Vitae Pharmaceuticals, Inc. (VTAE) — Overweight

Promising Small Molecule Discovery Play; Initiating With Overweight, $23 Target

CONCLUSION

Vitae is a structure-based small molecule drug discovery company. Partner Boehringer Ingelheim (BI) is conducting Phase II trials of VTP-34072 in diabetes and Phase Ib trials of BI-1181181 for Alzheimer's disease, both with data expected in 1H:15. Vitae plans to file an IND on VTP-43742 in 1H:15 with initial proof-of-concept psoriasis data expected by year-end. On Friday, January 23rd, Vitae raised $35.7 million, bringing estimated pro forma cash to $101.6 million to advance and expand its own pipeline. We are initiating coverage of Vitae with an Overweight rating and $23 price target.

- **Phase II Diabetes Data in 1H:15.** VTP-34072 is an oral small molecule inhibitor of 11β-HSD1 that reduces cortisol to treat Type II diabetes. BI is conducting a 4-week Phase II trial in 126 diabetics with safety and glucose lowering data expected in 1H:15. If successful, we forecast blockbuster sales from a safe and novel diabetes drug.

- **More Phase I Beta-Secretase Data in 1H:15.** BI-1181181 is a Beta-secretase or BACE inhibitor to treat Alzheimer's disease. In October, BI reported positive Phase I proof-of-concept data showing BI-1181181 decreased beta-amyloid (Aβ) levels by >80% in cerebral spinal fluid. Now BI is conducting Phase I multi-dose studies with data expected in 1H:15. There are currently no approved disease modifying agents for Alzheimer's disease, so we project Beta-secretase inhibitors could become a blockbuster class.

- **Exciting Autoimmune Program Entering the Clinic.** Vitae's lead wholly-owned program is an inhibitor of RORγt, a key regulator in TH17 activation. TH17 cells produce multiple downstream pro-inflammatory cytokines including IL-17 and IL-21, which are implicated in multiple autoimmune diseases. Vitae intends to file an IND on VTP-43742 in 1H:15 with initial proof-of-concept psoriasis data expected by year-end. Vitae then plans to initiate two Phase II trials, one large and one orphan autoimmune disease, in 2016.

- **Healthy Balance Sheet.** On Friday, January 23rd, Vitae issued 3 million shares at $11.90, raising gross proceeds of $35.7 million and bringing estimated pro forma cash to $101.6 million to advance and expand its pipeline.

RISKS TO ACHIEVEMENT OF PRICE TARGET

Risks include clinical, regulatory and commercial. Vitae's deals with BI may falter or drugs may fail in the clinic. Vitae may be unable to file new INDs. Vitae will likely need to raise additional capital.

COMPANY DESCRIPTION

Vitae is a structure-based small molecule drug discovery company.

PRICE: US$16.26
TARGET: US$23.00
Proj. EV of $469M + YE:15E net cash

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Changes	Previous	Current
Rating		Overweight
Price Tgt		US$23.00
FY14E Rev (mil)	—	US$8.7
FY15E Rev (mil)	—	US$0.8
FY14E EPS	—	US$(3.47)
FY15E EPS	—	US$(1.48)

52-Week High / Low	US$23.35 / US$5.41
Shares Out (mil)	21.0
Incl. recent 3M share offering w/o over allotment	
Market Cap. (mil)	US$341.5
Avg Daily Vol (000)	275
Book Value/Share	NA
Net Cash Per Share	US$4.54
Incl. net proceeds from recent offering less notes payable	
Debt to Total Capital	9%
$6.2M in notes payable as of Sept 30	
Div (ann)	NA
Fiscal Year End	Dec

Price Performance - 1 Year

Source: Bloomberg

YEAR	REVENUE (US$ m)						EARNINGS PER SHARE (US$)					
	Mar	Jun	Sep	Dec	FY	FY RM	Mar	Jun	Sep	Dec	FY	FY P/E
2013A	—	—	—	—	22.5	15.2x	—	—	—	—	0.12	NM
2014E	1.2A	1.2A	6.2A	0.2	8.7	39.2x	(8.37)A	(8.37)A	(1.06)A	(0.35)	(3.47)	NM
2015E	0.2	0.2	0.2	0.2	0.8	426.8x	(0.34)	(0.36)	(0.38)	(0.40)	(1.48)	NM

1Q:14 and 2Q:14 quarterly results not yet provided, so 6-mos reported results divided in half to arrive at 1Q:14 and 2Q:14 est.
Vitae went public in Sept 2014.

PROMISING SMALL MOLECULE PIPELINE WITH MULTIPLE VALUE DRIVERS IN 2015

Vitae is a biotechnology company developing oral, small molecule drugs against validated, yet difficult targets. Vitae employs a proprietary structure-based drug design platform called CONTOUR. Starting with a high resolution 3D crystal structure of a validated protein, Vitae's computational chemists are able to fit chemical fragments into the binding site and identify hits with increased affinity and specificity. Vitae's highly experienced medicinal chemists then optimize the candidates in order to improve drug-like properties and potency. This approach significantly reduces the time and cost to discover high affinity compounds to advance into preclinical development. The end result is that Vitae has been able to identify drugs against difficult targets where Big Pharma has often failed.

Vitae has signed two significant drug discovery partnerships with Boehringer Ingelheim. To date, Vitae has received $158 million in license fees, equity investment and research funding and is still eligible for $596 million in future milestones plus royalties. The lead program is VTP-34072, which inhibits 11β-HSD1 to reduce cortisol in order to treat Type II diabetes. BI is currently conducting a 4-week Phase II trial in 126 diabetics with safety and glucose lowering data expected in 1H:15. The second drug is BI-1181181, a beta secretase inhibitor to treat Alzheimer's disease. In October, BI reported positive Phase I proof-of-concept data showing BI-1181181 decreased amyloid beta (Aβ) levels by >80% in cerebral spinal fluid. Now BI is conducting multiple dose Phase I studies with data in 1H:15.

Vitae's lead wholly owned program is an inhibitor of RORγt, a key regulator in T_H17 activation. T_H17 cells produce multiple downstream pro-inflammatory cytokines including IL-17 and IL-21, which are implicated in multiple autoimmune diseases. Vitae intends to file an IND on VTP-43742 in 1H:15 with initial proof-of-concept psoriasis data expected by year-end. Vitae then plans to initiate 2 Phase II trials, one large and one orphan autoimmune disease, in 2016. VTP-43742 has potential applicability in psoriasis, lupus, rheumatoid arthritis and small indications like Behcet's disease and uveitis.

Vitae is developing LXRβ agonist with diverse applications. The first of which is a topical formulation for atopic dermatitis, VTP-38543, which should enter the clinic later this year. The second is an oral compound VTP-38443 intended for acute coronary syndrome.

Upcoming Events

- File an IND and initiate Phase I psoriasis trial for VTP-43742 in 1H:15
- BI to report Phase II diabetes data on 11β-HSD1 inhibitor VTP-34072 in 1H:15
- BI to report Phase I multi-dose data for BACE inhibitor BI-1181181 in 1H:15
- Report Phase I psoriasis data for VTP-43742 in 2H:15
- File an IND and initiate Phase I trial of topical VTP-38543 in 2H:15
- Initiate Phase II autoimmune trials of VTP-43742 in 2016
- Potentially file an IND and initiate Phase I trial of oral VTP-38543 in 2016
- Potentially initiate Phase II trials of topical VTP-43742 in atopic dermatitis in 2016
- Potentially sign new product or drug discovery partnerships

INVESTMENT RECOMMENDATION

Vitae completed a successful IPO in September at $8 and traded as high as $22 based on positive Phase I BI-1181181 data in December. On Friday January 23rd, Vitae issued 3 million shares at $11.90 raising gross proceeds of $35.7 million and bringing estimated pro forma cash to $101.6 million.

We are initiating coverage of Vitae with an Overweight rating and $23 price target based on a projected enterprise value of $469 million. We value Vitae's share of VTP-34072 at $62 million by applying a 10x multiple to 2021 diabetes royalties of $106 million discounted back at 50% through YE:15. We value Vitae's share of BI-1181181 at $146 million by applying the same 10x multiple to 2024 Alzheimer's disease royalties of $1.0 billion discounted back at 60% through YE:15. We believe the 10x multiples are appropriate for royalties and the 50%-60% discount rates are appropriate for Phase II/I assets, respectively.

We value wholly-owned VTP-43742 at $169 million by applying our standard 5x multiple to 2024 psoriasis, lupus and RA sales of $2.3 billion discounted back at 60% through YE:15. We value topical VTP-38543 at $91 million by applying our standard 5x multiple to 2025 sales of $2.7 billion discounted back at 65% through YE:15. We view these discount rates as high with the potential to adjust upon clinical data. To this we add YE:15E net cash of $63 million plus $1.2 million from the exercise of warrants (as of September 30) and subtract $6.2 million in notes outstanding. We divide our projected market cap of $527 million by 22.5 million shares including warrants to arrive at our $23 target.

Vitae is trading at a current market cap of $342 million equating to an enterprise value of $246 million. We see the opportunity for resumed price appreciation as BI reports clinical data, and Vitae advances its proprietary pipeline and potentially signs new partnerships. Vitae's comp group is trading at an average market cap of $644 million and an enterprise value of $505 million. (Please see Exhibit 1 below.)

Exhibit 1

VITAE COMPARABLE COMPANY ANALYSIS

Company	Ticker	Price 1/28/2015	Shares Out.	Market Cap.	Cash	LTD	Ent. Value
Achillion	**ACHN**	**$14.81**	**100.2**	**$1,485**	**$126.8**	**$0.1**	**$1,358**
Array	**ARRY**	**$7.40**	**132.0**	**$977**	**$111.4**	**$105.3**	**$970**
Arena	**ARNA**	**$4.56**	**241.1**	**$1,099**	**$293.3**	**$0.0**	**$806**
Exelixis	**EXEL**	**$2.04**	**195.2**	**$398**	**$204.2**	**$354.5**	**$548**
Orexigen	OREX	$5.49	123.2	$676	$218.8	$82.9	$540
Epizyme	EPZM	$21.11	34.2	$721	$212.6	$0.0	$509
Aegerion	AEGR	$23.16	28.4	$659	$367.6	$215.2	$506
Lexicon	LXRX	$0.90	713.8	$642	$331.6	$100.6	$411
Infinity	INFI	$14.98	48.8	$731	$381.7	$0.0	$349
Cytokinetics	CYTK	$7.31	36.6	$268	$78.5	$0.0	$189
Vivus	VVUS	$2.64	103.7	$274	$306.9	$217.1	$184
Synta	SNTA	$2.45	108.9	$267	$119.3	$16.1	$164
Rigel	RIGL	$2.07	87.8	$182	$157.7	$0.0	$24
Average				**$644**	**$223.9**	**$84.0**	**$505**
TOTAL				**$8,378**	**$2,910.4**	**$1,091.8**	**$6,559**
Vitae	**VTAE**	**$16.26**	**21.0**	**$342**	**$101.6**	**$6.2**	**$246**

Source: FactSet, Company reports and Piper Jaffray estimates.
Note: **BOLDED** companies are covered at Piper Jaffray.

VTP-34072: 11B-HSD1 INHIBITOR

Cortisol and Diabetes

Diabetes is a condition where glucose transport into cells is defective, leading to significant and prolonged hyperglycemia. Diabetes causes numerous and significant co-morbidities including neuropathy, and high blood pressure, which is itself implicated in kidney disease, stroke and heart disease.

There are two most prevalent forms of diabetes: Type I and Type II. Type I diabetes is caused by a deficiency in insulin production, and is therefore treated with insulin replacement therapy. Type II diabetes (T2D) is a multifactorial disease often associated with lifestyle in particular obesity. T2D is a prominent component of "metabolic syndrome". Unlike Type I patients, T2D patients produce sufficient levels of insulin, and are sometimes even hyperinsulinemic, however their cells fail to respond, a condition known as insulin resistance. The biologic basis for insulin resistance is not precisely understood, but is often linked to systemic inflammation.

One factor contributing to hyperglycemia is elevated cortisol levels. Cortisol is a hormone associated with stress responses and a number of metabolic processes. Cortisol increases blood glucose and lipid synthesis, acting against insulin. Perhaps most importantly, elevated cortisol contributes directly to insulin resistance through pro-inflammatory activity. An active line of research hypothesizes that limiting cortisol production could help control hyperglycemia, as well as mitigate the broader risks associated with the metabolic syndrome. 11beta-hydroxysteroid dehydrogenase type 1 (11β-HSD1) is the enzyme that catalyzes the conversion of cortisone into cortisol in liver, fat and skeletal muscle, and has emerged as a promising target for diabetes.

Boehringer Ingelheim 11β-HSD1 Partnership

In early 2006, Vitae initiated a drug discovery program against 11β-HSD1. Demonstrating the speed at which Vitae can identify compounds, the company began filing patents within 2 months and achieved animal PoC in 16 months. In October 2007, Vitae entered into a drug discovery collaboration for 11β-HSD1 with Boehringer Ingelheim (BI). Vitae received $15 million upfront, $7.2 million in R&D funding plus $43 million in milestones to date including $6 million for initiation of the Phase II trial last July. Vitae is eligible to receive an additional $272 million in future milestones plus high-single/low-double digit royalties.

VTP-34072 Clinical Development

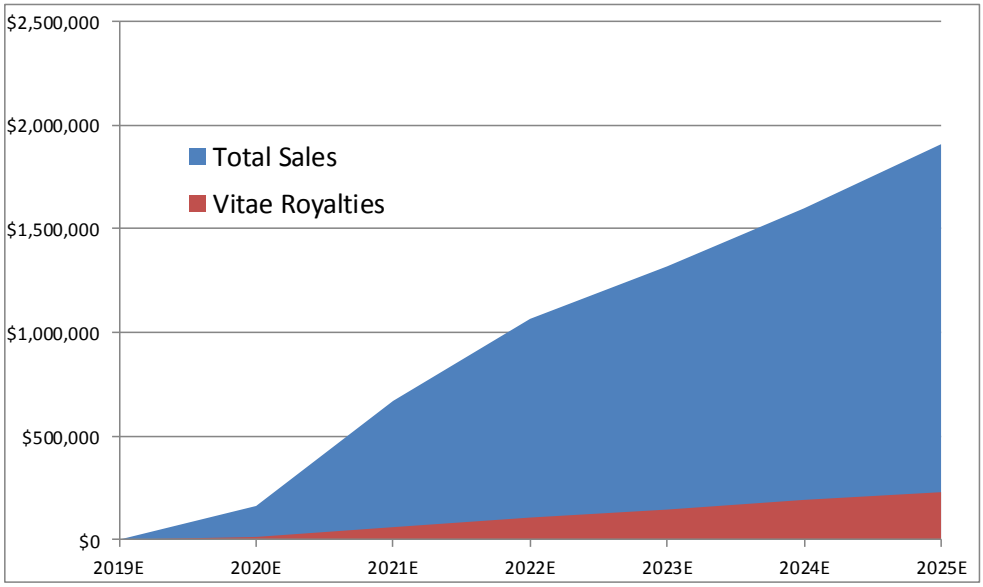
BI performed a single dose Phase I trial in 72 healthy overweight volunteers in which VTP-34072 was well tolerated and demonstrated a once daily dosing profile. BI then conducted a multi-dose trial in 70 overweight diabetics who received once daily dosing of VTP-34072 for 14 days. VTP-34072 was well tolerated at all doses with no dose limiting toxicity (DLTs) or SAEs. Lab results remained within normal ranges and there were no significant changes to heart rate, ECG or blood pressure. Importantly, VTP-34072 achieved a >90% inhibition of 11β-HSD1 in adipose tissue.

Based on these data, BI initiated a placebo controlled Phase II trial of VTP-34072 in 126 diabetics. Patients will be randomized to receive daily low, medium or high doses of VTP-34072 or placebo for 4 weeks. A fourth cohort will enroll patients on background metformin to receive the high dose of VTP-34072. The primary endpoint is 6-week safety, however BI will also measure changes in fasting blood glucose at 4 weeks to assess efficacy. Results from the trial are expected in 1H:15.

According to the Centers for Disease Control (CDC), over 21 million Americans are diagnosed with T2D. Following the market withdrawal of *Actos* and *Avandia*, safety is paramount in diabetes therapy. Assuming pricing in line with the new SGLT2 inhibitors *Invokana* (Johnson & Johnson) and *Farxiga* (AstraZeneca), even conservative penetration yields blockbuster sales potential for BI. We forecast total VTP-34072 sales of $162 million in its first year of approval 2020, growing to $669 million in 2021 and as high as $1.9 billion by 2025. Based on a royalty rate growing from the high single to low double digits, we estimate Vitae will receive $13 million in 2020, $60 million in 2021 and $229 million in 2025. (Please see Exhibit 2 below)

Exhibit 2

U.S. SALES AND ROYALTY FORECAST FOR VTP-34072



	2019E	2020E	2021E	2022E	2023E	2024E	2025E
Americans Diagnosed with T2D	21,032,890	21,663,876	22,313,793	22,983,206	23,672,703	24,382,884	25,114,370
Est. T2D Patients Using Any Meds	15,774,667	16,247,907	16,735,344	17,237,405	17,754,527	18,287,163	18,835,778
% of Type II Diabetics	*75.0%*	*75.0%*	*75.0%*	*75.0%*	*75.0%*	*75.0%*	*75.0%*
VTP-34072 Patients		81,240	167,353	258,561	310,704	365,743	423,805
% Penetration		*0.50%*	*1.00%*	*1.50%*	*1.75%*	*2.00%*	*2.25%*
Price		$2,000	$4,000	$4,120	$4,244	$4,371	$4,502
U.S. VTP-34072 Sales ($000's)		**$162,479**	**$669,414**	**$1,065,272**	**$1,318,504**	**$1,598,630**	**$1,907,985**
Royalty Rate		*8.0%*	*9.0%*	*10.0%*	*11.0%*	*12.0%*	*12.0%*
Vitae Royalties ($000's)		**$12,998**	**$60,247**	**$106,527**	**$145,035**	**$191,836**	**$228,958**

Source: Centers for Disease Control (CDC), Company reports, Piper Jaffray estimates.

BI-1181181: β-SECRETASE INHIBITOR

Beta-Secretase and Alzheimer's Disease

Alzheimer's disease is a progressive form of dementia typically in the elderly. According to the Alzheimer's Association, 5.2 million Americans suffer from Alzheimer's disease with an estimated direct cost of $200 billion in 2012. There are currently no approved disease modifying therapies for Alzheimer's disease.

Alzheimer's disease appears to be caused by the accumulation of Beta-amyloid (Aβ) plaques in the brain. Specifically, Aβ cleavage errors result in the accumulation of protein aggregates or plaques. Controlling, or even reversing, the formation of Aβ plaques has been an area of significant therapeutic research for Alzheimer's disease, however proven tricky. An emerging strategy with great promise involves targeting Aβ cleavage, and thereby limiting plaque deposition. Aβ is produced by snipping amyloid precursor protein (APP) by two enzymes β and γ secretase. B-secretase, also known as beta-site amyloid precursor protein cleaving enzyme or BACE, is the rate limiting step and consequently has emerged as a promising target in Alzheimer's disease drug development.

Boehringer Ingelheim βACE Partnership

In June 2009, Vitae entered into a second drug discovery alliance, this time for Beta-secretase or BACE inhibitor to treat Alzheimer's disease. Vitae received $15 million upfront, a total of $15.2 million in R&D funding plus $29 million in milestones to date including $14 million last February for advancing BI-1181181 into the clinic. In December 2012, the partners expanded the terms of the deal and BI paid to Vitae an additional $4 million fee. Vitae is eligible to receive an additional $326 million in future milestones plus high-single/low-double digit royalties.

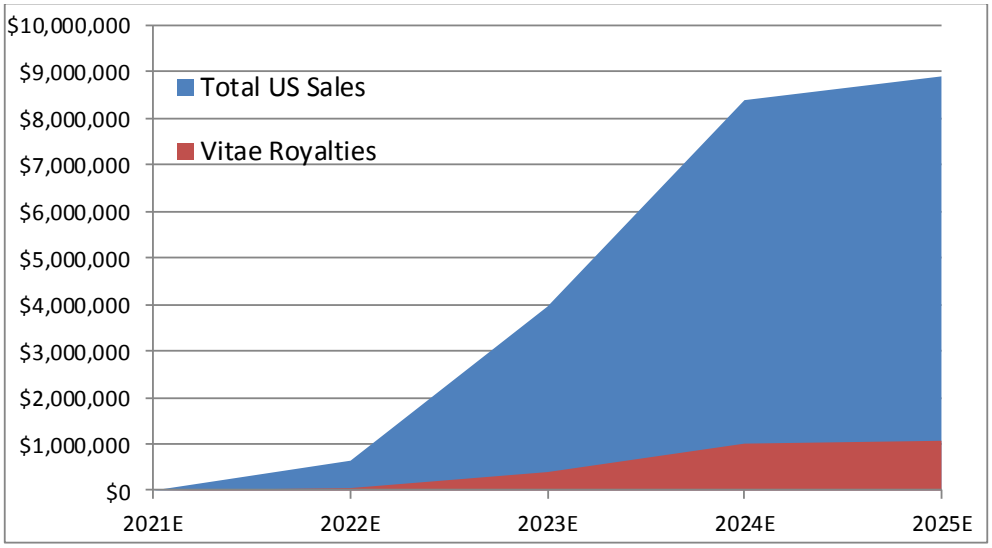
BI-1181181 Clinical Development

BI ran single dose Phase I trials finding that BI-1181181 was well tolerated. Importantly, intermediate doses decreased Aβ by >80% in the cerebral spinal fluid (CSF), providing initial clinical proof-of-concept. BI is now recruiting additional Phase I trials to investigate safety and pharmacodynamics of multiple dose of BI-1181181 in young and elderly healthy volunteers with data expected 1H:15.

There are currently no approved disease-modifying therapies for Alzheimer's disease, although there are β-secretase inhibitors further ahead in development. Assuming very conservative pricing of $10,000 per full year, we forecast U.S. sales of $640 million in 2022, growing to $4.0 billion in 2023 and $8.9 billion by 2025. Based on a royalty rate growing from the high single to low double digits, we estimate Vitae could receive royalties of $51 million in 2022, $395 million in 2023 and $1.07 billion in 2025 (Please see Exhibit 3 below).

Exhibit 3

U.S. SALES AND ROYALTY FORECAST FOR BI-1181181



	2021E	2022E	2023E	2024E	2025E
Americans with Alzheimer's Disease	6,209,072	6,395,344	6,587,204	6,784,821	6,988,365
VTP-34072 Patients		127,907	395,232	814,178	838,604
% Penetration		*2.0%*	*6.0%*	*12.0%*	*12.0%*
Price		$ 5,000	$ 10,000	$ 10,300	$ 10,609
U.S. VTP-37948 Sales ($000's)		**$639,534**	**$3,952,323**	**$8,386,038**	**$8,896,748**
Royalty Rate		*8.0%*	*10.0%*	*12.0%*	*12.0%*
Vitae Royalties ($000's)		**$51,163**	**$395,232**	**$1,006,325**	**$1,067,610**

Source: Alzheimer's Association, Company reports and Piper Jaffray estimates.

VTP-43742: RORγt INHIBITOR

TH17 Cells and Autoimmune Disease

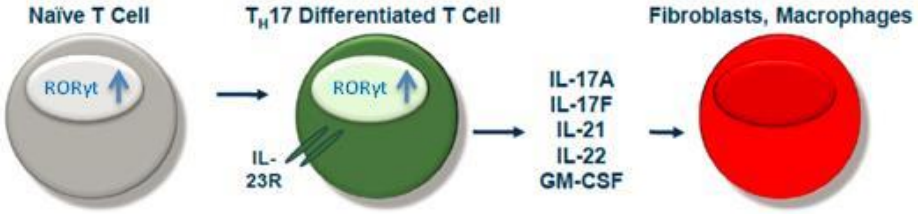
Recent research has highlighted the role of T_H17 cells in several autoimmune diseases. T_H17 cells are distinct from T_H1 and T_H2 cells. T_H17 cells produce a number of inflammatory cytokines including IL-17 (for which they are named), IL-21, IL-22 and GM-CSF that contribute to tissue damage and recruit additional inflammatory cells, such as macrophages.

Just last week, on January 21st, Novartis's gained FDA approval anti-IL-17a antibody *Cosentyx* (secukinumab) for the treatment of moderate-to-severe plaque psoriasis. This followed Japanese approval in December and European approval in January. Cosentyx approval was based on clinical superiority data over the market leading anti-TNF therapy *Enbrel*. At 12 weeks, Cosentyx achieved a PASI 90 score in 54% of patients vs. only 21% of patients on Enbrel. Cosentyx maintained this benefit with a PASI 90 score of 65% vs. 33% with Enbrel at week 52. More recently Cosentyx hit on the primary endpoints in two Phase III trials for psoriatic arthritis (PsA), a condition found in approximately 30% of psoriasis patients. Cosentyx provides important clinical evidence of the role of T_H17 modulation to control autoimmune disease.

RORγt is a transcription factor necessary for the differentiation of naïve T cells into pro-inflammatory T_H17 cells. Continued expression of RORγt plays a role in the production of the cell's cytokine repertoire. IL-23 has also been recognized as an important modulator of the T_H17 pathway. Monoclonal antibodies against IL-23, most notably Johnson & Johnson's *Stelara* (ustekinumab), have had success in treating psoriasis and psoriatic arthritis. IL-23 leads to T_H17 survival and expansion through STAT3 activation and RORγt expression. The central role of RORγt to T_H17 regulation provides a choke point where a single therapeutic candidate could both limit T_H17 differentiation as well as counter IL-23 signaling. (Please see Exhibit 4 below).

Exhibit 4

ROLE OF RORγt TH17 DIFFERENTIATION AND INFLAMMATION



Source: Company reports.

Inhibition of RORγt could provide the opportunity for a single target to down-regulate cytokine activity from a major inflammatory cell type. Targeting this control point could prove more effective than inhibiting individual downstream cytokines. The ability to impact a broad range of cytokines with a single drug, as opposed to treating individual targets, may maximize therapeutic effect while maintaining a manageable safety profile. Whereas Novartis' Cosentyx achieved superior results by targeting only IL-17a, VTP-43742 may be able to broaden response rates by significantly inhibiting several cytokines at their control point, RORγt.

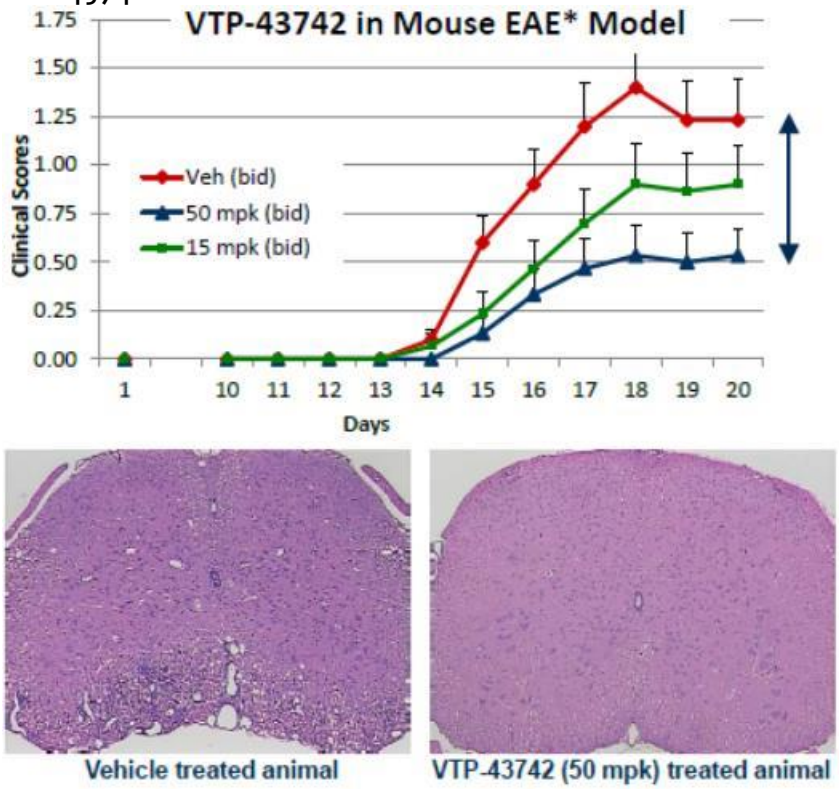
VTP-43742 Preclinical Work and Clinical Development Plans

Vitae's lead wholly-owned program is VTP-43742, an oral inhibitor of RORγt. Importantly, VTP-43742 is 1000-fold more selective for ROR-gamma versus the α or β isoforms, which should dramatically reduce the risk of off target effects.

In the Experimental Autoimmune Encephalomyelitis (EAE) multiple sclerosis murine model, VTP-43742 inhibited IL-17 production from T_H17 cells without harming Th1 or T-reg cells. New preclinical data shows VTP-43742 treatment attenuated disease progression as measured by clinical severity in the animals. (Please see top graph in Exhibit 5 below.) Further, spinal cord cross sections show that treatment prevented inflammation, vacuolization (an indication of demyelination), lymphocyte and neutrophil infiltration and the formation of necrotic cell debris. (Please see lower spinal cord histology in Exhibit 5 below)

Exhibit 5

VTP-43742 EFFICACY IN MULTIPLE SCLEROSIS MURINE MODEL



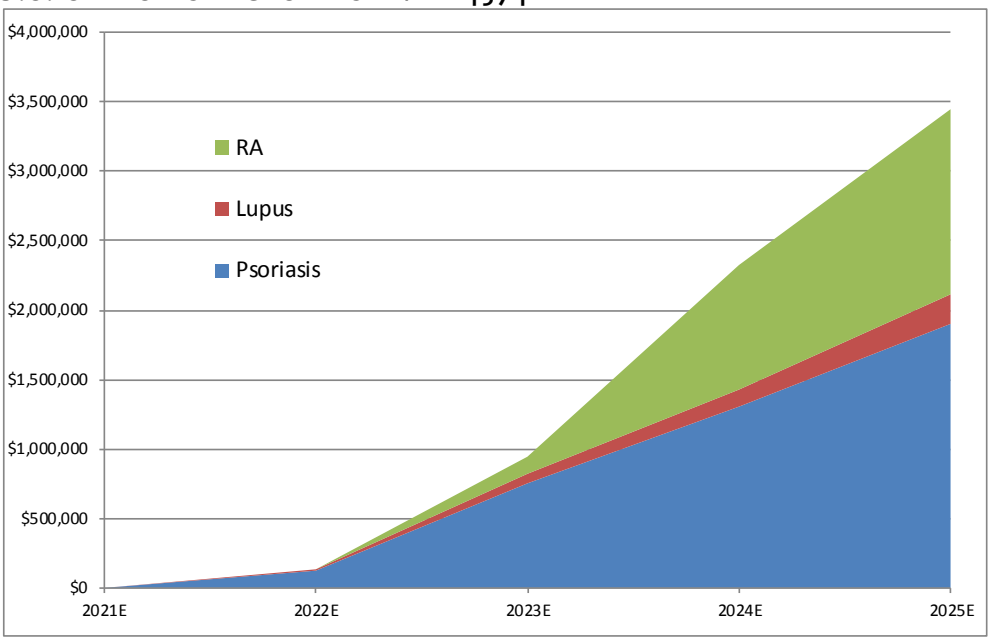
Source: Company reports.

Vitae intends to file an IND on VTP-43742 in 1H:15. Vitae will begin with a 4-week multiple ascending dose study in moderate to severe psoriasis patients. The company expects to report safety and PASI efficacy data by YE:15. We view psoriasis as a good first proof-of-concept program because the disease is known to be IL-17 responsive and efficacy can be assessed through simple visual examination. Mechanistic insight and biomarker data can be derived from easy to obtain punch biopsies. Assuming the drug proves safe and active, Vitae plans to initiate 2 Phase II trials, one large and one orphan autoimmune disease, in 2016. VTP-43742 has potential applicability in psoriasis, lupus, rheumatoid arthritis (RA) and small indications like Behcet's disease and uveitis.

Assuming moderate pricing and penetration rates, we forecast psoriasis sales of $124 million in 2022, growing to $753 million in 2023 and $1.9 billion in 2025. We forecast lupus sales of almost $10 million in 2022, growing to $69 million in 2023 and $213 million in 2025. Lastly, we project RA sales of $123 million in 2023, growing to $897 million in 2024 and $1.3 billion in 2025. (Please see Exhibit 6 below)

Exhibit 6

U.S. SALES FORECAST FOR VTP-43742



Psoriasis	2021E	2022E	2023E	2024E	2025E
Americans with Psoriasis	8,202,640	8,284,666	8,367,513	8,451,188	8,535,700
Patients with Moderate-to-Severe Psoriasis	**2,050,660**	**2,071,166**	**2,091,878**	**2,112,797**	**2,133,925**
% Severe Psoriasis	***25.0%***	***25.0%***	***25.0%***	***25.0%***	***25.0%***
VTP-43742 Patients (000)		20,712	62,756	105,640	149,375
VTP-43742 Penetration		***1.00%***	***3.00%***	***5.00%***	***7.00%***
Estimated VTP-43742 Price		$6,000	$12,000	$12,360	$12,731
U.S. VTP-43742 Sales ($000's)	**$0**	**$124,270**	**$753,076**	**$1,305,709**	**$1,901,660**

Lupus	2021E	2022E	2023E	2024E	2025E
Americans with Lupus	229,893	232,192	234,513	236,859	239,227
Seropositive Lupus Patients	**160,925**	**162,534**	**164,159**	**165,801**	**167,459**
% Seropositive	***70.0%***	***70.0%***	***70.0%***	***70.0%***	***70.0%***
Severe Lupus Patients (SLEDAI >10)	**80,462**	**81,267**	**82,080**	**82,901**	**83,730**
% Severe Patients	***50.0%***	***50.0%***	***50.0%***	***50.0%***	***50.0%***
VTP-43742 Patients (000)		1,625	5,746	9,948	16,746
VTP-43742 Penetration		***2.0%***	***7.0%***	***12.0%***	***20.0%***
Estimated VTP-43742 Price		$6,000	$12,000	$12,360	$12,731
U.S.VTP-43742 Sales ($000's)	**$0**	**$9,752**	**$68,947**	**$122,958**	**$213,189**

Rheumatoid Arthritis	2021E	2022E	2023E	2024E	2025E
Americans with RA	2,515,803	2,540,961	2,566,370	2,592,034	2,617,954
RA Patients Using Biologic DMARD	1,006,321	1,016,384	1,026,548	1,036,814	1,047,182
% Biologics Users	***40.0%***	***40.0%***	***40.0%***	***40.0%***	***40.0%***
VTP-43742 Patients (000)			20,531	72,577	104,718
VTP-43742 Penetration			***2.0%***	***7.0%***	***10.0%***
Estimated VTP-43742 Price			$6,000	$12,360	$12,731
U.S.VTP-43742 Sales ($000's)	**$0**	**$0**	**$123,186**	**$897,051**	**$1,333,146**

Total VTP-43742 Sales ($000's)	**$0**	**$134,022**	**$945,209**	**$2,325,718**	**$3,447,995**

Source: National Institute of Arthritis and Musculoskeletal and Skin Diseases, Lupus Foundation, CDC, Company reports and Piper Jaffray estimates.

LXRβ DEVELOPMENT PROGRAMS

VTP-38543: Topical LXRβ Agonist for Atopic Dermatitis

Vitae is developing LXRβ agonists with different forms of administration and thus applicability in different disease settings. The first is VTP-38543, a topical delivery formulation for atopic dermatitis.

Atopic Dermatitis, also commonly called eczema, is a recurring rash caused by an allergic reaction manifest by inflammation and immune cell activity in the skin. Approximately 10% of the population is affected by some form of the disease. The onset of atopic dermatitis generally occurs in infancy or childhood, and the majority of these patients continue to be impacted into adulthood. There is a tendency for patients with dermatitis to have dry and sensitive skin. Flares of atopic dermatitis are uncomfortable and described as "itchy". Scratching for relief can cause skin damage, inducing further skin inflammation and discomfort; prolonging and exacerbating the symptoms.

Topical corticosteroids are a nearly universal first line treatment for atopic dermatitis. These medications effectively reduce inflammation and allow the flares to subside. However the immune suppression of corticosteroids increases the risk of infection. Further corticosteroids suppress keratinocyte differentiation, thereby leading to thinning and discoloration of the skin. Vitae's approach is to achieve the anti-inflammatory efficacy of corticosteroids while avoiding the negative side-effects.

LXRβ is a nuclear receptor transcription factor active in a range of tissues and cells. LXRβ activity in macrophages inhibits the transcription of inducible Nitric Oxide synthase (iNOS), IL-6 and COX-2; all key to macrophage function, but also key mediators of tissue damage when in excess. Critically, LXRβ impacts keratinocytes in a fashion opposed to the corticosteroids. LXRβ activity induces keratinocyte differentiation into corneocytes that populate the skin's outer stratum corneum. LXRβ also increases the secretion of lamellar lipids, which pack the extra-cellular matrix of the stratum corneum contributing to the layer's integrity. Vitae believes the enhancement of skin quality will diminish the susceptibility to irritation, while control of inflammation will limit subsequent reactions.

VTP-38543: Preclinical Work and Development Plans

Vitae has dosed human keratinocytes with VTP-38543 in vitro. VTP-38543 resulted in dose-dependent expression of genes involved in lipid synthesis and transport, indicative of a potential to augment lipid in the stratum corneum. Vitae then evaluated VTP-38543 in a murine inflammation model, where an irritant (TPA) is applied to the ear. VTP-38543 achieved equivalent anti-inflammatory activity to 0.05% Clobetasol, a potent topical corticosteroid.

Vitae intends to file an IND for VTP-38543 in 2H:15. The company will conduct a Phase Ia study in healthy volunteers examining safety, pharmacodynamics and biomarkers for skin lipid activity. Data from this trial could be available by early 2016. Assuming a clean safety profile, Vitae will initiate a Phase Ib study in atopic dermatitis patients repeating the Phase Ia endpoints and looking for initial clinical responses.

VTP-38443: Acute Coronary Syndrome

Vitae is also working on an oral formulation of LXRβ, VTP-38443, for the potential treatment of acute coronary syndrome. In addition to its anti-inflammatory function, LXRβ plays a role in cholesterol transport from peripheral tissues to the liver for catabolism, as well as cholesterol elimination through the stool. Vitae believes that stimulating cholesterol

elimination can stabilize and potentially reduce the size of coronary plaques. Vitae performed preclinical rat studies showing that VTP-38443 increased cholesterol efflux over 48 hours to a greater extent and at lower doses than GlaxoSmithKline's LXR agonist GW3965. Next Vitae placed ApoE-/- mice on a high fat diet and ligated the carotid artery as a model of cardiovascular disease. VTP-38443 lowered the plaque burden and inflammation in the carotid artery. Interestingly, plasma triglycerides did not increase, as is common in pan-LXR stimulation, showing VTP-38443's on target and specific effect. Vitae will seek to file an IND in 2016.

CONTOUR STRUCTURE-BASED DRUG DESIGN

Vitae's pipeline has been internally identified using its proprietary structure-based drug design platform called CONTOUR. All rational design begins with a high resolution 3D crystal structure of the binding pocket of a target protein. Unlike traditional SBDD which attempts to score the binding of a **complete** small molecule into the binding pocket, CONTOUR fits chemical **fragments** into the binding site. CONTOUR scores these fragments interactions enabling Vitae's computational chemists to literally **build** molecules into the binding pocket that have increased affinity and specificity. Not only does this save time, however Vitae demonstrated that CONTOUR's molecular solutions were more closely related to a set of known targets than those produced by other available software. (Ischenko et al. *J. Chem. Info & Modeling*, 2012) Vitae's highly experienced medicinal chemists then optimize the candidates in order to improve drug-like properties and potency.

CONTOUR allows Vitae to be agnostic as to particular therapeutic areas, and rather focus on validated yet difficult to drug targets. This approach significantly reduces the time and cost to identify high affinity candidates to advance into preclinical development. The end result is that Vitae has been able to identify drugs against difficult targets where Big Pharma has often failed.

MANAGEMENT TEAM

Jeffrey Hatfield
President and CEO

Mr. Hatfield joined Vitae as President and CEO in March of 2004. Previously Mr. Hatfield was an executive at Bristol-Myers Squibb where he ran the Canadian operations, as well the Virology/Immunology division. Mr. Hatfield holds an MBA from The Wharton School of the University of Pennsylvania.

Richard Gregg, M.D.
Chief Scientific Officer

Prior to joining Vitae as CSO, Dr. Gregg spent 19 years at Bristol-Myers Squibb in charge of various R&D and development groups including for metabolic and cardiovascular diseases. Before that he was a researcher at the National Heart Lung and Blood Institute of the NIH for 10 years focusing on lipid and lipoprotein metabolism. Dr. Gregg received his M.D. from Stanford University School of Medicine.

Richard Morris, CPA
Chief Financial Officer

Mr. Morris became Vitae's CFO in May 2014. He was previously Vice President for Financial Planning and Strategic Analysis, as well as Chief Accounting Officer at ViroPharma. Mr. Morris joined ViroPharma from KPMG where he worked in the Healthcare Assurance group.

FINANCIALS

Revenues

Vitae recognizes revenues as part of its Boehringer Ingelheim collaborations. Up until 30 June 2014, Vitae recognized amortization of the BI upfront payments. Now the company recognizes periodic milestone payments. Specifically, Vitae recognized $22.5 million in 2013 and we forecast revenues of $8.7 million for the full year 2014. We presently forecast revenues of only $800,000 in 2015, although vitae may be paid milestones in 2H:15 for the initiation of new studies by BI.

Operating Expenses

R&D expense was $14.9 million in 2013. R&D expense was $4.8 million in 3Q:14 including approximately $300,000 in non-cash stock based compensation relating to the IPO in the quarter. We forecast R&D investment of $19.2 million for 2014 and $25 million in 2015.

G&A expense was $5.4 million in 2013 and $3.1 million in 3Q:14 including $1.7 million in non-cash stock based compensation relating to the IPO in the quarter. We budget G&A expense of $7.2 million for the full year 2014 and $8.0 million in 2015.

Net Loss

Vitae made $1.2 million in 2013 prior to going public, so reported earnings per share of $0.12 over 563,000 pre-IPO shares outstanding. Vitae lost $1.8 million or ($1.06) per basic share in 3Q:14. We project a net loss of $18.1 million or ($3.47) per basic share for the full year 2014 and $32.2 million or ($1.48) in 2015.

Balance Sheet

Vitae ended 3Q:14 with cash of $68 million. On Friday January 23rd, Vitae issued 3 million shares (excluding a 450,000 share over allotment) at $11.90 raising gross proceeds of $35.7

million. We estimate Vitae now holds pro forma cash of $101.6 million to advance and expand its pipeline. As of September 30th, Vitae held $5.7 million current and $510,004 in notes payable.

INVESTMENT RISKS

Risks associated with Vitae are common to other drug discovery companies including clinical, regulatory and commercial. Diabetes, Alzheimer's and autoimmune diseases are competitive fields with larger, more advanced and better funded players. Vitae's drugs may fail in the clinic or to gain regulatory approval. Vitae may be unable to file new INDs or identify novel drugs against future targets. Vitae's deals with BI may falter and/or the company may be unable to sign new partnerships. Vitae will likely need to raise additional future. The company could face future unforeseen litigation or have to defend its patents.

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Piper Jaffray Co.

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Vitae Pharmaceuticals
Quarterly Earnings Estimates
($ in thousands except per share)

1/29/15

	2012A	2013A	1QA[1]	2QA[1]	3QA	4QE	2014E	1QE	2QE	3QE	4QE	2015E
Revenues:												
Collaborative Revenue	$22,348	$22,513	*$1,164*	*$1,164*	$6,178	$200	$8,707	$200	$200	$200	$200	$800
Product Sales	0	0	*0*	*0*	0	0	0	0	0	0	0	0
Total Revenues	**$22,348**	**$22,513**	***$1,164***	***$1,164***	**$6,178**	**$200**	**$8,707**	**$200**	**$200**	**$200**	**$200**	**$800**
Operating Expenses:												
Research and Development	15,927	14,917	*4,713*	*4,713*	4,799	5,000	19,225	5,500	6,000	6,500	7,000	25,000
General and Administrative	4,915	5,406	*1,314*	*1,314*	3,096	1,500	7,225	1,750	2,000	2,000	2,250	8,000
Total Operating Expenses	**$20,842**	**$20,323**	***$6,027***	***$6,027***	**$7,896**	**$6,500**	**$26,449**	**$7,250**	**$8,000**	**$8,500**	**$9,250**	**$33,000**
Operating Income/(Loss)	**$1,506**	**$2,190**	***($4,862)***	***($4,862)***	**($1,718)**	**($6,300)**	**($17,742)**	**($7,050)**	**($7,800)**	**($8,300)**	**($9,050)**	**($32,200)**
Operating Margin	**NM**	**NM**	***NM***	***NM***	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
Interest income, Net	**(1,526)**	**(1,355)**	*(256)*	*(256)*	(217)	0	(730)	0	0	0	0	0
Other Income	**243**	**327**	*109*	*109*	126	0	343	0	0	0	0	0
PreTax Income/(Loss)	**$223**	**$1,162**	***($5,010)***	***($5,010)***	**($1,809)**	**($6,300)**	**($18,128)**	**($7,050)**	**($7,800)**	**($8,300)**	**($9,050)**	**($32,200)**
Pretex Margin	**NM**	**NM**	***NM***	***NM***	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
Income Tax Benefit (Expense)	**0**	**0**	*0*	*0*	0	0	0	0	0	0	0	0
Tax Rate	**0.0%**	**0.0%**	*0.0%*	*0.0%*	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**
Net Income/(Loss)	**$223**	**$1,162**	***($5,010)***	***($5,010)***	**($1,809)**	**($6,300)**	**($18,128)**	**($7,050)**	**($7,800)**	**($8,300)**	**($9,050)**	**($32,200)**
Net Margin	**NM**	**NM**	***NM***	***NM***	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
Net Income/(Loss) per Share	**$0.41**	**$0.12**	***($8.37)***	***($8.37)***	**($1.06)**	**($0.35)**	**($3.47)**	**($0.34)**	**($0.36)**	**($0.38)**	**($0.40)**	**($1.48)**
Shares Outstanding	**542**	**10,099**	*599*	*599*	1,712	18,000	**5,227**	20,500	21,750	22,000	22,500	**21,688**

Source: Company reports and Piper Jaffray estimates

1. 1Q:14 and 2Q:14 quarterly results not yet reported, so 6-month results divided in half to arrive at 1Q:14 and 2Q:14 quarterly estimates.

Current disclosure information for this company can be found at ***http://www.piperjaffray.com/researchdisclosures.***

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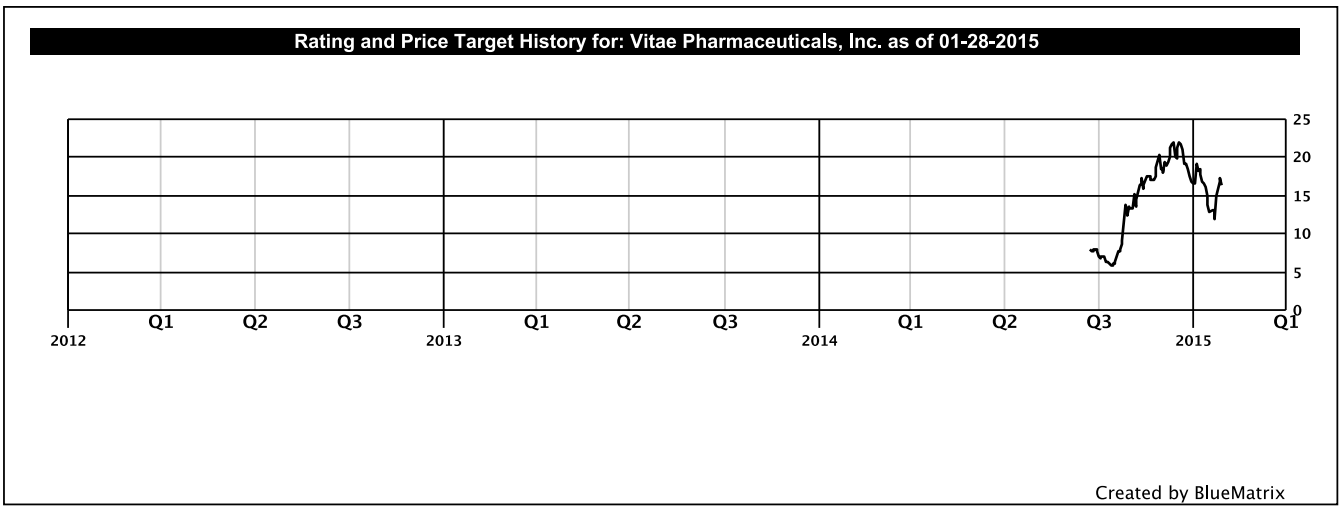

Notes: The boxes on the Rating and Price Target History chart above indicate the date of the Research Note, the rating, and the price target. Each box represents a date on which an analyst made a change to a rating or price target, except for the first box, which may only represent the first Note written during the past three years.

Legend:
I: Initiating Coverage
R: Resuming Coverage
T: Transferring Coverage
D: Discontinuing Coverage
S: Suspending Coverage
OW: Overweight
N: Neutral
UW: Underweight
NA: Not Available
UR: Under Review

Distribution of Ratings/IB Services
Piper Jaffray

			IB Serv./Past 12 Mos.	
Rating	Count	Percent	Count	Percent
BUY [OW]	381	60.77	100	26.25
HOLD [N]	232	37.00	20	8.62
SELL [UW]	14	2.23	0	0.00

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Analyst Certification — Edward A. Tenthoff, Sr Research Analyst
— Benjamin J. Adler, Ph.D., Research Analyst

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