October 14, 2013

WELLS FARGO SECURITIES

Equity Research

Five Prime Therapeutics, Inc.

FPRX: We Initiated Coverage With An Outperform Rating

Outperform / V

Sector: Biotechnology
Market Weight

Initiation of Coverage

- **Summary: We initiated coverage of Five Prime with an Outperform rating on the shares and a $17-19 valuation range.** We believe FP-1039 and FPA008 have considerable promise in cancer and inflammatory diseases, respectively, and expect these agents and the likely sustainable stream of other biologics flowing out of their differentiated discovery platform to drive long-term value. Our valuation is based on a blend of probability-adjusted, discounted out-year EPS and sales multiples, combined with technology value.
- **We believe FPRX's biologics discovery platform provides the foundation for a sustainable pipeline and long-term revenue growth.** Five Prime's core technology is a comprehensive and efficient platform for the discovery of protein-based therapeutics, or biologics, incorporating a broad expression library of potential drug targets and high-throughput screening and validation systems. Through a combination of expertise, effort, and inventiveness, we believe FPRX has overcome shortcomings of other biologics engines, enabling a differentiated ability to discover and develop novel drugs for cancer and inflammatory diseases. We believe the platform's capabilities have been validated by the clinical and preclinical agents, and novel targets that have stemmed from it, as well as multiple collaborations with large pharma companies.
- **Lead asset FP-1039 has the potential to be an effective, safe therapy for a range of targeted cancer indications.** '1039's mechanism of inhibiting FGFs, signaling factors known to promote tumor growth and angiogenesis, has good scientific rationale, in our view, and FPRX's approach of using a ligand trap could improve the therapeutic window versus other developmental drugs targeting this pathway. Indeed, '1039 appeared well tolerated in an initial phase I solid tumor study, and we believe the recently initiated phase Ib in patients with FGFR-1 amplification should enable clearer proof of concept of its potential activity when data are available in H2 2014. Though early, we believe '1039's long-term potential in both FGFR-1-amplified and angiogenesis-driven tumors could be considerable, and estimate probability-adjusted sales of $360+ million by 2023, on which FPRX would receive royalties from partner GSK.
- **We view FPA008 as promising for a number of inflammatory diseases.** '008, a wholly owned antibody against CSF-1R expected to enter the clinic by year-end, showed robust preclinical evidence of activity. This, combined with its direct effects on monocytes/macrophages--upstream of several tried-and-true anti-inflammatory targets--makes it more likely the agent will ultimately demonstrate clinical benefits, in our view. Assuming FPRX can successfully optimize its efficacy/safety balance and confirm its potential areas of differentiation, we believe it could have a broad market opportunity in a number of inflammatory indications such as rheumatoid arthritis and psoriasis.

Valuation Range: $17.00 to $19.00 from NE to NE
Our valuation range is based on applying a 30x multiple to our 2023 estimated EPS and discounting at 15%, blended with 2.5x multiple of 2023 estimated sales, and discounting 10-12%, plus $4 for technology/pipeline value. Key risks, in our view, are clinical and regulatory failure of its programs, competition, and financing.

Investment Thesis:
We believe Five Prime's technology platform and biologics stemming from it will drive long-term value.

	2012A	2013E		2014E	
EPS		**Curr.**	**Prior**	**Curr.**	**Prior**
Q1 (Mar.)	NE	NE A		NE	
Q2 (June)	NE	NE A		NE	
Q3 (Sep.)	NE	(0.43)		NE	
Q4 (Dec.)	NE	(0.47)		NE	
FY	($23.05)	($3.27)		($1.68)	
CY	($23.05)	($3.27)		($1.68)	
FY P/E	NM	NM		NM	
Rev.(MM)	$10	$12		$15	

Source: Company Data, Wells Fargo Securities, LLC estimates, and Reuters
NA = Not Available, NC = No Change, NE = No Estimate, NM = Not Meaningful
V = Volatile, = Company is on the Priority Stock List

Ticker	FPRX
Price (10/11/2013)	$13.19
52-Week Range:	$12-16
Shares Outstanding: (MM)	16.8
Market Cap.: (MM)	$221.6
S&P 500:	1,703.20
Avg. Daily Vol.:	356,588
Dividend/Yield:	$0.00/0.0%
LT Debt: (MM)	$0.0
LT Debt/Total Cap.:	0.0%
ROE:	NE
3-5 Yr. Est. Growth Rate:	NE
CY 2013 Est. P/E-to-Growth:	NM
Last Reporting Date:	09/05/2013 After Close

Source: Company Data, Wells Fargo Securities, LLC estimates, and Reuters

Brian Abrahams, M.D., Senior Analyst
(212) 214-8060
brian.abrahams@wellsfargo.com
Matthew J. Andrews, Associate Analyst
(617) 603-4218
matthew.j.andrews@wellsfargo.com
Shin Kang, Ph.D., Associate Analyst
(212) 214-5036
shin.kang@wellsfargo.com

Please see page 27 for rating definitions, important disclosures and required analyst certifications
All estimates/forecasts are as of 10/14/13 unless otherwise stated.

Company Description

Five Prime Therapeutics (FPRX), Inc., headquartered in South San Francisco, California, is a biotechnology company focused on discovering and developing protein therapeutic candidates based on its extensive library of 5,600+ extracellular proteins, including ligands and receptors. Its lead development candidate is FP-1039 [ph.I(b)], an FGFR1-targeted ligand trap in development for solid tumors and partnered with GlaxoSmithKline. Behind '1039, its unpartnered pipeline includes FPA008 (ph.I) a monoclonal antibody in development for inflammatory diseases (e.g., rheumatoid arthritis), and FPA144 (preclinical), an antibody for gastric cancer. Beyond its three lead programs, Five Prime has discovery collaborations with GSK for muscle diseases (sarcopenia and cachexia) and respiratory diseases (refractory asthma and COPD) and UCB Pharma for fibrotic-related immunologic and CNS diseases.

Investment Thesis

We initiated coverage of Five Prime Therapeutics with an Outperform rating and a $17-19 valuation range. We believe FP-1039 and FPA008 have considerable promise in cancer and inflammatory diseases, respectively, and expect these agents and the likely sustainable stream of other biologics, including FPA144 and novel cancer immunotherapies, flowing out of their differentiated discovery platform, to drive long-term value.

We believe Five Prime's discovery platform provides a differentiated foundation for the company, enabling organic pipeline growth and external partnerships to drive long-term, sustainable value. Five Prime's core technology is a comprehensive and efficient platform for the discovery of protein-based therapeutics, or biologics. Although there are other companies with existing protein-based discovery engines, they have shortcomings that Five Prime has been able to address, we believe, through a combination of experience, time, effort, and inventiveness. One cornerstone is the company's comprehensive protein expression library containing 5,600 proteins--the majority of the receptors and secreted proteins amenable to biologic intervention--in complete, full-length, and functional form, which enables a vast database for drug screening and limits artifacts. Five Prime has also developed a highly automated, high-throughput protein screening system to rapidly interrogate potential drug targets within this library, as well as an efficient *in vivo* system to validate such targets in disease-relevant animal models. We believe that these elements will provide Five Prime with a differentiated ability to discover, optimize, and develop novel biologics for cancer and inflammatory diseases, a considerable market (such drugs had sales of more than $71 billion in 2012). Discovery partnerships with several major pharmas, such as GSK and UCB Pharma, in our opinion, validate the attractiveness of Five Prime's platform and have also demonstrated its ability help Five Prime generate nondilutive capital ($220 million since 2006).

Lead drug FP-1039, in our view, has the potential to be an effective and safe therapy for a broad range of targeted cancer indications. FP-1039 is a fusion protein that uses the fibroblast growth factor receptor 1 (FGFR-1) as a "decoy" receptor to serve as a ligand trap for FGFs, signaling factors known to promote tumor growth and angiogenesis. Partnered with GSK, it recently entered a phase Ib study. Although there are no marketed cancer drugs that inhibit FGF this specifically, we believe animal studies, mutational screening of human cancers, and signals of clinical activity observed with other developmental mediators of the pathway provide solid evidence it is a valid approach. By virtue of being constructed as a ligand trap, we believe '1039 also has the potential for an improved profile compared to other FGF-pathway targeted agents currently or previously in development. This includes less off-target side effects on tyrosine kinases like VEGF compared to small molecules, and fewer interactions with hormonal FGFs; these could enable higher dosing, greater activity, and better tolerability. Indeed, in an initial phase I study in advanced cancer patients, '1039 looked safe, at doses that conferred adequate inhibition of FGF signalling. Although the nonselected patient population made it difficult to get a read on activity, we believe we could see clearer efficacy signals in the recently initiated phase Ib study in NSCLC and other solid tumors, as it will enroll patients with FGFR-1 amplification who—by virtue of having tumors likely more dependent on this pathway—should benefit more from '1039. Though a subpopulation, there are still a meaningful (6-22%) portion of patients with common solid tumors who are believed to have FGFR-1 amplification, providing substantial market opportunity. Considerable additional market potential could come from '1039's use in angiogenesis-mediated tumors such as renal cell carcinoma (RCC) and hepatocellular carcinoma (HCC), where preclinical data have shown the drug's potential to be complementary to VEGF inhibitors by preventing a potential angiogenesis escape pathway. Overall, we estimate blended probability-weighted sales of more than $360 million by 2023, with more than $1 billion in overall potential if successful in multiple tumor types.

We believe FPA008, Five Prime's next asset, has promise in a number of inflammatory diseases. FPA008 is a wholly owned antibody against CSF1-R expected to enter the clinic by year-end. The CSF-1R pathway has become a more closely studied target, as survival and proliferation of monocytes and macrophages--cells that are key in the inflammatory process--are mediated through the CSF-1 receptor and its signaling ligands, CSF-1 and IL-34 (the latter of which was discovered through Five Prime's platform). Preclinical data indicated strong activity of Five Prime's antibody in the validated CIA mouse model of rheumatoid arthritis (RA), where the agent reduced joint swelling and bone damage vs. marketed biologic Enbrel, in our view increasing the likelihood that it will show clinical efficacy. As with any immunomodulatory approach for inflammatory diseases, Five Prime would need to optimize the efficacy/safety balance for each indication. Still, several factors, including its natural preference for inflammatory versus anti-infective cells, low ADCC activity, and dosing cushion before a liver biomarker might be observed, increase our confidence the drug will have a therapeutic window that is clinically and commercially acceptable. Though there are many drugs on the market or in development for inflammatory diseases, there remains a considerable unmet need across diseases including lupus, RA, MS, and psoriasis, where there is also strong scientific rationale for CSF-1R inhibition. Additionally, '008 has the potential to be differentiated through better structural benefits in diseases like RA, owing to its more direct inhibition of bone-eroding osteoclasts, and through the possibility of using activated monocyte levels in a companion diagnostic to predict response. '008 is set to enter a phase I by year-end exploring safety, PK, and monocyte reductions, with a subsequent transition into RA patients. Though the drug is early, we believe the longer-term opportunity for '008 could be considerable, and estimate nearly $300 million worldwide in RA and psoriasis early in its launch, with blockbuster potential beyond this.

FPA144, as well as other programs in early-stage development, illustrate the pipeline breadth that Five Prime's platform has the potential to create. FPA144 is a monoclonal antibody targeting FGFR2b, designed to have ADCC activity against cells expressing the FGFR2b receptor, which has been found to be overexpressed in certain solid tumors such as a subset of gastric cancers. Xenograft data for the mAb demonstrated dose-dependent tumor suppression in an FGFR2-amplified gastric cancer model, suggestive of its potential activity. Given its early stage of development (it is slated to enter the clinic in H2 2014), we do not currently include the program in our valuation. However, we believe it could have the potential for both an accelerated development path in the United States, due to the small patient population, as well as a broader market opportunity in Asia, where gastric cancer is more common. Beyond FPA144, Five Prime also has multiple other targeted biologic agents in preclinical development stemming from its discovery platform, which we believe could provide a steady stream of value-generating assets, including novel cancer immunotherapies and drugs for steroid-resistant asthma.

Valuation

We have established a $17-19 valuation range for Five Prime. We based our valuation analysis on our probability-adjusted revenue projections for FP-1039 in various solid tumor types and FPA008 in RA and psoriasis. We assume 15-35% probabilities of success for FP-1039, depending on the indication and extensiveness of the clinical and preclinical evidence, and a 20% probability of success for FPA008 in light of its early stage. Assuming approximately 25.7 million shares diluted shares outstanding, which accounts for several potentially dilutive capital raises as well as a $75 million upfront payment for an FPA008 partnership, we arrived at a probability-adjusted 2023 EPS of $1.53. Applying a 30x multiple, which we believe is appropriate for a biotechnology company of Five Prime's size and potential, and discounting at 15% for slightly over nine years, would yield a valuation of $13. Using a valuation analysis based on sales multiples, applying a 2.5x multiple (assuming all programs are partnered) on our estimated probability-adjusted worldwide product sales of $422 million, and discounting back slightly over nine years at 10-12% yields a potential valuation range of $16. Blending these two methodologies and adding $4.00 for the company's technology value, would yield a valuation range of $17-19.

Exhibit 1. Valuation Analysis

Year:	**2023E**	**Discount (yrs)**	**9.2**	**EPS:**	**$1.53**	**Shares out:**	**25,700**
Product:	Indication:	Region	Probability of success:	Prob-weighted sales	Net to company:	Probability-weighted EPS contribution:	
FP-1039	Various solid tumors	Worldwide	13-35%	$363M	9%	$1.31	
FPA008	RA, psoriasis	Worldwide	20%	$59M	9%	$0.21	
Total				$422M		$1.53	

	Discount Rate:				
EPS Multiple:	5%	10%	15%	20%	25%
15	$15	$9	$6	$4	$3
20	$19	$13	$8	$6	$4
25	$24	$16	$10	$7	$5
30	$29	$19	$13	$9	$6
35	$34	$22	$15	$10	$7
40	$39	$25	$17	$11	$8

	Discount Rate:				
Sales Multiple:	9%	10%	11%	12%	13%
1.5	$11	$10	$9	$9	$8
2.5	$19	$17	$16	$14	$13
3.5	$26	$24	$22	$20	$19

Blended EPS and sales multiples	$14
Technology/early-stage pipeline value	$4
Implied fair value	**$18**

Source: Wells Fargo Securities, LLC estimates

Upcoming Milestones And Product Pipeline

Exhibit 2. Upcoming milestones

Product	Event	Timeline
FP-1039	Top-line results from ph.Ib study	2H14
	Potential pre-ph.IIb study meeting with FDA	2H14/1H15
	Consider initiating ph.II/III randomized study of SOC+/-'1039 in NSCLC	2015
	Explore studies in other cancer indications (GIST, mesothelioma, GBM, RCC, HCC)	2014/2015
FPA008	Complete manufacture of drug substance for ph.I	End-2013
	Initiate ph.I study	End-2013
	Ph.I top-line PK and safety results	2H14
	Expand ph.I study to include RA patients	2H14
	Introduce SC formulation	2H14/2015
	File IND, initiate ph.II study likely in biologics failures	2015
	Explore other inflammatory diseases (IPF, lupus nephritis, etc.)	2015
FPA144	File IND	2014
	Initiate ph.I study	2H14
	Top-line ph.I results	2015

Source: Company reports and Wells Fargo Securities, LLC estimates

Exhibit 3. Product pipeline

Product (partner)	Indication/mechanism	Status
FP-1039 (GSK)	Oncology (multiple solid tumors); FGF Ligand Trap	Phase Ib
FPA008	Autoimmune disease; CSF1R antibody	Entering phase I
FPA144	Gastric cancer; FGFR2b antibody	Pre-IND
GSK	Muscle wasting (sarcopenia and cachexia), respiratory (refractory asthma and COPD)	Discovery
UCB	Fibrosis, immunologic, and CNS diseases	Discovery
Multiple candidates	Antibodies and ligand traps vs. cancer, immunotherapy, steroid resistant asthma	Discovery

Source: Company reports and Wells Fargo Securities, LLC

Key Risks

- **Clinical risk**--Given the early stage of Five Prime's biologics programs, there the risk that a number of them could face setbacks on their respective clinical devlopment paths. For FP-1039, inhibition of FGF1R has been scientifically validated, but it has not been clinically proven to be an effective mechanism in humans, including those with FGFR1 overexpression and while FP-1039 was specifically designed to overcome the limitations of similar approaches, it is possible there could be undesired adverse events/effects such as interaction with hormonal FGF receptors, weight loss, and/or retinal epithelial detachment seen with other agents. While not observed in the initial ph.I study, emergence of such toxicities could limit dose escalation, requiring dosing at lower and possibly less beneficial doses. In addition, there are no extensive historical battery of clinical results in FGFR1 over-expressed squamous NSCLC, which could make the phase Ib data more difficult to put into context and to help guide future clinical development (e.g., powering assumptions in phase II and III studies, and treatment effects). If the incidence of patients with FGFR1 over-expression is lower than Five Prime expects, this could also push out recruitment timelines for the ph.Ib and future studies, development timelines, and potentially future revenue. For FPA008, though natural selectivity for monocytes involved in inflammation should help, infection risk is always as possibility with immunomdulatory approaches, especially those directly targeting monocytes/macrophages.

- **Regulatory risk--**In cancer, development of new therapies means the standards of care for each tumor type often change rapidly, which could complicate future trial designs for '1039 and '144. Five Prime, GSK, and other potential partners would need FDA buy-in for a potential faster path to market for '1039 in refractory squamous NSCLC and for '144 with amplified gastric cancer to enable those agents to reach the market more quickly, or the development timelines and time to revenue generation would become longer. For '008, the auotimmune markets are crowded, especially in RA, which is likely to raise the efficacy and safety bars for regulatory approval.

- **Commercial risk**--FP-1039 and FPA144 are designed to be targeted toward specific populations with overexpression or amplification of certain genes/proteins; if these population are smaller than what is projected based on the literature, this could limit Five Prime's revenue opportunity. For FPA008, the RA market is crowded, thus it will be important for Five Prime to formulate '008 as a subcutaneous injection rather than an intravenous infusion, and to demonstrate a meaningful improvement in important bone endpoints (which has been a challenge to prove in recent studies of other agents), in order to maximize differentiation from other therapies and gain meaningful market share.

- **Finanacial risk**--Five Prime's candidates are at an early stage of development, and while the company has been able to generate cash from non-dilutive platform collaborations, it will need additional funding as it advances '008 and '144 into human studies on its own. Raising cash in the equity markets would result in dilution to current shareholders.

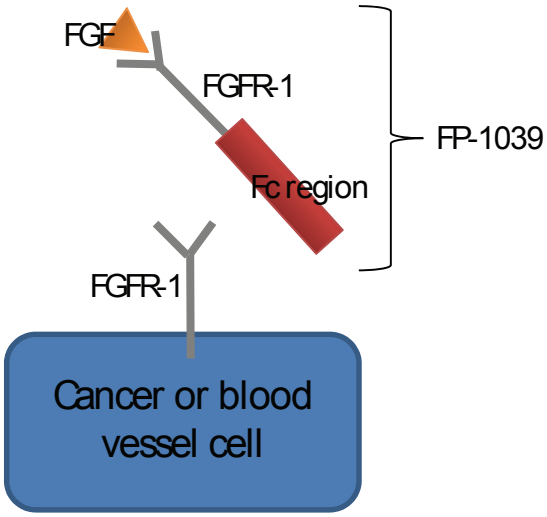
Developmental Programs

FP-1039

Overview

FP-1039 (also known as GSK3052230) is a fusion protein inhibiting FGFs in phase I development for various cancers. The agent is designed to inhibit FGFs known to promote tumor growth and angiogenesis, with the potential for fewer toxicities than other agents targeting similar pathways. FP-1039 is constructed as a ligand trap, with the extra-cellular domain of the FGFR1c receptor fused to the Fc portion of an antibody (Exhibit 4). Five Prime completed a small phase I study in patients with advanced cancers, and a phase Ib study in a more targeted population with FGFR1 overexpression is ongoing, with data expected H2 2014. The agent is partnered with GSK in the United States, Canada, and Europe.

Exhibit 4. FP-1039 Fusion Construct



Source: Wells Fargo Securities, LLC

Mechanism Of Action

FGFs are a biologically validated target for potential anticancer therapies, in our opinion. Generally speaking, blockade of tyrosine kinases involved in oncogenic signaling pathways is a tried-and-true approach to cancer treatment, with multiple effective and successful agents on the market. FGF signalling itself is believed to be involved in promoting cancer cell growth, tumor angiogenesis, and survival of tumor stem cells. Animal studies, xenograft models, and mutational screening of human cancers provide strong evidence that alterations in the FGF signaling pathway--such as by mutational activation or overexpression of FGF receptors, or upregulation of FGFs--promotes tumor growth. Indeed, cancers with overexpression of FGFR1 are associated with a poorer prognosis.

Early studies of other FGF-targeted agents have shown potential signals of activity, which while too early to be definitive, help support the approach. Several other companies have explored inhibition of the FGF signaling pathway for cancer, with approachs including small molecule tyrosine kinase inhibition, as well as monoclonal antibodies against both specific FGF ligands, such as FGF2, as well as particular receptors. A few of the more notable agents currently and previously in clinical development are listed in Exhibit 5.

Exhibit 5. Notable Other Agents Targeting FGF Pathway Currently Or Previously In Development

	Drug	Company	Approach	Results/ status
Small molecules	AZD-4547	AstraZeneca	Small molecule FGFR1-3 inhibitor	Hyperphosphatemia observed in ph.I, as well as increased liver enzymes, stomatitis, renal failure, retinal detachment, nail changes, alopecia, and mucositis; one PR in a NSCLC patient with some additional pts with stable disease (5/20 FGFR amplified patients with clinical response); ph.IIs of 80mg BID being investigated in solid tumor studies including FGFR1-amplified breast cancer and squamous NSCLC, and FGFR2 amplified in gastric/esophageal cancers
	BGJ-398	Novartis	Small molecule FGFR inhibitor	Hyperphosphatemia observed in ph.I, as well as diarrhea (37%), fatigue (37%), and nausea; one 33% reduction in target lesions in lung cancer pt with FGFR1/CEP8 ratio of 2.6; entering ph.II combo study with PI3K alpha inhibitor in advanced solid tumors in +/- FGFR1-3 alterations
	JNJ-42756493	Astex/JNJ	Small molecule FGFR inhibitor	Ph.I in advanced solid/hematologic cancers
	ARQ-087	ArQule	Small molecule inhibitor of FGFR1, 2, and 3	Ph.I in refractory solid tumors
	LY-2874455	Lilly	Small molecule FGFR inhibitor	Ph.I in 100 advanced cancer pts in Asia
	lucitanib hydrochloride (E-3810)	Servier/Eos	Small molecule multiple-TKR inhibitor	2 PRs and 1 SD among 5 FGFR1+ patients with advanced solid tumors in ph.I
Biologics	OM-RCA-001	OncoMax/PX Therapeutics	Humanized anti-FGFR1 mAb	Preclinical, RCC
	BAY-1179470	Bayer	Anti-FGFR2 mAb	Recently entered ph.I in Japan
	HuGAL-F2	Roche/Galaxy	Humanized anti-FGF2 mAb	Preclinical including HCC
	RG-7444/R3mab	Roche	Humanized anti-FGFR3 mAb	Completed ph.I in MM and solid tumors, likely discontinued
	n/a	Genentech	Anti-FGFR1 antibody	Discontinued while preclinical due to weight loss
	ENMD-0996	EntreMed	Therapeutic vaccine targeting FGF-2	Discontinued while preclinical
	IMC-A1	ImClone	Neutralizing mAb against FGFR1c	Preclinical, no longer in development; caused rapid weight loss in animals theorized to be related to hypothalamic interaction
	ProMabin/MOR-201	ProChon Biotech/Morphosys	FGFR3 antibody	Discontinued while preclinical

Source: Wells Fargo Securities, LLC and company reports

Some of the agents have shown clear anti-tumor potential preclinically, and some possible signals of activity have been seen in initial studies in advanced cancer patients. These include a 33% reduction in target lesions in a lung cancer patient on NVS's small molecule FGFR inhibitor BGJ-398, and a partial response plus some stable disease observed with AZN's small molecule AZD-4547 (5/20 FGFR1 or 2 amplified patients had clinical benefit). As these other programs progress, they should provide a better read both on the potential competitive landscape in this space but also on ways their approachs could be refined.

The FGF family does have some complexities, though, that require a nuanced approach to targeting. Of the 22 known FGF ligands, some are mitogenic--binding to one of six transmembrane FGF receptors to activate signal transduction cascades involved in cellular proliferation and angiogenesis and/or directly translocate to the nucleus to mediate these functions. However, others are hormonal, affecting areas like phorphorus and calcium kidney balance (a gain-of-function mutation in FGF23 results in rickets).

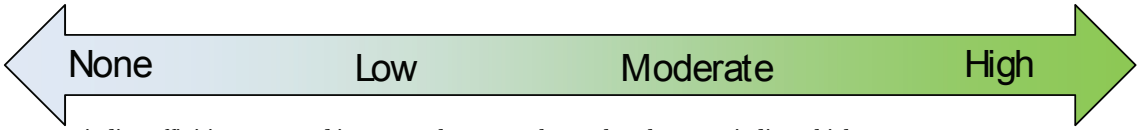
Exhibit 6. Different FGF Subtypes, And FP-1039's Degree Of Affinity For Each One

FGF-7	0
FGF-10	0
FGF-12	0
FGF-19	0
FGF-21	0
FGF-22	0

FGF-23	6.7

FGF-20	0.151
FGF-3	0.292
FGF-5	0.295

FGF-1	0.0031
FGF-18	0.0299
FGF-6	0.034
FGF-16	0.0404
FGF-8b	0.0456
FGF-2	0.0462
FGF-17	0.0594
FGF-4	0.0675
FGF-9	0.0919



Notes: Binding affinities expressed in x10^8 M; lower numbers other than zero indicate higher potency.
Source: Adapted from Harding TC et al 2013 and Wells Fargo Securities, LLC

We believe FP-1039's more optimized approach should help it address some of the shortcomings of other FGF pathway modulators, helping maximize its chances of success. Though there have been some potential signals of activity with other FGF pathway modulators, dose escalation--and in some cases advanced development altogether--has been limited by certain toxicities, relating to the complexity of the pathway and its multiple ligands and receptors. FP-1039 has the potential to avoid some of these issues:

- **Endocrinological interactions**: Because inhibition of FGF receptors also blocks the necessary binding of the hormonal FGFs like FGF23 to their receptors, it can cause endocrinological disruptions, and in fact hyperphosphatemia was seen in phase I studies of both NVS's and AZN's small molecules. Five Prime should be able to get around this because the hormonal FGFs are believed to require a cellular co-receptor for binding, so use of an FGFR1 "decoy" receptor unattached to a cell should more selectively trap the antitumor FGF ligands.

- **Off-target side effects**: Though the small molecules have been designed to be selective for FGFR, they still do retain some activity against VEGF. For instance, AZN's and ASTX's agents are 20- and 30-fold more selecitve for FGF receptors than for VEGFR2. In contrast, Five Prime's ligand trap does not interact with VEGF or VEGFR at all. That might create a wider therapeutic window for Five Prime, as dosing should not be limited by any VEGF-related toxicities, enabling it to maximally inhibit tumorigenic FGFs.

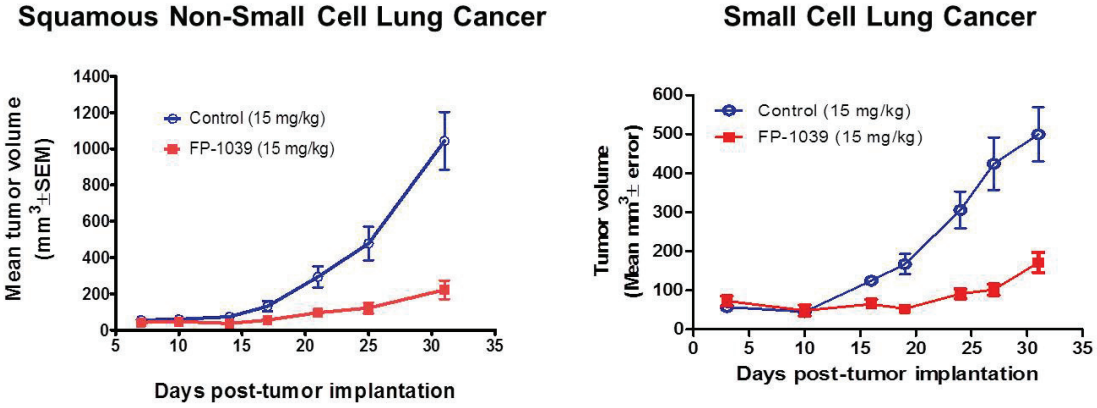
- **Breadth of anti-FGF activity**: Earlier approaches included inhibitors of specific ligands such as FGF2. However, FP-1039 should have the advantage of inhibiting a much broader array of tumorigenic FGF ligands, which could theoretically lead to better activity.

- **Other issues**: Some other side effects have been seen with other FGF pathway inhibitors. One of IMCL's anti-FGFR1 antibodies, to the c-splice receptor variant, caused profound weight loss in animals, as did a similar anti-FGFR1 antibody from Genentech. This was hypothesized to be due to hypothalamic interactions. However, this could theoretically be due to differences in these agents' approach to inhibiting the biology compared to '1039 (i.e., potential cell-killing activity against FGFR1-expressing hypothalamic cells), and we note was not seen with '1039 in animal studies (at doses up to 200mg/kg- far more than needed to block the receptor) or in humans. Grade 1/2 retinal epithelial detachment was also observed with AZN's small molecule (and we believe also NVS's), the mechanism for which is unclear. This could potentially relate to the small molecules' effects directly inhibiting FGFR2 (though both FGFR1 and FGFR2 are expressed to some degree in the retinal epithelium). Nonetheless, neither this side effect, nor any visual issues, was observed in Five Prime's phase I study, providing some comfort, though dosing was much shorter than in AZN's study, so it still bears watching in larger, longer studies.

Preclinical Data

Preclinical data support the mechanistic rationale, demonstrating clear antitumor effects both as a single agent and in combination with chemo in FGFR1-amplified tumor models--helping form the basis for GSK/Five Prime's phase Ib strategy. In xenograft models of NSCLC and SCLC with FGFR1 amplification, '1039 as a single agent demonstrated tumor suppressive effects (Exhibit 7).

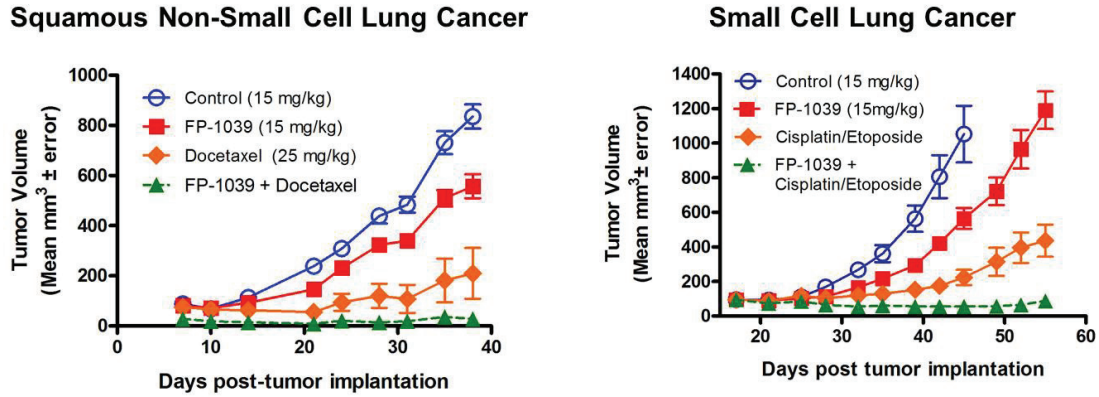
Exhibit 7. Xenograft Models Of FGFR1-Amplified Squamous NSCLC And SCLC Show Inhibtion Of Tumor Growth By Single-Agent FP-1039



Source for both charts: Company reports (used with permission)

While activity was not quite as robust as for chemo in these models, the agent did provide additional benefits on top of chemo (Exhibit 8).

Exhibit 8. Xenograft Models Of FGFR1-Amplified Squamous NSCLC And SCLC Show Additional Tumor Inhibition When FP-1039 Is Added To Chemotherapy

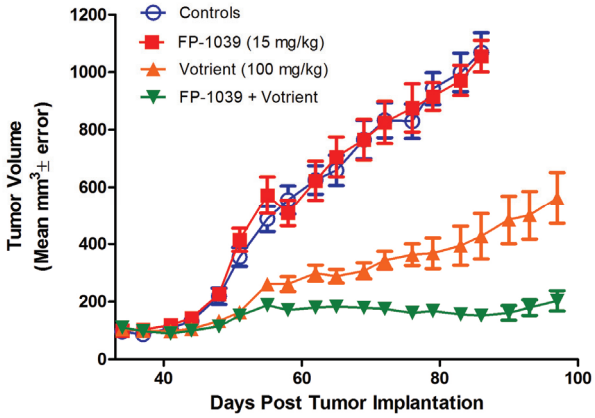


Source for both charts: Company reports (used with permission)

It is theorized that by interacting with the survival pathway, using chemotherapy plus FGF inhibition would have additive antitumor activity.

There is also some evidence for FP-1039's enhancement of activity of antiangiogenic drugs, which if it plays out clinically could provide additional broad market opportunity for the agent. As a single agent, no activity for '1039 was observed in a xenograft model of renal cell carcinoma, a tumor type known to be highly dependent on angiogenesis. However, the drug did look to enhance the activity of anti-VEGF agent pazopanib (Exhibit 9). This suggests that blockage of FGF using '1039 may prevent what is believed to be a pro-angiogenesis "escape pathway" that can lead to growth/replace on or following VEGF treatment.

Exhibit 9. FP-1039 Enhances VEGF-Inhibitor (pazopanib) tumor Inhibition In An Angiogenesis-Related Cancer (RCC) Model Despite Minimal Single-Agent Activity



Source: Company reports (used with permission)

This could open up the possibility for '1039 to be used, perhaps in combination with VEGF treatment, in a number of angiogenesis-dependent solid tumors such as RCC, HCC, and GBM.

Clinical Trials

The phase I study confirmed acceptable safety at doses, which effectively reduced FGF. The phase Ia study was conducted in 39 patients with advanced solid tumors. Doses tested included 0.5mg/kg up to 16mg/kg (the later equating to 20mg/kg in subsequent trials, using updated terminology), in once-weekly IV infusions over four weeks. No MTD was identified, and initial DLTs of grade 3 neutropenia and a bowel perforation at the lower dose appear to be unlikely drug-related, in our view. Overall, there did not look to be any particularly concerning pattern of adverse events (Exhibit 10):

Exhibit 10. Grade 2 Or Higher Side Effects Observed In Initial Phase I Study Suggest No Clear Dose-Dependent Signals

Dose	0.5mg/kg	0.75mg/kg	1mg/kg	2mg/kg	4mg/kg	8mg/kg	16mg/kg
Number of pts	6	6	6	3	3	5	10
Anemia			17%				
Leukopenia							10%
Neutropenia			17%*				
Diarrhea			17%				
Intestinal perforation			17%*				
Nausea			17%				
Vomiting							10%
Fatigue	33%						20%
Infusion reaction							10%
Edema			17%				
Hypocalcemia	17%						
Hyponatremia							10%*
Weakness							10%*
Urticaria		17%					

*grade 3 side effect; all others grade 2

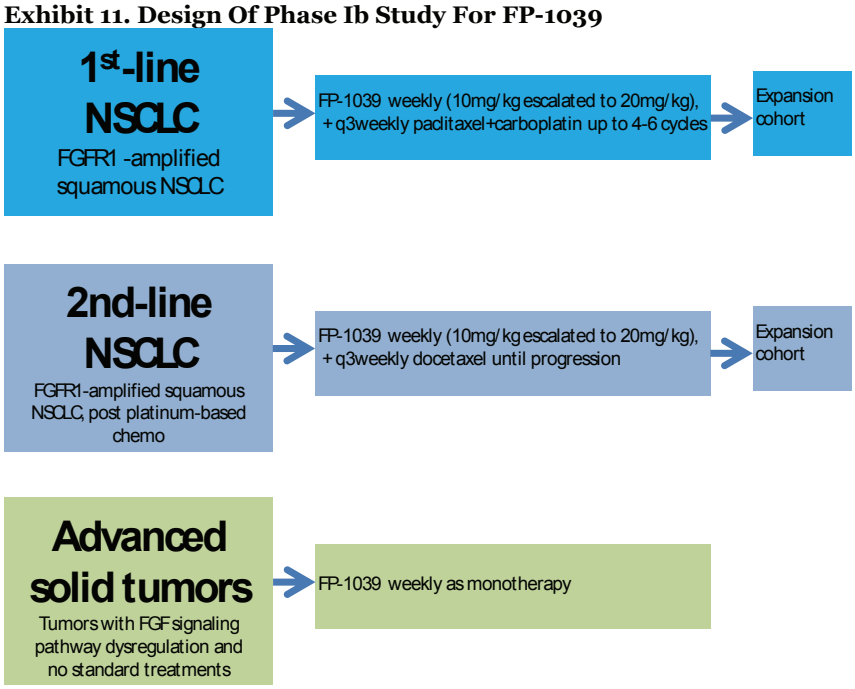
Source: Company reports and Wells Fargo Securities, LLC

Importantly, none of the side effects that have been concerning with other agents--hyperphosphatasia, weight loss, retinal epithelial detachment, or alopecia--were observed. At the 8mg/kg dose (where no grade 2 drug-related AEs were seen), FGF2, a relatively easily measureable FGF ligand, was completely suppressed. While just one of many ligands that bind to FGFR1, we believe it does suggest '1039 should have a reasonably wide therapeutic window. Given the complexity of the FGF pathways and the multiple cell and tissue types utilizing FGF signaling, though, we believe it will still be important for larger and longer studies to confirm the safety of the approach and of FG-1039.

It is difficult to gauge potential activity from the initial study, given the nonselected patient population. The phase I was conducted several years ago, before there was a more refined understanding of the role of FGFs in cancer. As such, patients in the study represented an "all-comers" population not selected for FGFR1 gene amplification nor for vascularized/angiogenesis-dependent tumors more likely to respond. Indeed, no squamous NSCLC or RCC patients were enrolled. The short duration of treatment also makes it difficult to assess efficacy. One patient with prostate cancer with prior rapid progression on chemo did experience tumor shrinkage and seven months of stable disease, and 16 others had stable disease in the study. No trends were observed between FGF2 reductions or dose, also making it difficult to tease out any potential drug effects.

The recently initiated phase Ib study should provide a clearer read on FP-1039's potential activity in the targeted population. Partner GSK recently initiated a 70-104 patient phase Ib study of '1039, which opened to patient enrollment in September. The study will explore the agent in first- or second-line squamous NSCLC patients with FGFR1 amplification, in combination with standard of care chemotherapy, with an additional arm to test monotherapy safety and activity in other solid tumors. U.S. and European sites will be included in the study, and the trial will measure safety, tolerability, and overall response rate. The study is expected to read out in H2 2014, though given the highly specific inclusion criteria, tracking the pace of enrollment once multiple academic sites are up and running should better inform exact potential timelines. Exhibit 11 offers an illustration of the trial design.

Exhibit 11. Design Of Phase Ib Study For FP-1039



Note: 20mg/kg dose in phase Ib study equates to 16mg/kg dose studied in phase Ia
Source: Company reports, clinicaltrials.gov, and Wells Fargo Securities, LLC

Results from the study would help inform next steps for the agent. Because it is open label, assessing clinical activity will require examining historical data for chemo alone in the NSCLC indications. Our review of historical data indicates that typical ORRs for chemo doublets/singlets in first- and second-line squamous NSCLC patients, respectively, are as follows:

- First-line squamous NSCLC with carboplatin/paclitaxel: roughly 25% based on the ph.III Abraxane + carboplatin study supporting FDA approval.
- Second-line NSCLC: ph.III monotherapy results for Taxotere (docetaxel) were not based on histology (e.g., squamous and non-squamous) and were 5.5% and 5.7%, respectively, in the TAX317 and TAX320 studies. Due to the lower overall ORR, we expect there is likely no significant difference in ORR by histology.

One limitation that could make interpreting results of the phase Ib study difficult is that there is no useful historical data on the response rates for FGFR1-amplified patients; the expected responses to chemo could theoretically be lower, since these patients tend to have a worse prognosis, but this is not certain. Five Prime and GSK have not set a specific bar for efficacy for moving the program forward, as it would be a multifactorial decision based on safety, efficacy, and PK/PD assessments, but we believe response rates of 40-45+% in the front line and 10-15+% in the second line, with reasonable tolerability and accounting for characteristics within the studied patient population, would likely raise interest.

In terms of potential next steps, there are a variety of different options depending on the data both in NSCLC patients and in other tumor types. Given the small patient population, considerable unmet need, and specific targeting for a responsive patient population, the FDA could potentially be amenable to a more expeditious regulatory path in previously treated squamous NSCLC with FGFR1 amplification. If there are signals of activity in the second-line population, we believe GSK and Five Prime might consider moving FP-1039 into a randomized phase II or phase II/III study on top of docetaxel in such patients, with the possibility that robust response rates could enable accelerated approval. In the first-line squamous NSLCLC setting, the companies might conduct a randomized phase II or phase II/III study on top of a chemo doublet, with a likely longer duration, larger size, and possible PFS endpoint. In part depending on the results of the monotherapy FP-1039 arm of the phase Ib, GSK and Five Prime might also explore other FGFR1-amplified tumors like ER+ breast cancer or head and neck cancer, angiogenesis-driven cancers like renal cell carcinoma, HCC, and GBM, or ligand-driven diseases like mesothelioma and GIST.

GSK Partnership

FP-1039 is partnered with GSK in key territories. The agent was originally partnered with HGSI, for which Five Prime received $50 million upfront--a reasonably sizable payment for such an early-stage asset. Following completion of the phase I in early 2011, as HGSI was ramping up production of the fusion protein, HGSI was acquired by GSK in 3Q12. GSK maintained the partnership with Five Prime, an additional endorsement of the program's potential, in our opinion, though the remanufacture of all material in GSK's facility added another year to the development timelines. Under the partnership agreement, Five Prime is eligible for $435 million in milestones, of which $70 million are development-related (including $5 million for phase Ib completion and $15 million for phase II start), and $195 million are regulatory-related. GSK pays for all FP-1039 development costs, including reimbursing Five Prime for any R&D activities, and will pay Five Prime a low-double-digit to high-teens royalty on sales of the drug. Five Prime retains a co-promote option in the United States, which, if the company exercises it, would increase its royalty rate by a low-single-digit percentage.

Market Opportunity

We believe the long-term market opportunity for FP-1039 could be considerable, depending on the indications. Our patient-based revenue build for FP-1039 includes indications that are based on tumors with FGFR1 amplification (NSCLC, SCCHN, mBC, and SCLC) and in combination with anti-angiogenic agents (RCC and HCC). We apply varying probabilities of success, with squamous NSCLC the highest at 35%, other FGFR1-amplified tumors , which will not have been as extensively studied slightly lower and with later times to market, and angiogenesis-related tumors having the lowest probability of success but offering considerable opportunity if successful. We assume a price per cycle of $10,000 in today's dollars, similar to other recently approved targeted anticancer agents (and slightly lower in the EU), with the number of cycles of treatment varying based on the tumor type. We assume '1039 reaches the market in its first indication, squamous NSCLC, by 2021 in the United States. We include some probability-weighted potential for '1039 reaching the market sooner (by 2018) in later-line squamous NSCLC if the FDA is amenable to accelerated approval based on a ph.II/III study. Taken the assumptions together and blending the probability-weighted revenue across the various indications, we estimate global '1039 sales of slightly more than $360 million by 2023, which would generate $54 million in royalty revenue to Five Prime. With success in multiple indications, we estimate '1039's future global sales in could exceed $1 billion.

Exhibit 12. FP-1039 Revenue Build

Squamous NSCLC

		2018E	2019E	2020E	2021E	2022E	2023E
United States	U.S. population	322,292,786	325,193,421	328,120,162	331,073,244	334,052,903	337,059,379
	Number of pts with squamous NSCLC	52,211	52,681	53,155	53,634	54,117	54,604
	Patients with FGFR1 amplification (22%)	11,487	11,590	11,694	11,799	11,906	12,013
	Squamous 1L with FGFR1 amplification	4,595	4,636	4,678	4,720	4,762	4,805
	FP-1039 penetration in 1L	0%	0%	0%	10%	18%	25%
	Squamous 2L with FGFR1 amplification	6,892	6,954	7,017	7,080	7,143	7,208
	FP-1039 penetration in 2L	8%	15%	20%	25%	28%	32%
	Probability adjustment for accel approva	40%	40%	40%	100%	100%	100%
	Price per month (cycle)	$12,167	$12,653	$13,159	$13,686	$14,233	$14,802
	# of cycles	6.5	6.6	6.7	6.8	6.9	7
	Revenues	$17,440,927	$34,843,833	$49,490,293	$208,636,845	$280,616,583	$363,461,484
Europe	E.U. population (Major EU countries)	537,154,644	541,989,036	546,866,937	551,788,739	556,754,838	561,765,632
	Number of pts with squamous NSCLC	57,529	58,047	58,569	59,097	59,628	60,165
	Patients with FGFR1 amplification (22%)	12,656	12,770	12,885	13,001	13,118	13,236
	Squamous 1L with FGFR1 amplification	5,063	5,108	5,154	5,200	5,247	5,295
	FP-1039 penetration in 1L	0%	0%	0%	0%	10%	18%
	Squamous 2L with FGFR1 amplification	7,594	7,662	7,731	7,801	7,871	7,942
	FP-1039 penetration in 2L	0%	0%	0%	0%	15%	20%
	Price per month (cycle)	$9,733	$10,123	$10,527	$10,949	$11,386	$11,842
	# of cycles	6.5	6.6	6.7	6.8	6.9	7
	Revenues	$0	$0	$0	$0	$133,985,757	$210,663,825
	Total Revenues	**$17,440,927**	**$34,843,833**	**$49,490,293**	**$208,636,845**	**$414,602,340**	**$574,125,310**
	Probability Adjusted Revenues (35%)	**$6,104,324**	**$12,195,341**	**$17,321,603**	**$73,022,896**	**$145,110,819**	**$200,943,858**

SCCHN

		2018E	2019E	2020E	2021E	2022E	2023E
United States	U.S. population	322,292,786	325,193,421	328,120,162	331,073,244	334,052,903	337,059,379
	Number of pts with SCCHN	104,584	105,525	106,475	107,433	108,400	109,376
	Patients with FGFR1 amplification (17%)	17,779	17,939	18,101	18,264	18,428	18,594
	FP-1039 penetration	0%	0%	0%	0%	5%	10%
	Patients on FP-1039	0	0	0	0	921	1859
	Price per month (cycle)	$12,167	$12,653	$13,159	$13,686	$14,233	$14,802
	# of cycles	3.5	3.6	3.7	3.8	3.9	4
	Revenues	$0	$0	$0	$0	$51,146,219	$110,093,942
Europe	E.U. population (Major EU countries)	537,154,644	541,989,036	546,866,937	551,788,739	556,754,838	561,765,632
	Number of pts with SCCHN	190,339	192,052	193,780	195,524	197,284	199,059
	Patients with FGFR1 amplification (17%)	32,358	32,649	32,943	33,239	33,538	33,840
	FP-1039 penetration	0%	0%	0%	0%	0%	5%
	Patients on FP-1039	0	0	0	0	0	1,692
	Price per month (cycle)	$9,733	$10,123	$10,527	$10,949	$11,386	$11,842
	# of cycles	3.5	3.6	3.7	3.8	3.9	4
	Revenues	$0	$0	$0	$0	$0	$80,146,580
	Total Revenues	**$0**	**$0**	**$0**	**$0**	**$51,146,219**	**$190,240,523**
	Probability Adjusted Revenues (20%)	**$0**	**$0**	**$0**	**$0**	**$10,229,244**	**$38,048,105**

Breast Cancer

		2018E	2019E	2020E	2021E	2022E	2023E
United States	U.S. population	322,292,786	325,193,421	328,120,162	331,073,244	334,052,903	337,059,379
	Number of pts with Breast Cancer	304,331	307,070	309,834	312,623	315,436	318,275
	Patients with FGFR1 amplification (11%)	33,476	33,778	34,082	34,388	34,698	35,010
	FP-1039 penetration	0%	0%	0%	0%	0%	6%
	Patients on FP-1039	0	0	0	0	0	2101
	Price per month (cycle)	$12,167	$12,653	$13,159	$13,686	$14,233	$14,802
	# of cycles	6.5	6.6	6.7	6.8	6.9	7
	Revenues	$0	$0	$0	$0	$0	$217,659,675
Europe	E.U. population (Major EU countries)	537,154,644	541,989,036	546,866,937	551,788,739	556,754,838	561,765,632
	Number of pts with Breast Cancer	332,499	335,491	338,511	341,557	344,631	347,733
	Patients with FGFR1 amplification (11%)	36,575	36,904	37,236	37,571	37,909	38,251
	FP-1039 penetration	0%	0%	0%	0%	0%	0%
	Patients on FP-1039	0	0	0	0	0	0
	Price per month (cycle)	$9,733	$10,123	$10,527	$10,949	$11,386	$11,842
	# of cycles	6.5	6.6	6.7	6.8	6.9	7
	Revenues	$0	$0	$0	$0	$0	$0
	Total Revenues	**$0**	**$0**	**$0**	**$0**	**$0**	**$217,659,675**
	Probability Adjusted Revenues (20%)	**$0**	**$0**	**$0**	**$0**	**$0**	**$43,531,935**

Small-cell Lung Cancer

		2018E	2019E	2020E	2021E	2022E	2023E
United States	U.S. population	322,292,786	325,193,421	328,120,162	331,073,244	334,052,903	337,059,379
	Number of pts with SCLC	34,511	34,822	35,135	35,451	35,770	36,092
	Patients with FGFR1 amplification (6%)	2,071	2,089	2,108	2,127	2,146	2,166
	FP-1039 penetration	0%	0%	0%	0%	10%	20%
	Patients on FP-1039	0	0	0	0	215	433
	Price per month (cycle)	$12,167	$12,653	$13,159	$13,686	$14,233	$14,802
	# of cycles	6	6.1	6.2	6.3	6.4	6.5
	Revenues	$0	$0	$0	$0	$19,550,366	$41,671,849
Europe	E.U. population (Major EU countries)	537,154,644	541,989,036	546,866,937	551,788,739	556,754,838	561,765,632
	Number of pts with SCLC	41,833	42,209	42,589	42,972	43,359	43,749
	Patients with FGFR1 amplification (6%)	2,510	2,533	2,555	2,578	2,602	2,625
	FP-1039 penetration	0%	0%	0%	0%	0%	10%
	Patients on FP-1039	0	0	0	0	0	262.4951031
	Price per month (cycle)	$9,733	$10,123	$10,527	$10,949	$11,386	$11,842
	# of cycles	6	6.1	6.2	6.3	6.4	6.5
	Revenues	$0	$0	$0	$0	$0	$20,204,958
	Total Revenues	**$0**	**$0**	**$0**	**$0**	**$19,550,366**	**$61,876,807**
	Probability Adjusted Revenues (25%)	**$0**	**$0**	**$0**	**$0**	**$4,887,591**	**$15,469,202**

Source: Company reports and Wells Fargo Securities, LLC estimates

Renal Cell Carcinoma

		2018E	2019E	2020E	2021E	2022E	2023E
United States	U.S. population	322,292,786	325,193,421	328,120,162	331,073,244	334,052,903	337,059,379
	Number of pts with RCC	63,782	64,356	64,935	65,519	66,109	66,704
	FP-1039 penetration	0%	0%	0%	0%	1%	3%
	Patients on FP-1039	0	0	0	0	330.5453473	2001.121533
	Price per month (cycle)	$12,167	$12,653	$13,159	$13,686	$14,233	$14,802
	# of cycles	8.5	8.6	8.7	8.8	8.9	9
	Revenues	$0	$0	$0	$0	$41,871,750	$266,593,384
Europe	E.U. population (Major EU countries)	537,154,644	541,989,036	546,866,937	551,788,739	556,754,838	561,765,632
	Number of pts with RCC	106,303	107,260	108,225	109,199	110,182	111,173
	FP-1039 penetration	0%	0%	0%	0%	0%	1%
	Patients on FP-1039	0	0	0	0	0	555.8670924
	Price per month (cycle)	$9,733	$10,123	$10,527	$10,949	$11,386	$11,842
	# of cycles	8.5	8.6	8.7	8.8	8.9	9
	Revenues	$0	$0	$0	$0	$0	$59,242,974
	Total Revenues	**$0**	**$0**	**$0**	**$0**	**$41,871,750**	**$325,836,358**
	Probability Adjusted Revenues (15%)	**$0**	**$0**	**$0**	**$0**	**$6,280,762**	**$48,875,454**

Hepatocellular Carcinoma

		2018E	2019E	2020E	2021E	2022E	2023E
United States	U.S. population	322,292,786	325,193,421	328,120,162	331,073,244	334,052,903	337,059,379
	Number of pts with HCC	20,111	20,292	20,475	20,659	20,845	21,033
	FP-1039 penetration	0%	0%	0%	0%	1%	4%
	Patients on FP-1039	0	0	0	0	208.4490114	841.3002098
	Price per month (cycle)	$12,167	$12,653	$13,159	$13,686	$14,233	$14,802
	# of cycles	5.5	5.5	5.5	5.5	5.5	5.5
	Revenues	$0	$0	$0	$0	$16,317,837	$68,493,141
Europe	E.U. population (Major EU countries)	537,154,644	541,989,036	546,866,937	551,788,739	556,754,838	561,765,632
	Number of pts with HCC	46,496	46,914	47,337	47,763	48,193	48,626
	FP-1039 penetration	0%	0%	0%	0%	0%	1%
	Patients on FP-1039	0	0	0	0	0	486.2626454
	Price per month (cycle)	$9,733	$10,123	$10,527	$10,949	$11,386	$11,842
	# of cycles	6	6.1	6.2	6.3	6.4	6.5
	Revenues	$0	$0	$0	$0	$0	$37,428,950
	Total Revenues	**$0**	**$0**	**$0**	**$0**	**$16,317,837**	**$105,922,091**
	Probability Adjusted Revenues (15%)	**$0**	**$0**	**$0**	**$0**	**$2,447,676**	**$15,888,314**
Total Potential Sales of '1039		$17,440,927	$34,843,833	$49,490,293	$208,636,845	$543,488,512	$1,043,902,315
Potential Probability-Weighted '1039 Sales		$6,104,324	$12,195,341	$17,321,603	$73,022,896	$168,956,092	$362,756,867
Total Prob-Weighted Royalties to Five Prime		**$915,649**	**$1,829,301**	**$2,598,240**	**$10,953,434**	**$25,343,414**	**$54,413,530**

Source: Company reports and Wells Fargo Securities, LLC estimates

FPA008

Overview

FPA008 is a humanized monoclonal antibody targeting CSF-1R, in preclinical development for inflammatory diseases. The antibody, which is fully owned by Five Prime, is expected to enter the clinic by year-end 2013. Five Prime plans to explore the drug in multiple autoimmune/inflammation-related indications, beginning with RA.

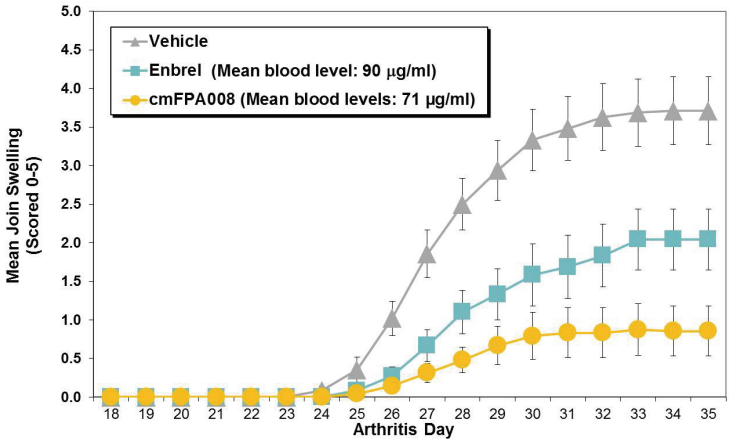
Mechanism Of Action

'008 works by targeting a key inflammatory modulator, within a pathway partially elucidated by Five Prime. Macrophages and monocytes are cells known to play key roles in the inflammatory process, infiltrating tissues such as joints in RA patients and secreting cytokines such as TNF, IL-1, and IL-6--all of which themselves are targets of marketed RA therapies. The survival and proliferation of monocytes and macrophages is mediated by CSF-1 acting on the cellular receptor CSF-1R. Through their expression library and receptor-ligand matching system, Five Prime scientists discovered a second ligand for the CSF-1R, which became known as IL-34, which acts on a different part of the receptor but is thought to confer similar downstream signaling effects. Subsequent work by others showed that IL-34, too, is increased in the serum and synovial fluid of RA patients, confirming its role in human inflammatory processes. '008 acts as an inhibitor of the CSF-1R receptor, preventing signaling by either CSF-1 or IL-34 from activating monocytes/macrophages.

Preclinical Data

Preclinical data demonstrated clear activity in animal models of RA. In initial *ex-vivo* studies, biopsies of inflamed joint tissue from RA patients were treated with '008, and as might be expected, levels of cytokines (TNF-alpha, IL-6, IL-1-beta) declined. In the CIA mouse model of RA, which is a well validated and commonly used model, rodents receiving the mouse version of the antibody had considerably less joint swelling, inflammation, and bone damage compared to Enbrel dosed at the human therapeutic equivalent doses (Exhibit 13).

Exhibit 13. FPA008 Shows Clear Activity In CIA Mouse Model Of Rheumatoid Arthritis



Source: Company reports (used with permission)

Future success would depend on Five Prime's ability to successfully optimize the efficacy/safety balance for each indication; several factors increase our comfort in the potential safety of the approach, though there is still much clinical work needed to confirm this. Given the robust preclinical data (and similarly strong preclinical results for other drugs with this target), as well as the fact that it acts upstream of several tried-and-true anti-inflammatory targets, we believe the antibody will very likely have activity. There are several theoretical safety risks to targeting monocytes/macrophages directly, but several features of the drug and pathway give us more comfort:

- **Targeting inflammatory monocytes:** Monocytes/macrophages, in addition to inflammation, also play important roles in immune surveillance, phagocytosis of damaged cells, and tissue repair. However, bacterial killing is mediated by monocytes that are CD16-, and these cells have a lower concentration of CSF-1R on their surfaces than do monocytes that have matured into more infiltrative, inflammatory CD16+ cells--this creating a natural selectivity.

- **Non-ADCC:** Another aspect of the approach that could limit the potential infection risk is that '008 was engineered as a non-ADCC antibody. This is in contrast to several other CSF-1R mAbs in development, mostly for cancers. As such, this might reduce the potentially unexpected effects of cell killing, and enable activity solely based on biological inhibition of this macrophage/monocyte activation/proliferation pathway.

- **Awareness of biomarker effects:** One additional potential biomarker effect to note is that anti-monocytic treatments also block Kupffer cells, which clear CK, ALT, and AST from the liver. As such, anti-CSF-1R agents can lead to reversible increases in these biomarkers, as was seen with PFE's phase I study as well as Five Prime's primate experiments. Though this could confound potential detection of a true liver toxicity during development and would be a commercial limitation if elevations are observed at clinically effective doses, it does not actively reflect true histological liver damage (which these biomarkers are frequently used as indicators of). Importantly, Five Prime's preclinical work suggests there is a considerable (100-fold) window between drug levels reducing CD16+ monocytes and those elevating ALT/AST/CK, which could likely make this a non-issue.

Clinical Path Forward

FPA008 is expected to enter the clinic by year-end. Having completed GLP-enabling toxicology studies, Five Prime is in the process of manufacturing phase I supply of '008, and plans to initiate the phase I study by year-end. The phase I, which is to take place outside the U.S., is to explore PK and safety data from several doses (3mg/kg to 10-20mg/kg) administered intravenously. Depletion in CD16+ monocytes would be an important biomarker for potential on-target activity, with animal studies indirectly suggesting a 60-80% decline could correlate with efficacy. Subsequently, it plans to transition into a phase II in RA patients, where measures of bone turnover and MRIs would be assessed to determine any potential differential bone benefits. An IND is expected to be filed with the phase II start, to enable inclusion of U.S. sites.

The crowded RA space means that the efficacy and safety bar will be relatively high, but '008 has some potential differentiating features, and there are also many other inflammatory indications the antibody could be useful in. There are multiple drugs approved in RA, with more than a decade of experience with the biologics. This means there are unlikely to be any shortcuts in the regulatory path forward, and efficacy and safety needs to be at least comparable to enable commercial use. Still, we believe it is a sound strategy for Five Prime to at least begin development in the RA indication--where trials are highly straightforward--to assess proof of concept, and then determine whether to explore indications like lupus nephritis, psoriasis, or MS, where there is also strong scientific rationale for CSF-1R inhibition. Depending on the indication, it would be important for Five Prime to transition '008 from an IV (which is to be tested in phase I) to subcutaneous (SC) form, though the company is optimistic the antibody should be concentratable into a SC. Depending on results of the RA study, it is possible baseline CD16+ monocyte count could serve as a biomarker to predict degree of response, creating the potential for a companion diagnostic. Finally, one important potential differentiating feature is that by directly inhibiting bone-eroding osteoclast cells--which have CSF-1R--'008 could potentially produce enhanced structural benefits in disease like RA that are characterized by bone damage; such effects have, however, been a bit more difficult to elicit in modern RA studies.

Competitive Landscape

There are several other competitors worth watching that are also developing anti-CSF-1 type drugs, though several are geared for other indications. Notable agents with similar targets, listed in Exhibit 14, comprise a mix of small molecules and antibodies, and receptor or ligand targeted agents, from preclinical to phase II development.

Exhibit 14. Notable Other Agents Targeting CSF1 Pathway In Development

	Drug	Company	Approach	Results/ status
Small molecules	JNJ-40346527	JNJ	Small molecule CSF1R inhibitor	In ph.II for RA, Hodgkin's lymphoma; ph.II RA data expected 1Q14
	PLX-5622	Plexxicon	Small molecule selective CSF1 inhibitor	In ph.I for RA
	ARRY-382	Array/Celgene	Small molecule CSF-1R inhibitor	In ph.I for cancer; exact status unclear
	AC708	Ambit	Small molecule CSF1R inhibitor	Expected to enter ph.I by mid-2014
	CSF1-2 kinase inhibitors	Jannsen	Small molecule CSF1R inhibitor	Preclinical data presented mid-2013
Biologics	PD-360324	Pfizer	mAb targeting CSF-1	In ph.I and II for pulmonary sarcoidosis, lupus; RA study completed. Ph.I data showed reversible increases in CK, AST.
	RG-7155	Roche	Humanized mAb targeting CSF1R, targeted to inhibit tumor-promoting M2 macrophages	In ph.I for solid tumors
	AMG-820	Amgen	Fully human mAb against CSF1R	In ph.I for solid tumors
	IMC-CS4/LY-3022855	Lilly/ImClone	Antibody targeting CSF1R	In ph.I for solid tumors
	TG-3003	Transgene	Humanized mAb targeting CSF1R	Preclinical; status unknown
Biologics targeting GM-CSF	KB-003	KaloBios	Anti-GM-CSF mAb	In ph.II for asthma
	MOR-103	MorphoSys/GSK	Anti-GM-CSF mAb	Completed ph.I/II for RA; in ph.Ib for MS
	mavrilimumab	CSL/MedImmune/ AZN	Anti-GM-CSF mAb	In ph.II for RA; showed 1.2-pt reduction in DAS28-CRP from baseline after 12 weeks of highest dose

Source: Company reports and Wells Fargo Securities, LLC

Perhaps the most similar approach is taken by Pfizer, which is developing an antibody to the CSF-1 ligand, PD-360324. Following an RA study, Pfizer is now concentrating development of the antibody on lupus. These RA results have not been reported, but the fact that Pfizer is no longer pursuing this indication suggests the efficacy was not robust. We do not believe that this necessarily bodes poorly for FPA008, however, for several reasons. First, Pfizer's antibody only targets one of what are now known to be two ligands for CSF1-R whereas FPA008 targets the receptor itself and so should have broader activity. Secondly, PK data for the agent suggest that at the monthly infusion intervals in the RA trial, CD16+ cells were substantially depleted after infusion, but certain (albeit not all) CD16+ populations returned to baseline in the ensuing weeks--perhaps indicating the possible insufficient efficacy resulted from PK issues (inadequately sustained monocyte suppression) rather than a mechanistic issue that would potentially affect FPA008, as well.

Market Opportunity

We believe the market opportunity could be very significant for an anti-inflammatory drug with potential in broad indications. We assume, with initiation of a phase I program in 2014 and a full global development program, that FPA008 could reach market by 2023 in the United States and H2 2023 in Europe. We assume Five Prime signs a licensing agreement for the asset globally, with an upfront payment of $75 million in 2016 and 15-20% royalties on out-year sales, and does not pay meaningfully for development costs beyond that year. For modeling purposes we assume RA and psoriasis are the two initial indications that Five Prime and/or its partner pursues, but note there are a number of additional autoimmune/inflammation indications for which CSF-1R inhibition would make scientific sense, which could provide upside opportunity. With incremental penetration in the RA and psoriasis indications, we estimate total worldwide sales of just under $300 million in 2023, generating royalties of slightly more than $50 million to Five Prime in 2023. We believe the ultimate long-term opportunity could exceed $1 billion.

Exhibit 15. FPA008 Revenue Build

FPA008- Immunology Revenue Build Estimates

	Rheumatoid Arthritis	2022E	2023E
United States	Overall population	334,052,903	337,059,379
	Incidence	96,875	97,747
	Number of patients with RA	4,531,982	4,628,857
	Number of patients with moderate to severe disease	2,265,991	2,314,428
	Pts started on TNF each year	96,011	96,875
	Penetration among MTX failures otherwise starting TNF	0.0%	2.0%
	Pts switching TNF each year	57,607	58,125
	Penetration among TNF failures	0.0%	2.0%
	Number of pts on FPA008	0	3,100
	Annual net price	$28,466	$29,605
	Sales in USD	**$0**	**$91,775,469**
	Royalties to FPRX in USD	**$0**	**$18,355,094**
Europe	Overall population	556,754,838	561,765,632
	Incidence	161,459	162,912
	Number of patients with RA	7,553,303	7,714,762
	Number of patients with moderate to severe disease	3,776,651	3,857,381
	Pts started on TNF each year	160,019	161,459
	Penetration among MTX failures otherwise starting TNF	0.0%	0.8%
	Pts switching TNF each year	96,011	96,875
	Penetration among TNF failures	0.0%	0.8%
	Number of pts on FPA008	0	2,067
	Annual net price	$22,773	$23,684
	Sales in USD	**$0**	**$48,946,917**
	Royalties to FPRX in USD	**$0**	**$7,342,038**
	Worldwide sales of FPA008 in RA	**$0**	**$140,722,387**
	Worldwide royalties to FPRX in RA	**$0**	**$25,697,131**
	Psoriasis	**2022E**	**2023E**
United States	Overall population	334,052,903	337,059,379
	Number of patients with psoriasis	6,681,058	6,741,188
	Number of patients with moderate to severe disease	835,132	842,648
	Addressable patient population	417,566	421,324
	Penetration	0.0%	0.4%
	Number of pts on FPA008	0	3,371
	Annual net price	$28,466	$29,605
	Sales	**$0**	**$99,786,044**
	Royalties to FPRX in USD	**$0**	**$19,957,209**
Europe	Overall population	556,754,838	561,765,632
	Number of patients with psoriasis	11,135,097	11,235,313
	Number of patients with moderate to severe disease	1,391,887	1,404,414
	Addressable patient population	695,944	702,207
	Penetration	0.0%	0.2%
	Number of pts on FPA008	0	2,247
	Annual net price	$22,773	$23,684
	Sales	**$0**	**$53,219,223**
	Worldwide royalties to FPRX in USD	**$0**	**$7,982,884**
	Worldwide sales of FPA008 in psoriasis	**$0**	**$153,005,267**
	Worldwide royalties to FPRX in psoriasis	**$0**	**$27,940,092**
	Total '008 Sales	**$0**	**$293,727,654**
	Total '008 Royalties to Five Prime	**$0**	**$53,637,224**

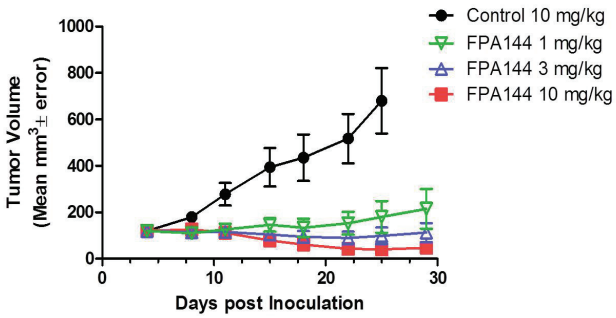
Source: Wells Fargo Securities, LLC estimates

FPA144

FPA144 is a monoclonal antibody targeting FGFR2b, in preclinical development for gastric and other solid tumors. The antibody, inlicensed by Five Prime from Galaxy in 2011 and now wholly owned by Five Prime, is designed to have ADCC activity against cells expressing the FGFR2b receptor. FGFR2b is a receptor for several of the potentially tumorigenic, non-endocrine-related FGFs (1, 3, 7, 10, and 22); the FGFR2 gene that encodes it has been found to be amplified in certain solid tumor types and the protein overexpressed in other cancers as well. Given its early stage of development, we do not yet ascribe value to FPA144, but note positive progress could lead to upside potential to our long-term estimates.

Preclinical data support the mechanistic approach. Preclinical data indeed showed that FPA144 provides dose-dependent tumor suppression in an FGFR2-amplified gastric cancer xenograft model, in which FGFR1 trap FP-1039 did not have activity (Exhibit 16).

Exhibit 16. Dose-Dependent Suppression Of Gastric Tumors With FGFR2 Amplification By FPA144 In Xenograft Model



Source: Company reports (used with permission).

This is further validated by the activity seen by another company's anti-FGF tyrosine kinase inhibitor against this tumor cell line.

FPA144 is planned to enter the clinic in H2 2014, and could potentially have an expedited development path. Five Prime plans to file an IND for the program in 2014 then begin an initial single-agent dose escalation study. Over time, the company will likely move the antibody into biomarker-selected populations, and ultimately it may be tested in combo with standards of care for front-line solid tumor indications. Five Prime has indicated that it would also consider a phase I study in Japan, where the incidence of gastric cancer is much higher; South Korea is another region the company may consider exploring development in. In the United States, given the very small patient population (2,200-6,600 gastric cancer patients are believed to have the FGFR2 amplification), there is the potential opportunity for the agent to be developed and approved in a more-expedited way such as via accelerated approval. Since FGFR2 is expressed in epithelium, one key during development will be balancing safety with theoretical side effects to hair, the GI tract, and the retina.

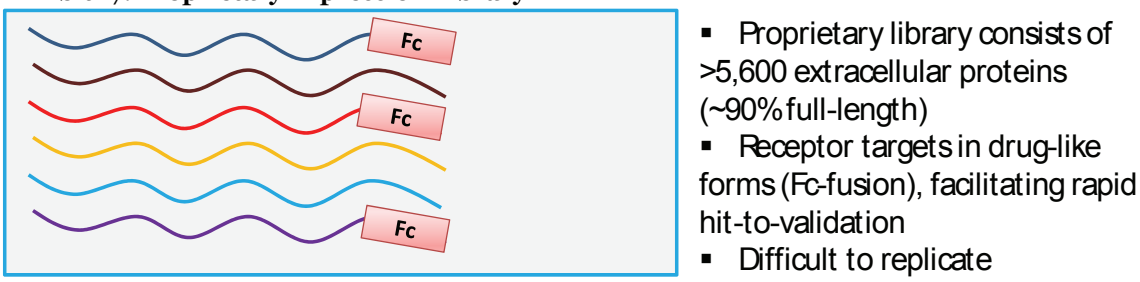
Technology Platform

We believe Five Prime's differentiated discovery platform provides a solid foundation for driving organic, long-term pipeline growth as well as enabling nondilutive financing through external partnerships. Five Prime's core foundation is its comprehensive and efficient platform for the discovery of protein-based therapeutics, or biologics. Given many of the favorable qualities of biologics, including predictable effects at an identified target, potential for greater sustainability given the lack of a clear path for biosimilars (at least in the United States), and validated market receptivity--with protein therapeutics for cancer and inflammatory diseases selling over $71 billion last year, we believe such a platform should have considerable value. Although there are other companies with existing protein-based discovery platforms, they have shortcomings. Five Prime has addressed many of these using a combination of expertise, with many members of the senior team having had experience in biologics discovery, and focused efforts, the platform having taken seven years of work to establish. We believe this helps set Five Prime's platform apart and raises the barrier to entry for future competitors attempting to replicate what the company has built.

Five Prime's platform can be thought of as consisting of three major components. These are (1) a proprietary protein expression library of more than 5,600 extracellular proteins (secreted proteins and cell surface receptors) in mostly full-length and "drug-ready" forms; (2) a highly automated high-throughput protein screening system to rapidly interrogate potential drug targets; and (3) a high-throughput *in vivo* discovery and validation system. We review each of these components in more detail below.

(1) Comprehensive and complete protein expression library: A key differentiating feature of Five Prime's platform is its proprietary expression library used to screen for drug targets. The library consists of more than 5,600 proteins, which are either secreted (ligands) or are cell surface receptors. These can represent targets for protein-based therapies using either a ligand itself (e.g., EPO, Insulin, GM-CSF) or antibody or fusion protein inhibitor of a ligand or a receptor (e.g., Avastin, Enbrel, Yervoy).

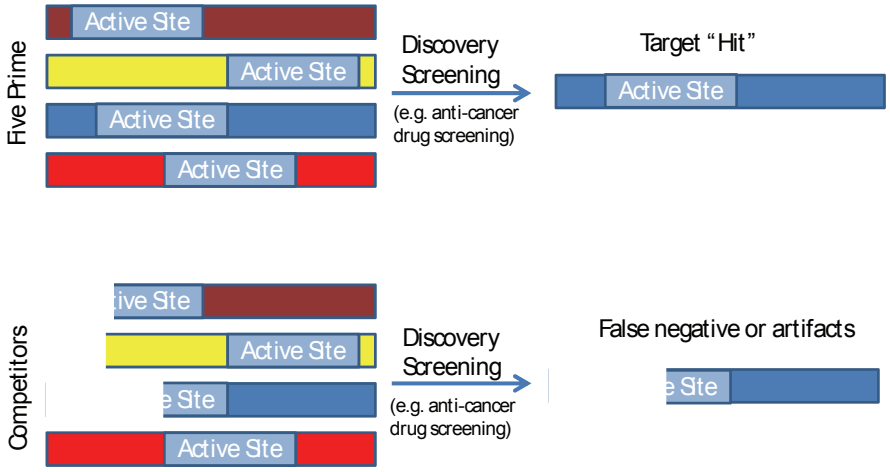
Exhibit 17. Proprietary Expression Library



Source: Wells Fargo Securities, LLC

The company has painstakingly built this library such that it is not only comprehensive, containing the vast majority of the secreted and receptor proteins that exist, but also complete, containing full-length proteins built from full-length mRNA. Most other expression libraries in the industry include numerous truncated proteins, as a byproduct of the technique used to derive the expression library from the mRNA of cells. Such libraries are typically constructed from the 3' end of the mRNA, and due to poor fidelity of the enzymes used, they have incomplete extension to the other (5') end of the mRNA. Five Prime minimized this problem by individually reconstructing the full-length mRNA by a technique called 5' extension (which is where the company's name, "Five Prime," stems from). As illustrated in Exhibit 18, we believe Five Prime's technology thus enables the company to potentially limit false negatives or other experimental artifacts confounded by the presence of incomplete/truncated proteins, helping mitigate the "garbage-in-garbage-out" flaws common to other libraries.

Exhibit 18: Illustration Of Advantages Of Five Prime's More Complete Library In Drug Discovery

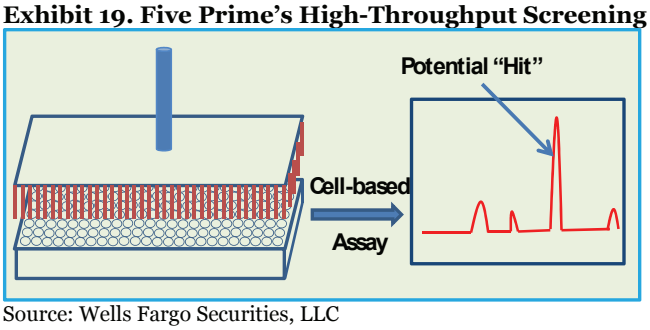


Source: Wells Fargo Securities, LLC

Another area of differentiation within Five Prime's library compared with prior and existing competing technologies, in our view, is the fact that whenever the individual proteins are receptors, Five Prime reengineers them to form a soluble receptor, by incorporating an Fc-fusion in place of their cell surface-bound, transmembrane domains. This essentially creates them into a functional "trap" for their corresponding ligands and also bypasses the need to generate a ligand-specific antibody. Advantages of the "trap" technology (versus monoclonal antibodies) are that it bypasses the antibody construction step--which can prolong development time--and also can target multiple ligands (rather than having a ligand-specific antibody).

(1) Highly automated, high-throughput protein screening system to rapidly interrogate potential drug targets: FPRX has established an efficient protein synthesis system based on its proprietary library. The protein production system is highly automated (roughly 2,000 proteins produced per week) with high QA standards to ensure that the quality of proteins utilized in the drug screen is reliable and fully functional. We believe the latter helps considerably reduce "noise," enabling the scientists to distinguish real hits from experimental artifacts. Once the high-quality proteins are produced, they are used in cell-based screens to search for "hits" with therapeutic potential. Five Prime uses cell-based screens that use cells derived from human diseases and microenvironments that more accurately mimic the "natural" states of human disease. The company has thus far performed about 100 cell-based screens using roughly 50 different cell types, which we believe demonstrates the platform's high efficiency and versatility.

Exhibit 19. Five Prime's High-Throughput Screening System

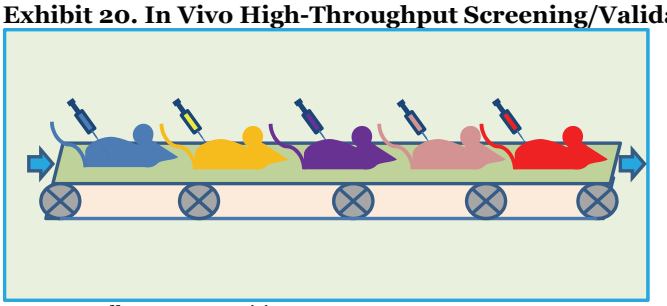


- High-throughput cell-based screen
- Optimized production of high quality protein input for screening

Source: Wells Fargo Securities, LLC

(2) Efficient *in vivo* expression model to rapidly screen multiple targets and validate candidate targets in disease-relevant mouse models. Complementary to its high-throughput cell-based screening system, the company has an *in vivo* screening system it terms "Rapid In Vivo Protein Production System" (RIPPS). This system uses animal models to test candidate drugs in a more disease-relevant system (e.g. a mouse carrying certain disease-like genetic defects, or an artificially induced disease state). We believe RIPPS is more efficient than most other *in vivo* systems in that utilizes a streamlined the expression system--scientists directly inject into the animal the expression DNA, which then homes to the liver to produce high levels of protein. This bypasses the need for separate protein production/purification or the generation of a viral expression constructs. Overall, we believe RIPPS is a highly efficient system to screen and validate a large number of targets using disease relevant animal models, and an important part of a broader platform that can enable efficient discovery of novel drugs and targets.

Exhibit 20. In Vivo High-Throughput Screening/Validation Platform



- High-throughput in vivo screening in relevant animal/disease models
- No need for protein expression/ purification, viral transduction, etc
- Optimized for target discovery and validation

Source: Wells Fargo Securities, LLC

Discovery partnerships provide external validation for the platform and its capabilities, in our view. The company has engaged in discovery partnerships with several major pharma players over the past few years, generating $220 million since 2006. We believe these provide strong validation of the platform, as well as the benefits of incremental cash flow to support the company's own preclinical and clinical programs. A summary of the company's active, as well as previous, drug discovery collaborations is depicted in Exhibit 21.

Exhibit 21. Current And Prior Drug Discovery Collaborations

Collaborator	Inception Date	End of term	Indication	Upfront payment	Equity investment	Research funding
GSK	**July 2010 (expanded May 2011)**	**May 2014**	Muscle diseases (sarcopenia & cachexia)	$7MM	$7.5MM	$16MM
GSK	**April 2012**	**April 2016**	Respiratory diseases (COPD & refractory asthma)	$7.5MM	$10MM	$2MM
UCB	**March 2013**	**March 2016**	Fibrosis-related immunologic and CNS diseases	$6MM	N/A	$2.2MM
Previous collaborations	Boehringer Ingelheim, Centocor, and Pfizer					

Source: Company reports and Wells Fargo Securities, LLC

Intellectual Property

FPRX's 3 main programs (FP-1039, FPA008, and FPA144) all have granted composition-of-matter patents extending out to 2026-2031 and several method-of-use patents that extend out longer (Exhibit 22). US7678890 covers the composition of FP-1039 comprising the FGFR1 trap fusion protein. FP-1039 has several method-of-administration and treatment patents with a patent life estimated to expire in 2031. FPA008, an anti-CSF1R monoclonal antibody, is covered by a composition of matter patent US8206715 and several other method-of-use pending applications. FPA144, anti-FGFR2b monoclonal antibody, is covered by a composition of matter patent (US8101723), licensed from Galaxy Biotech. In addition to patents and pending applications related to the company's lead pipeline drugs, our review of the company's patent estate revealed that it has filed/issued patents around targets including IL-27, other FGF(R) family members, SDF-1, FZD8, and Notch. Longer term, biologics exclusivity, as well as the difficulty in recreating these proteins, are likely to protect Five Prime's agents from traditional generic competition even beyond the scope of its patents.

Exhibit 22. Summary Of Intellectual Property

Pat./Application	Title	Type	Est. expiration
FP-1039			
US7678890	Compositions and methods of treating disease with FGFR fusion proteins	Composition of matter	2026
US 13/296,161	Treatment of cancer with elevated dosages of soluble FGFR1 fusion proteins	Dosing	2031
US 13/296,168	FGFR1 EXTRACELLULAR DOMAIN COMBINATION THERAPIES	Method of treatment	2031
US 13/296,161	Treatment of cancer with elevated dosages of soluble FGFR1 fusion proteins	Method of treatment	2031
FPA008			
US8206715	Antibodies that bind colony stimulating factor 1 receptor (CSF1R)	Composition of matter	2031
US 13/464,503	Antibodies that bind colony stimulating factor 1 receptor (CSF1R)	Method of treatment	2032
FPA144			
US8101723	Monoclonal antibodies to fibroblast growth factor receptor 2	Composition of matter	2029
12/614,282	Monoclonal antibodies to fibroblast growth factor receptor 2	Method of treatment	2029

Source: USPTO, company reports, and Wells Fargo Securities, LLC

Financials

With its recent initial public offering, we believe Five Prime is in a solid cash position to fund operations through the key proof-of-concept data for FP-1039 and FPA144. As a result of the IPO, on a pro forma basis, we believe Five Prime would have had $91 million cash, equivalents, and marketable securities as of mid-2013. Net cash burn is expected to be $30 million or less per year, which we believe should enable the company to reach proof-of-concept results for both FP-1039 and FPA008, with current cash on hand. Offsetting some of Five Prime's cash burn is the company's expectation that it will be able to complete at least one collaborative agreement per year. If so, these deals would be structured similarly to its discovery collaboration GSK for muscle disease (2010) and respiratory disease (2012) programs, which resulted in upfront cash payments of $7-10 million and research funding of roughly $2-3 million per year for each agreement. Five Prime has no debt and after the IPO has 16.8 million in basic shares outstanding with approximately 2.3 million options remaining.

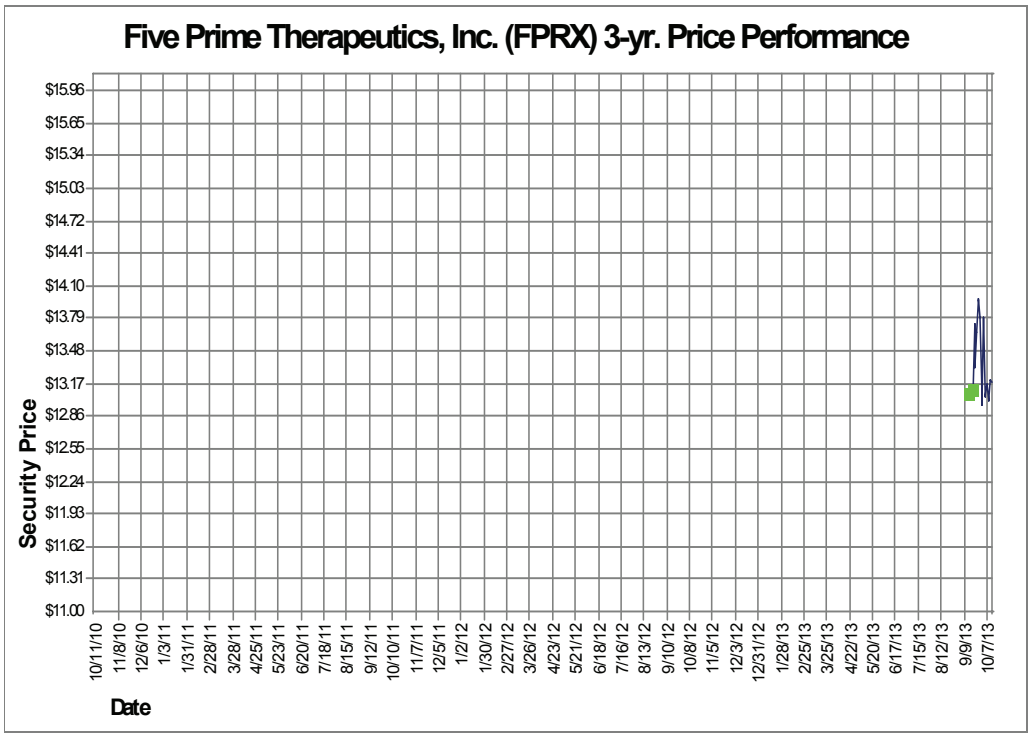
Five Prime Therapeutics (FPRX)
Statement of Operations (Income Statement)

(in thousands except per share amounts)

	2010A	2011A	2012A	1HA	3QE	4QE	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
Revenues																	
Total Global FP-1039 sales (15-35% prob-weighted by tumor type)												*$6,104*	*$12,195*	*$17,322*	*$73,023*	*$168,956*	*$362,757*
Total Global FPA008 sales (20% prob-weighted)																	*$58,746*
Collaborative revenue	$23,740	$64,916	$9,983	$6,524	$2,500	$2,500	$11,524	$15,100	$26,800	$97,800	$21,500	$34,000	$21,500	$39,000	$54,000	$39,000	$34,000
FP-1039 (royalties; probabilty weighted by tumor type)												$916	$1,829	$2,598	$10,953	$25,343	$54,414
FPA008 (royalties; probability weighted)																	$10,727
Total revenues, net	**$23,740**	**$64,916**	**$9,983**	**$6,524**	**$2,500**	**$2,500**	**$11,524**	**$15,100**	**$26,800**	**$97,800**	**$21,500**	**$34,916**	**$23,329**	**$41,598**	**$64,953**	**$64,343**	**$99,141**
Expenses																	
Research and development	$29,417	$34,039	$28,778	$16,515	$7,800	$8,300	$32,615	$34,246	$35,958	$37,756	$39,266	$40,837	$42,062	$43,324	$44,624	$45,962	$47,341
Selling, general and administrative	$8,338	$11,216	$9,009	$4,778	$2,150	$2,300	$9,228	$10,151	$10,557	$10,979	$11,418	$11,875	$12,350	$12,844	$13,358	$13,892	$14,448
Total operating expenses	**$37,755**	**$45,255**	**$37,787**	**$21,293**	**$9,950**	**$10,600**	**$41,843**	**$44,397**	**$46,515**	**$48,735**	**$50,684**	**$52,712**	**$54,412**	**$56,168**	**$57,981**	**$59,854**	**$61,789**
Operating Income	**($14,015)**	**$19,661**	**($27,804)**	**($14,769)**	**($7,450)**	**($8,100)**	**($30,319)**	**($29,297)**	**($19,715)**	**$49,065**	**($29,184)**	**($17,796)**	**($31,083)**	**($14,570)**	**$6,972**	**$4,489**	**$37,352**
Interest income	$58	$114	$88	$28	$155	$140	$323	$195	$425	$895	$1,257	$1,174	$1,011	$871	$949	$1,064	$1,688
Other income (expense) net	$491	($65)	$121	$420	$0	$0	$420	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Loss) income before benefit from income taxes	**($13,466)**	**$19,710**	**($27,595)**	**($14,321)**	**($7,295)**	**($7,960)**	**($29,576)**	**($29,101)**	**($19,290)**	**$49,960**	**($27,928)**	**($16,622)**	**($30,071)**	**($13,699)**	**$7,921**	**$5,554**	**$39,040**
Benefit (expense) from income taxes	$5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$390
Net (loss) income	**($13,461)**	**$19,710**	**($27,595)**	**($14,321)**	**($7,295)**	**($7,960)**	**($29,576)**	**($29,101)**	**($19,290)**	**$49,960**	**($27,928)**	**($16,622)**	**($30,071)**	**($13,699)**	**$7,921**	**$5,554**	**$39,430**
Earnings Per Share (GAAP)	**($12.22)**	**$10.35**	**($23.05)**	**($11.55)**	**($0.43)**	**($0.47)**	**($3.27)**	**($1.68)**	**($1.00)**	**$2.28**	**($1.40)**	**($0.81)**	**($1.38)**	**($0.62)**	**$0.32**	**$0.22**	**$1.53**
Shares Outstanding (Basic)	1,102	1,152	1,197	1,240	16,800	16,900	9,045	17,300	19,200	19,600	20,000	20,400	21,800	22,200	22,600	23,000	23,400
Shares Outstanding (Diluted)	1,102	1,904	1,197	1,240	19,100	19,200	10,195	19,600	21,500	21,900	22,300	22,700	24,100	24,500	24,900	25,300	25,700

Source: Company reports and Wells Fargo Securities, LLC estimates

Required Disclosures



	Date	Publication Price ($)	Rating Code	Val. Rng. Low	Val. Rng. High	Close Price ($)
❐	9/18/2013		IPO at $13.00			

Source: Wells Fargo Securities, LLC estimates and Reuters data

Symbol Key

▼	Rating Downgrade	◆	Initiation, Resumption, Drop or Suspend
▲	Rating Upgrade	■	Analyst Change
●	Valuation Range Change	❐	Split Adjustment

Rating Code Key

1	Outperform/Buy	SR	Suspended
2	Market Perform/Hold	NR	Not Rated
3	Underperform/Sell	NE	No Estimate

Additional Information Available Upon Request

I certify that:
1) All views expressed in this research report accurately reflect my personal views about any and all of the subject securities or issuers discussed; and
2) No part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by me in this research report.

- Wells Fargo Securities, LLC maintains a market in the common stock of Five Prime Therapeutics, Inc.
- Wells Fargo Securities, LLC or its affiliates managed or comanaged a public offering of securities for Five Prime Therapeutics, Inc. within the past 12 months.
- Wells Fargo Securities, LLC or its affiliates intends to seek or expects to receive compensation for investment banking services in the next three months from Five Prime Therapeutics, Inc.
- Wells Fargo Securities, LLC or its affiliates received compensation for investment banking services from Five Prime Therapeutics, Inc. in the past 12 months.
- Five Prime Therapeutics, Inc. currently is, or during the 12-month period preceding the date of distribution of the research report was, a client of Wells Fargo Securities, LLC. Wells Fargo Securities, LLC provided investment banking services to Five Prime Therapeutics, Inc.

FPRX: Key risks, in our view, are clinical and regulatory failure of its programs, competition, and financing.

Wells Fargo Securities, LLC does not compensate its research analysts based on specific investment banking transactions. Wells Fargo Securities, LLC's research analysts receive compensation that is based upon and impacted by the overall profitability and revenue of the firm, which includes, but is not limited to investment banking revenue.

STOCK RATING

1=Outperform: The stock appears attractively valued, and we believe the stock's total return will exceed that of the market over the next 12 months. BUY
2=Market Perform: The stock appears appropriately valued, and we believe the stock's total return will be in line with the market over the next 12 months. HOLD
3=Underperform: The stock appears overvalued, and we believe the stock's total return will be below the market over the next 12 months. SELL

SECTOR RATING

O=Overweight: Industry expected to outperform the relevant broad market benchmark over the next 12 months.
M=Market Weight: Industry expected to perform in-line with the relevant broad market benchmark over the next 12 months.
U=Underweight: Industry expected to underperform the relevant broad market benchmark over the next 12 months.

VOLATILITY RATING

V = A stock is defined as volatile if the stock price has fluctuated by +/-20% or greater in at least 8 of the past 24 months or if the analyst expects significant volatility. All IPO stocks are automatically rated volatile within the first 24 months of trading.

As of: October 14, 2013

49% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Outperform.	Wells Fargo Securities, LLC has provided investment banking services for 49% of its Equity Research Outperform-rated companies.
48% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Market Perform.	Wells Fargo Securities, LLC has provided investment banking services for 36% of its Equity Research Market Perform-rated companies.
3% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Underperform.	Wells Fargo Securities, LLC has provided investment banking services for 18% of its Equity Research Underperform-rated companies.

Important Disclosure for International Clients

EEA--The securities and related financial instruments described herein may not be eligible for sale in all jurisdictions or to certain categories of investors. For recipients in the EEA, this report is distributed by Wells Fargo Securities International Limited ("WFSIL"). WFSIL is a U.K. incorporated investment firm authorized and regulated by the Financial Services Authority. For the purposes of Section 21 of the UK Financial Services and Markets Act 2000 ("the Act"), the content of this report has been approved by WFSIL a regulated person under the Act. WFSIL does not deal with retail clients as defined in the Markets in Financial Instruments Directive 2007. The FSA rules made under the Financial Services and Markets Act 2000 for the protection of retail clients will therefore not apply, nor will the Financial Services Compensation Scheme be available. This report is not intended for, and should not be relied upon by, retail clients.

Australia--Wells Fargo Securities, LLC is exempt from the requirements to hold an Australian financial services license in respect of the financial services it provides to wholesale clients in Australia. Wells Fargo Securities, LLC is regulated under U.S. laws which differ from Australian laws. Any offer or documentation provided to Australian recipients by Wells Fargo Securities, LLC in the course of providing the financial services will be prepared in accordance with the laws of the United States and not Australian laws.

Hong Kong--This report is issued and distributed in Hong Kong by Wells Fargo Securities Asia Limited ("WFSAL"), a Hong Kong incorporated investment firm licensed and regulated by the Securities and Futures Commission to carry on types 1, 4, 6 and 9 regulated activities (as defined in the Securities and Futures Ordinance, "the SFO"). This report is not intended for, and should not be relied on by, any person other than professional investors (as defined in the SFO). Any securities and related financial instruments described herein are not intended for sale, nor will be sold, to any person other than professional investors (as defined in the SFO).

Japan--This report is distributed in Japan by Wells Fargo Securities (Japan) Co., Ltd, registered with the Kanto Local Finance Bureau to conduct broking and dealing of type 1 and type 2 financial instruments and agency or intermediary service for entry into investment advisory or discretionary investment contracts. This report is intended for distribution only to professional investors (Tokutei Toushika) and is not intended for, and should not be relied upon by, ordinary customers (Ippan Toushika).

The ratings stated on the document are not provided by rating agencies registered with the Financial Services Agency of Japan (JFSA) but by group companies of JFSA-registered rating agencies. These group companies may include Moody's Investors Services Inc, Standard & Poor's Rating Services and/or Fitch Ratings. Any decisions to invest in securities or transactions should be made after reviewing policies and methodologies used for assigning credit ratings and assumptions, significance and limitations of the credit ratings stated on the respective rating agencies' websites.

About Wells Fargo Securities, LLC
Wells Fargo Securities is the trade name for the capital markets and investment banking services of Wells Fargo & Company and its subsidiaries, including but not limited to Wells Fargo Securities, LLC, a U.S. broker-dealer registered with the U.S. Securities and Exchange Commission and a member of NYSE, FINRA, NFA and SIPC, Wells Fargo Institutional Securities, LLC, a member of FINRA and SIPC, Wells Fargo Prime Services, LLC, a member of FINRA, NFA and SIPC, Wells Fargo Bank, N.A. and Wells Fargo Securities International Limited, authorized and regulated by the Financial Services Authority.

Wells Fargo Securities, LLC is a U.S. broker-dealer registered with the U.S. Securities and Exchange Commission and a member of the New York Stock Exchange, the Financial Industry Regulatory Authority and the Securities Investor Protection Corp.

This report is for your information only and is not an offer to sell, or a solicitation of an offer to buy, the securities or instruments named or described in this report. Interested parties are advised to contact the entity with which they deal, or the entity that provided this report to them, if they desire further information. The information in this report has been obtained or derived from sources believed by Wells Fargo Securities, LLC, to be reliable, but Wells Fargo Securities, LLC, does not represent that this information is accurate or complete. Any opinions or estimates contained in this report represent the judgment of Wells Fargo Securities, LLC, at this time, and are subject to change without notice. For the purposes of the U.K. Financial Services Authority's rules, this report constitutes impartial investment research. Each of Wells Fargo Securities, LLC, and Wells Fargo Securities International Limited is a separate legal entity and distinct from affiliated banks.

SECURITIES: NOT FDIC-INSURED/NOT BANK-GUARANTEED/MAY LOSE VALUE

Wells Fargo Securities, LLC Institutional Sales Offices

Wells Fargo Securities, LLC
One Boston Place
Suite 2700
Boston, MA 02108
(877) 238-4491

Wells Fargo Securities, LLC
230 W. Monroe
24th Floor
Chicago, IL 60606
(866) 284-7658

Wells Fargo Securities, LLC
375 Park Avenue
New York, NY 10152-0005
(800) 876-5670

Wells Fargo Securities, LLC
550 California Street
SAC Tower, 6th Floor, Suite 625
San Francisco, CA 94104-1004

Wells Fargo Securities International Limited
1 Plantation Place
30 Fenchurch Street
London, EC3M 3BD
44-207-962-2879

Diane Schumaker-Krieg
Global Head of Research, Economics & Strategy
(212) 214-5070 / (704) 410-1801
diane.schumaker@wellsfargo.com

Sam J. Pearlstein
Co-Head of Equity Research (212) 214-5054
sam.pearlstein@wellsfargo.com

Todd M. Wickwire
Co-Head of Equity Research (410) 625-6393
todd.wickwire@wellsfargo.com

Paul Jeanne, CFA, CPA
Associate Director of Research
(443) 263-6534 / (212) 214-8054
paul.jeanne@wellsfargo.com

Lisa Hausner
Global Head of Publishing
(443) 263-6522
lisa.hausner@wellsfargo.com

Consumer

Beverage/Tobacco
Bonnie Herzog (212) 214-5051
Jessica Gerberi, CFA (212) 214-5029
Adam Scott (212) 214-8064

Cosmetics, Household & Personal Care
Chris Ferrara, CFA, CPA (212) 214-8050
Joe Lachky, CFA (314) 875-2042
Zachary Fadem, CPA (212) 214-8018

Education
Trace A. Urdan (415) 947-5470
Jeffrey Lee (415) 396-4328

Food
John Baumgartner, CFA (212) 214-5015

Homebuilding/Building Products
Adam Rudiger, CFA (617) 603-4260
Joey Matthews, CPA (415) 396-3873

Household and Personal Care/Leisure
Timothy Conder, CPA (314) 875-2041
Karen Wang (314) 875-2556
Marc J. Torrente (314) 875-2557

Restaurants & Foodservice
Jeff Farmer, CFA (617) 603-4314
Imran Ali (617) 603-4315
Jay Donnelly (617) 603-4207

Retail
Matt Nemer (415) 396-3938
Kate Wendt (415) 396-3977
Trisha Dill, CFA (312) 920-3594
Omair Asif (415) 222-1159
Maren Kasper (415) 396-3194
Evren Kopelman, CFA (212) 214-8024
Connie Wang (212) 214-5024
Paul Lejuez, CPA, CFA (212) 214-5072
Tracy Kogan (212) 214-8065
Justin C. Matthews (212) 214-8059

Industrial

Aerospace & Defense
Sam J. Pearlstein (212) 214-5054
Gary S. Liebowitz, CFA (212) 214-5055
Michael D. Conlon (212) 214-5056

Automotive/Electrical and Industrial Products
Rich Kwas, CFA (410) 625-6370
David H. Lim (443) 263-6565
Deepa Raghavan, CFA (443) 263-6517

Chemicals
Frank J. Mitsch (212) 214-5022
Sabina Chatterjee (212) 214-8049
Maggie Cheung (212) 214-8011

Containers & Packaging
Chris Manuel (216) 643-2966
Gabe S. Hajde (216) 643-2967

Diversified Industrials
Allison Poliniak-Cusic, CFA (212) 214-5062
Michael L. McGinn (212) 214-5052

Machinery
Andrew Casey (617) 603-4265
Justin Ward (617) 603-4268
Sara Magers, CFA (617) 603-4270

Metals & Mining
Sam Dubinsky (212) 214-5043
Amir Chaudhri (212) 214-5045

Shipping, Equipment Leasing, & Marine MLPs
Michael Webber, CFA (212) 214-8019
Donald D. McLee (212) 214-8029

Transportation
Anthony P. Gallo, CFA (410) 625-6319
Michael Busche (704) 410-2129
Casey Deak (443) 263-6579

Retail Research Marketing

Retail Research Marketing
Colleen Hansen (410) 625-6378

Energy

Exploration & Production
David R. Tameron (303) 863-6891
Gordon Douthat, CFA (303) 863-6920
Stuart Gillespie (303) 863-5859
Brad Carpenter, CFA (303) 863-6894
Jamil Bhatti, CFA (303) 863-6880

Master Limited Partnerships
Michael J. Blum (212) 214-5037
Sharon Lui, CPA (212) 214-5035
Praneeth Satish (212) 214-8056
Eric Shiu (212) 214-5038
Ned Baramov (212) 214-8021

Utilities
Neil Kalton, CFA (314) 875-2051
Sarah Akers, CFA (314) 875-2040
Jonathan Reeder (314) 875-2052
Glen F. Pruitt (314) 875-2047

Oilfield Services and Drilling
Matthew D. Conlan, CFA (212) 214-5044
Tom W. Rhee, CFA, FRM (212) 214-8012

Refiners & Integrateds
Roger D. Read (713) 577-2542
Lauren Hendrix (713) 577-2543

Health Care

Biotechnology
Brian C. Abrahams, M.D. (212) 214-8060
Matthew J. Andrews (617) 603-4218
Shin Kang, PhD (212) 214-5036

Healthcare Facilities
Gary Lieberman, CFA (212) 214-8013
Ryan Halsted (212) 214-8022

Healthcare IT & Distribution
Jamie Stockton, CFA (901) 271-5551
Stephen Lynch (901) 271-5552

Life Science Tools & Services
Tim Evans (212) 214-8010
Luke E. Sergott (212) 214-8027

Managed Care
Peter H. Costa (617) 603-4222
Polly Sung, CFA (617) 603-4324
Brian Fitzgerald (617) 603-4277

Medical Technology
Larry Biegelsen (212) 214-8015
Lei Huang (212) 214-8039
Craig W. Bijou (212) 214-8038

Pharmaceuticals
Michael Faerm (212) 214-8026
Brian E. Jeep (212) 214-8069

Real Estate, Gaming & Lodging

Gaming
Cameron McKnight (212) 214-5046
Barry Jonas (212) 214-8066
Rich Cummings (212) 214-8030

Healthcare/Manufactured Housing/Self Storage
Todd Stender (212) 214-8067
Philip DeFelice, CFA (443) 263-6442

Lodging/Multifamily/Retail
Jeffrey J. Donnelly, CFA (617) 603-4262
Dori Kesten (617) 603-4233
Robert LaQuaglia, CFA, CMT (617) 603-4263
Tamara Fique (443) 263-6568

Office/Industrial/Infrastructure
Brendan Maiorana, CFA (443) 263-6516
Young Ku, CFA (443) 263-6564
Blaine Heck, CFA (443) 263-6529

Financial Services

Brokers/Exchanges/Asset Managers
Christopher Harris, CFA (443) 263-6513
Nathan Burk, CFA (314) 875-2055
Andrew Bond (443) 263-6526

Insurance
John Hall (212) 214-8032
Elyse Greenspan, CFA (212) 214-8031
Kenneth Hung, CFA, ASA (212) 214-8023
Rashmi H. Patel, CFA (212) 214-8034

Specialty Finance
Joel J. Houck, CFA (443) 263-6521
Jonathan Bock, CFA (443) 263-6410
Vivek Agrawal (443) 263-6563
Ronald Jewsikow (443) 263-6449
Charles Nabhan (443) 263-6578

U.S. Banks
Matt H. Burnell (212) 214-5030
Herman Chan (212) 214-8037
Jason Harbes, CFA (212) 214-8068

Media & Telecommunications

Advertising
Peter Stabler (415) 396-4478
Ignatius Njoku (415) 396-4064
Steve Cho (415) 396-6056

Media & Cable
Marci Ryvicker, CFA, CPA (212) 214-5010
Eric Katz (212) 214-5011
Stephan Bisson (212) 214-8033

Telecommunication Services - Wireless/Wireline
Jennifer M. Fritzsche (312) 920-3548
Andrew Spinola (212) 214-5012
Caleb Stein (312) 845-9797

Technology & Services

Communication Technology
Jess Lubert, CFA (212) 214-5013
Michael Kerlan (212) 214-8052
Gray Powell, CFA (212) 214-8048
Priya Parasuraman (617) 603-4269

Information & Business Services
Eric J. Boyer (443) 263-6559

IT & BPO Services
Ed Caso, CFA (443) 263-6524
Richard Eskelsen, CFA (410) 625-6381
Tyler Scott (443) 263-6540

IT Hardware
Maynard Um (212) 214-8008
Munjal Shah (212) 214-8061

Semiconductors
David Wong, CFA, PhD (212) 214-5007
Amit Chanda (314) 875-2045
Parker Paulin (212) 214-5066

Software/Internet, Technology
Jason Maynard (415) 947-5472
Karen Russillo (415) 396-3505

Digital Media/Internet
Peter Stabler (415) 396-4478
Ignatius Njoku (415) 396-4064
Steve Cho (415) 396-6056

Transaction Processing
Timothy W. Willi (314) 875-2044
Robert Hammel (314) 875-2053
Alan Donatiello (314) 875-2054

Strategy

Equity Strategy
Gina Martin Adams, CFA, CMT (212) 214-8043
Peter Chung (212) 214-8063

Strategic Indexing
Daniel A. Forth (704) 410-3233