Conclusions from Existing Data:**
  - **Efficacy:** Demonstrated clinical benefit by MRI and pain and function
  - **Safety:** Most frequent AEs were asymptomatic CK elevation, periorbital edema, pruritis

- **Ongoing trial amended to:**
  - Enroll additional (up to 30) patients to evaluate a flexible, every-4-week dosing schedule and provide additional data to inform pivotal trial decision/design
  - Pain is now an inclusion criterion, as improvement in pain is a key clinically meaningful endpoint
  - Patients with asymptomatic elevations of CK will be allowed to continue on treatment



Before treatment*



After 5 cabiralizumab doses at 4 mg/kg

*ASCO 2017 data presentation; 29-year-old female with PVNS treated with cabiralizumab

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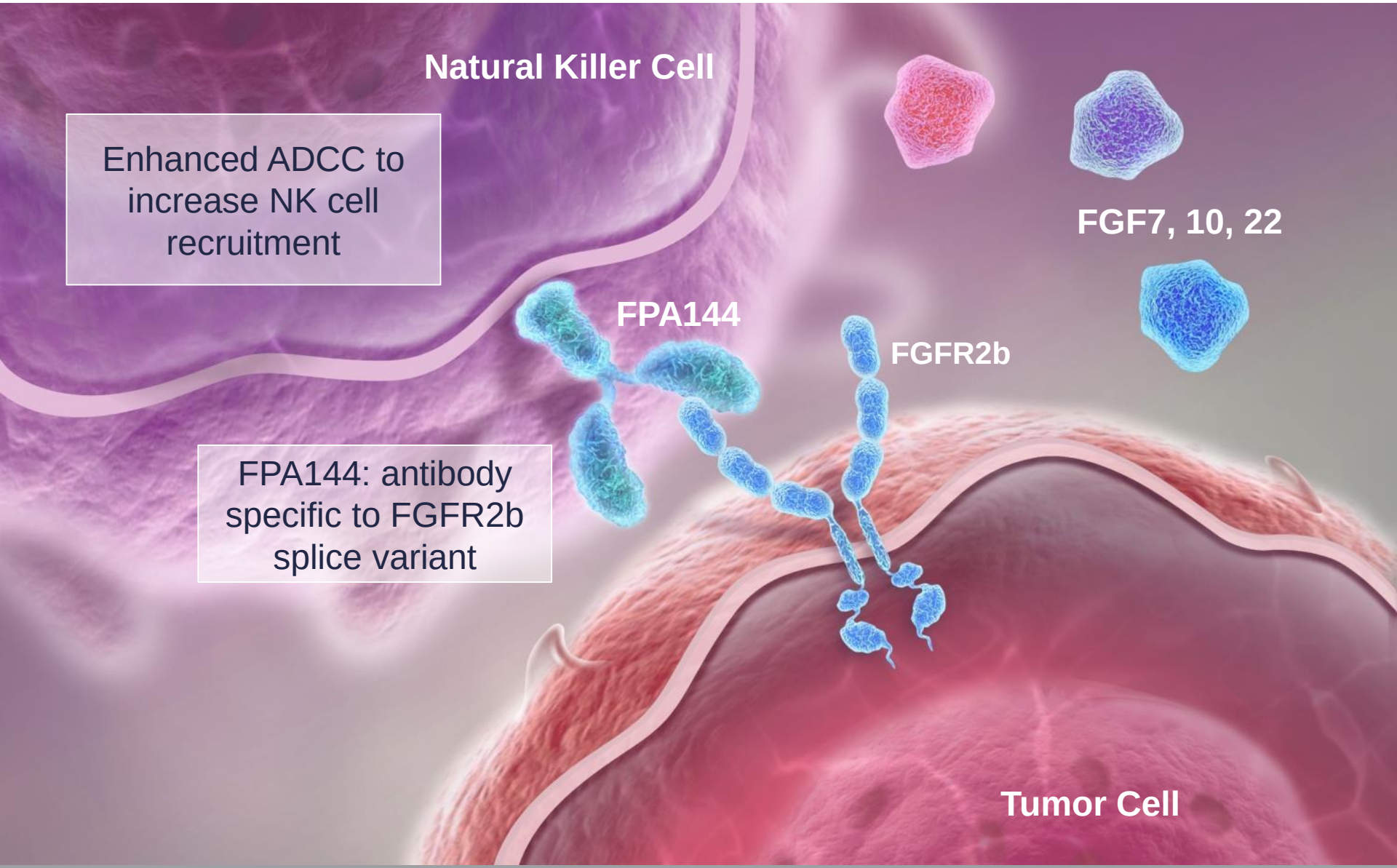
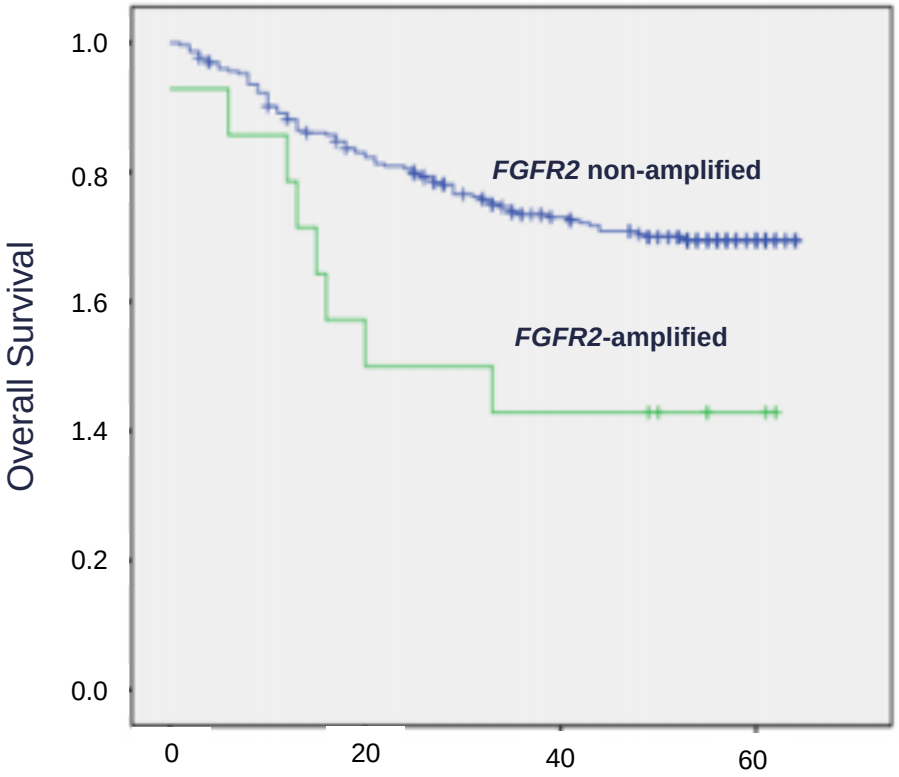
FPA144 Was Designed to Recruit Tumor-Killing NK Cells into the Tumor Microenvironment



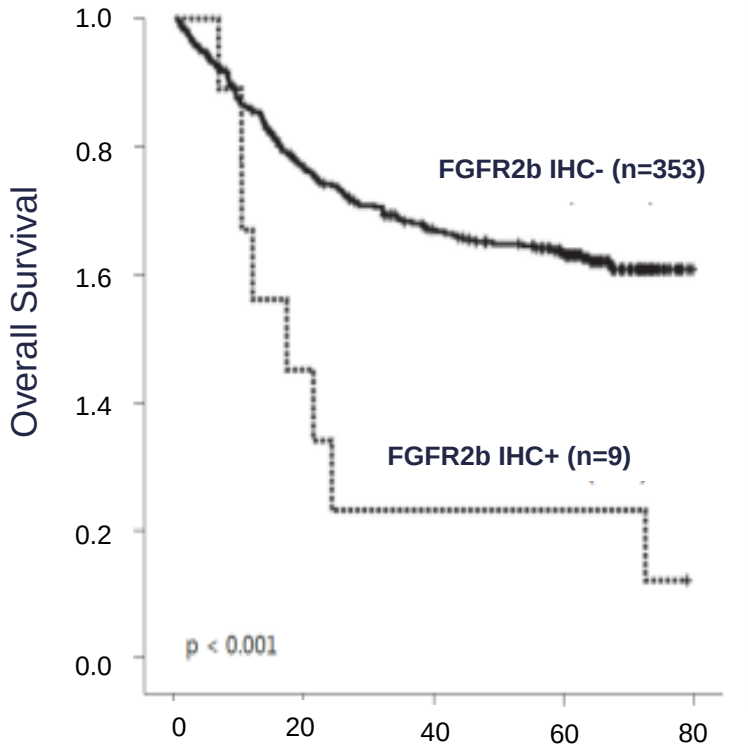
FGFR2b Overexpression and *FGFR2* Gene Amplification are Associated with Poor Prognosis

FGFR2 Gene Amplification (DNA)



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

FGFR2b Protein Overexpression (IHC)



Pathobiology 2015; 82:269-279

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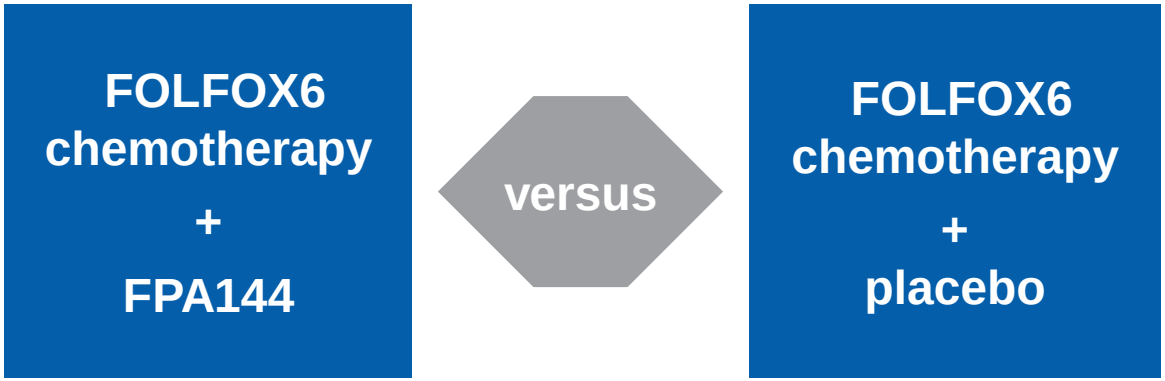
Preparing for Pivotal Trial of FPA144 for Front-Line Treatment of FGFR2b+ Gastric Cancer

- Continuing regulatory discussions worldwide on start of registration-enabling pivotal trial plan
  - Global (including China and Japan) randomized, controlled trial
  - Patients with metastatic gastric or gastro-esophageal junction cancer
    - Select biomarker-positive patients by ctDNA (blood-based) or IHC (tumor sample) tests; approximately 10% of patients expected to be biomarker-positive
  - Phase 1 safety run-in followed by Phase 3 trial
- Study start-up activities underway



Study Objectives

- OS (primary)
- PFS
- ORR

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Phase 1 Expansion Studies of Monotherapy FPA144

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

Metastatic gastric or GEJ cancer * – patients with high FGFR2b expression

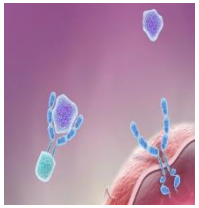
Metastatic bladder cancer – patients with FGFR2b expression

Study Objectives

- Safety
- PK
- Objective response rate and duration

* Enrollment complete

FP-1039 Highlights



- A protein drug designed to block FGF signaling
- Mesothelioma often overexpresses FGF-2, and FP-1039 blocks FGF-2
- Phase 1b enrollment complete
  - 25 previously untreated malignant pleural mesothelioma patients in combination with pemetrexed/cisplatin
  - Updated clinical trial data presented as an oral presentation at the ESMO 2017 Congress in September
  - FP-1039 was well tolerated and majority of patients across all does levels experienced tumor reduction
- Will seek partner to move program forward

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Summary of Cash and Cash Guidance

CASH, CASH EQUIVALENTS & MARKETABLE SECURITIES

$320.8 million as of September 30, 2017

FY 2017 ESTIMATED NET CASH USED IN OPERATIONS

<$120 million

ESTIMATED CASH, CASH EQUIVALENTS & MARKETABLE SECURITIES

Estimate ending 2017 with slightly less than $300 million

SHARES OUTSTANDING

28.9 million (as of September 30, 2017)

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Summary of Financial Results

(as of September 30, 2017; In Millions Except Per Share Amounts)

	2Q17	2Q16	YTD 2017	YTD 2016
Revenue	$8.3	$6.7	$26.3	$22.4
R&D expense	$42.7	$23.9	$118.2	64.9
G&A expense	$9.7	$9.1	$29.5	$25.3
Net loss	($43.3)	($19.4)	($121.0)	($45.6)
LPS per basic and diluted share	($1.54)	$(0.72)	($4.34)	($1.70)

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News Flow and Anticipated Milestones

Cabiralizumab Bristol-Myers Squibb

Multiple I-O Tumor Settings

- Expect to complete Phase 1b enrollment (7 settings) YE17
- Provide updates from additional cohorts 2H18

PVNS (Monotherapy)

- Enrolling additional patients w/flexible q4 week schedule
- Complete Phase 2 enrollment In 2018

FPA144 Gastric Cancer

- Preparing to begin Phase 1 chemo combo trial by YE17
- Transition to randomized, global Phase 3 portion mid-18
- Complete Japan P1 trial in 2018

Research

- FPA150 (B7-H4 antibody) IND Dec 17; Phase 1 initiation 1H18
- FPT155 (CD80-Fc) IND mid-18 with Phase 1 initiation 2H18

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Thank You

www.fiveprime.com

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