William Blair

Adamas Pharmaceuticals, Inc.

Efficiently Building a CNS Franchise; Initiating Coverage With Outperform Rating

Adamas Pharmaceuticals is a specialty pharmaceutical company focused on therapies for the treatment of central nervous disorders; specifically, the company's pipeline spans treatments for Alzheimer's disease, Parkinson's disease, and traumatic brain injury (TBI). These pipeline products are composed of extended-release and fixed-dose combinations of existing products, which will follow the 505(b)(2) regulatory pathway, a strategy that should enable lower-risk clinical development.

While Adamas's 505(b)(2) strategy should enable faster development and reduced clinical risk given the well-characterized nature of the company's pipeline, intellectual property will likely be a focus throughout the life of the company. However, we believe the acquisition of Forest Laboratories by Actavis, a sophisticated generics company, validates the Namenda XR and Namenda XR fixed-dose combination intellectual property. The disclosed pipeline at Adamas includes three products, two of which—Namenda XR and the Namenda XR/donepezil fixed-dose combination—will play a critical role in solidifying the $1.6 billion Namenda franchise for development partner Forest Laboratories. Given the high-profile acquisition of Forest by Actavis for $25 billion, we believe the Namenda royalty stream has been de-risked. While we wait for the Namenda franchise royalties to begin in 2018, we believe investor focus should remain on the development of ADS-5102, a product for levodopa-induced dyskinesia (LID) in Parkinson's disease.

ADS-5102 data suggests efficacy well beyond immediate-release amantadine for LID. While experience with amantadine in Parkinson's disease dates to the 1970s, the extended-release formulation of ADS-5102 allows for more tolerable and effective dosing, which we believe has led to best-in-class data from the Phase II/III EASED study. Adamas will initiate the second Phase III study for ADS-5102 in the near term, with data likely to report out in 2016. The 3.0-hour increase in "ON" time and 0.9-hour decrease in "OFF" time, as well as the roughly 17% decrease in LID observed to date, look to be best in class versus the other formulations of carbidopa/levodopa.

Our risk-adjusted net present value suggests $35 per share based on the Namenda franchise royalty stream from Actavis and our belief that ADS-5102 sales will exceed $500 million. Near-term catalysts include the continued Namenda franchise conversion to Namenda XR and the approval of Namenda XR/donepezil fixed-dose combination. The usual regulatory, clinical, and competitive risks in development-stage pharmaceuticals also apply to shares of Adamas.

Adamas Pharmaceuticals is a developer of specialty therapeutics for the treatment of disorders affecting the central nervous system. The company is based in Emeryville, California.

Tim Lugo
+1 415 248 2870
tlugo@williamblair.com

May 5, 2014
Basic Report (14-056)

Stock Rating:	**Outperform**
Company Profile:	**Aggressive Growth**
Price Target:	$35.00
Symbol:	ADMS (Nasdaq)
Price:	$20.01 (52-Wk.: $14–$20)
Market Value (mil.):	$330
Fiscal Year End:	December
Long-Term EPS Growth Rate:	NA
Dividend/Yield:	None

Estimates	**2013A**	**2014E**	**2015E**
EPS FY	$5.99	$0.95	$0.59
EBITDA (mil.)	$58.3	$13.3	$10.0
Valuation			
P/E	3.3x	21.1x	33.9x

Trading Data	
Shares Outstanding (mil.)	16.4
Float (mil.)	6.3
Average Daily Volume	222,789

Financial Data	
Long-Term Debt/Total Capital	$0
Book Value Per Share	NM
Enterprise Value (mil.)	$244.0
EBITDA (mil.)	$13.3
Enterprise Value/EBITDA	18.3

Contents

Company Overview

Adamas Pharmaceuticals, Inc. is a specialty pharmaceutical company that enhances the pharmacokinetic profiles of approved drugs for use alone and in fixed-dose combination products for those affected by chronic disorders of the central nervous system (CNS). Roughly 36 million people in the United States suffer from chronic CNS disorders according to estimates by company management. Adamas is advancing a pipeline of drug candidates for the treatment of chronic CNS disorders, such as Parkinson's disease and Alzheimer's disease.

The company's experienced team has developed an integrated process involving in-depth knowledge of CNS markets, interactions between drug plasma concentrations and clinical side effects, regulatory issues, and pharmaceutical development and optimization of its products. The company has multiple product candidates in late-stage clinical development that are either wholly owned or being developed in collaboration with Forest Laboratories, Inc. Exhibit 1 details the product pipeline and the targeted disease.

Exhibit 1
Adamas Pharmaceuticals, Inc.
Select Product Portfolio Pipeline

Product	PRE-IND	Phase I	Phase II	Phase III/ Pivotal	Filed with Regulators	Comments/Timing
ADS-5102 (Nurelin) Amantadine Extended Release (ER)						Wholly owned lead product. Phase III designation for levodopa-induced dyskinesia (LID) in Parkinson's disease. Traumatic brain injury (TBI)/undisclosed indication still in pre-industrial-new-drug stage.
MDX-8704 Memantine ER/ Donepezil (United States)						In development with Forest Laboratories for moderate to severe dementia associated with Alzheimer's disease.
ADS-8704 Memantine ER/ Donepezil (excl. United States)						For moderate to severe dementia associated with Alzheimer's in the ex-U.S. market.
ADS-8902 (Amantadine/Ribavirin/ Oseltamivir)						For severe influenza, in collaboration with the National Institutes of Health and the U.S. Navy.

Sources: Company reports and William Blair & Company, L.L.C.

Adamas plans to advance its product candidates through the 505(b)(2) regulatory pathway and commercialize its products in the United States through a specialty CNS salesforce. In addition to the company's in-development CNS products, opportunities are being developed for the treatment of severe influenza infection in collaboration with the National Institutes of Health and U.S. Navy; however, we have not ascribed any value to this program in our valuation.

In exhibit 2, on the following page, we include the key catalysts for Adamas through 2016. In general, with the company leveraged to the Namenda franchise at Forest Laboratories/Actavis Pharmaceuticals, we believe the continued market share mix between Namenda and Namenda XR—and eventually the "double switch" from Namenda XR to the Namenda fixed-dose combination (FDC)—will influence how shares trade over the next 16 months. Beyond that, we believe data coming out of the ADS-5102 program, which is just now entering its second Phase III study, will ultimately lead to the largest value inflection point for the company in late 2015 or 2016, depending on trial enrollment.

Exhibit 2
Adamas Pharmaceuticals, Inc.
Timeline and Events

Date	Product	Event	Description/Comments
2014			
H1 2014	MDX-8704 (Forest)	Legal	NDA acceptance (up to $25 million milestone)
H2 2014	ADS-5102	Clinical	Initiate Phase III PD-LID study
H2 2014	ADS-5102	Clinical	Initiate Phase II/III chronic traumatic brain injury study
2015			
H1 2015	MDX-8704 (Forest)	Regulatory	Potential approval of NDA filing (up to $30 million milestone
H2 2015	ADS-5102	Clinical	Complete enrollment of Phase III PD-LID study
H1 2015	ADS-5102	Clinical	Initiate additional Phase II/III study for ADS-5102

Sources: Company reports and William Blair & Company, L.L.C. estimates

Key Risks

An investment in shares of Adamas Pharmaceuticals involves clinical, regulatory, and financial risks that are typical for developmental-stage biopharmaceutical companies. We estimate that Adamas will be profitable over the 2014-2015 period; however, the company might incur losses beginning in 2016 as preparations begin for the launch of ADS-5102. In addition to the risks associated with ADS-5102 development, there are intellectual property, manufacturing, and competition risks to consider.

The ability to maintain effective intellectual property rights for product candidates presents a risk. Because of the complexity involved in the patent position of specialty pharmaceuticals and biotechnology companies, pending and future patent applications might not result in patents being issued in the United States or other jurisdictions. In a worst-case scenario, Adamas will receive only three years of Hatch-Waxman exclusivity, while in a best-case scenario the Adamas intellectual property surrounding method claims associated with the unique pharmacokinetic profile of ADS-5102 will protect the franchise through 2027.

Adamas's product candidates have never been manufactured on a commercial scale. The risks associated with scaling up manufacturing to commercial scale include potential problems with scale-up, reproducibility issues, and lot consistency, among others. Although Adamas relies on third-party contract manufacturing organizations, it is working on a second source of drug product manufacturing and would like it to be in place before the new drug application (NDA) filing.

A competitive environment exists in the CNS product space. Adamas faces competition from major pharmaceutical companies, specialty pharmaceutical companies, and biotechnology companies. For example, AbbVie's research-and-development pipeline includes a carbidopa/levodopa intestinal gel for advanced Parkinson's disease that is approved in Europe and Canada; in the United States, the gel will likely be launched in 2014. In Alzheimer's disease treatments, Namenda XR and MDX-8704 might compete with generic products, such as galantamine, rivastigmine, and donepezil, and branded products, such as the Exelon patch by Novartis.

Parkinson's Disease Overview

Parkinson's disease is a type of motor system disorder characterized by four primary symptoms, according to the National Institute of Neurological Disorders and Stroke: 1) tremors in the hands, arms, legs, and face; 2) stiffness of the limbs; 3) slowness of movement (also called bradykinesia); and 4) postural instability. The Parkinson's Disease Foundation estimates that roughly 1 million people in the United States live with the disease; worldwide, that number is estimated at 7 million to 10 million. Every year, roughly 60,000 people in the United States are diagnosed with the disease, with men 1.5 times more likely than women to be afflicted. Aging is most commonly associated with the development and progression of Parkinson's disease; only 4% of people who have the disorder are diagnosed before age 50. Based on the aging of baby boomers, we believe the diagnosis of Parkinson's disease will likely increase over the next 5-10 years, as will the need for effective treatments.

The consensus belief among doctors and researchers is that the development of Parkinson's disease is a result of the death of dopaminergic neurons. These neurons are located in the midbrain and are the main source of dopamine in the central nervous system. These neurons and this portion of the midbrain (also referred to as the *substantia nigra)* are also the part of the brain heavily involved in the roles of reward and addiction as well as movement. The mechanisms behind the most common treatments of Parkinson's disease involve the replacement of dopamine lost via cell death and the degradation of neurons located in the midbrain.

Several medications are used to treat Parkinson's disease. Most drugs fall into the categories of: carbidopa/levodopa therapy, dopamine agonists, anticholinergics, MAO-B inhibitors, and COMT inhibitors. In exhibit 3, we include a select number of the therapies used to treat Parkinson's disease.

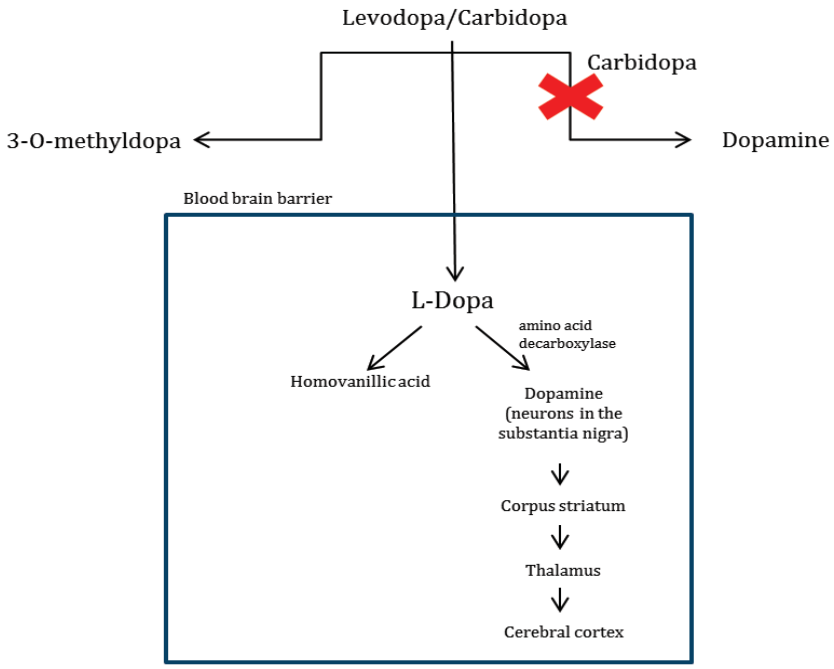
Exhibit 3
Adamas Pharmaceuticals, Inc.
Types of Medications Used to Treat Parkinson's Disease

Class/Type	Drug Name	Comments
Carbidopa/Levodopa	Sinemet, SinemetCR	First course of treatment, converts to dopamine
Carbidopa/Levodopa orally disintegrating tablet	Parcopa	Allows for patients with swallowing difficulties
Carbidopa/Levodopa/Entacapone	Stalevo	Secondary course of treatment, combines with levodopa/carbidopa to block COMT enzyme
Apomorphine hydrochloride	Apokyn	Adjunct levodopa therapy to treat "OFF" periods
Bromocriptine	Parlodel	Mimics dopamine to manage major symptoms; first course of treatment alone or with levodopa
Pramipexole	Mirapex	First course of treatment alone or with levodopa
Ropinirole	Requip	Mimics dopamine to manage major symptoms
Rotigotine transdermal system	Neupro	For advanced-stage idiopathic Parkinson's disease
Selegiline	Eldepryl, Carbex	Delays wearing off by prolonging effectiveness of levodopa
Rasagiline	Zelapar	Tertiary medication, controls brain's metabolism of dopamine
Entacapone	Comtan	Signs and symptoms of Parkinson's disease as initial monotherapy and adjunct to levodopa
Tolcapone	Tasmar	Tertiary medication for motor fluctuations, limited to those who have exhausted other options
Rivastigmine tartrate	Exelon	No known drug-drug interactions; dementia associated with Parkinson's disease

Sources: Parkinson's Disease Foundation and William Blair & Company, L.L.C.

According to the Parkinson's Disease Foundation, levodopa (L-3,4-dihydroxyphenylalanine or L-DOPA) is considered the gold-standard treatment for Parkinson's disease. Following the administration of levodopa, functional neurons convert the levodopa into the dopamine; this dopamine supplements the dopamine lost through the death of the *substantia nigra* neurons. In addition, levodopa is commonly combined with carbidopa to ensure that levodopa is metabolized in the brain. This occurs through the inhibition of levodopa metabolism into dopamine by carbidopa prior to its crossing of the blood brain barrier. We include a schematic of the carbidopa/levodopa metabolism in exhibit 4.

Exhibit 4
Adamas Pharmaceuticals, Inc.
Mechanism of Action of Levodopa/Carbidopa



Sources: Pharmacology Weekly and William Blair & Company, L.L.C.

After scientist George Cotzias's clinical introduction of levodopa for Parkinson's disease, originally described in a 1960 issue of *The New England Journal of Medicine*, it became apparent that long-term use of levodopa could induce priming, or a molecular sensitization that can narrow the therapeutic window, thus decreasing the efficacy of the therapy following many years of use. With this narrowing window of levodopa therapy, in which each exposure to a direct or indirect stimulant of dopamine influences subsequent responses, side effects involving motor control can occur (Bargiotas and Konitsiotis. *Neurophyschiatr Dis Treat* 2013); these motor side effects are collectively known as levodopa-induced dyskinesia (LID).

Levodopa-Induced Dyskinesia in Parkinson's Disease

A survey of 2,000 publications found that LID develops in roughly 40% of Parkinson's disease patients treated for four to six years with levodopa (Ahlskog and Muenter, *Mov Disord* 2001). Further, another study estimated that Parkinson's disease patients treated with levodopa for less than 5 years have an 11% risk of developing dyskinesia, while those treated for 6 to 9 years have a 32% risk and patients treated for more than 10 years have an 89% risk (Fabbrini G et al., *Mov Disord* 2007).

Two main factors are involved in the origin of LID: one is the degree of dopaminergic neuron depletion in the midbrain, and the other is the pharmacokinetics and mechanism of action of levodopa. First, development of LID in Parkinson's disease patients can occur by progressive dopaminergic neuron degeneration in the midbrain that lowers the threshold required for LID to occur. Therefore, the impact of levodopa is more pronounced after long-term treatment. This threshold could be correlated with the clearance of dopamine from the synaptic cleft. In both the normal brain and in early-phase Parkinson's, once levodopa is incorporated into the dopaminergic neurons of the midbrain, it is cleared by the dopaminergic reuptake transporter. However, in the later phases of Parkinson's disease, the regulation and clearance of dopamine is compromised and the availability of dopamine is dependent on the bioavailability of the exogenous levodopa being provided by medication. Second, the pharmacokinetic profile of levodopa skews from normal endogenous production of dopamine within the midbrain to dopamine needed for neuron signaling being provided by exogenous medication. The exogenous medication holds a highly variable pharmacokinetic profile in comparison to endogenous production of dopamine, and will have increased variability based on penetration and the metabolism of the medication across the blood-brain barrier.

The pattern of LID can vary with respect to the time of onset in relation to levodopa intake. Levodopa has a short half-life of roughly 1.5 to 2.0 hours, leading to alternating peaks and troughs of levodopa plasma levels (Cedarbaum JM, *Clin Pharmacokinet* 1987). This is in contrast to the normal state of dopamine release, wherein basal levels of dopamine never fall below a certain threshold (Goto et al., *Neuropharmacology* 2007). In Parkinson's disease, particularly late-stage Parkinson's disease, in which the degree of dopaminergic neuron depletion is increased, dopamine release from levodopa develops a phasic or pulsatile pharmacokinetic profile that most likely contributes to LID.

Young-onset Parkinson's disease has also been shown to be associated with a higher incidence of LID (Guridi J, et al., *Parkinson's Dis,* 2012). The five-year risk of LID was 50% in patients with disease onset between 50 and 59 years, compared with 16% with disease onset after 70 years. The risk of LID also increases as dosing of levodopa increases, as demonstrated in the DATATOP study, one of the largest trials in the field. Increased levodopa dosage, combined with the pulsatile pharmacokinetic profile and short half-life of levodopa as well as the depletion of *substantia nigra* dopaminergic neurons associated with the onset and progression of Parkinson's disease, plays a critical role in the clinical presentation of LID.

Strategies to treat LID center on the prevention of its development and addressing individual symptoms as they occur.

Exhibit 5
Adamas Pharmaceuticals, Inc.
Therapeutic Strategies for Levodopa-Induced Dyskinesias

Strategy
Prevention of LID development by early use of dopamine agonists and reduced levodopa dose intake at the beginning of treatment
Symptomatic treatment
Reverting dyskinesias by continuous dopaminergic stimulation and reducing OFF hours while improving dyskinesias

Sources: Thanvi B, et al. *Postgrad Med J,* 2007 and William Blair & Company, L.L.C.

Increasing ON Time, Reducing OFF Time, and Managing Dyskinesia Are the Goals of Parkinson's Disease Treatments

During the course of their degenerative disease, Parkinson's patients develop motor fluctuations commonly characterized as "OFF" times, a state of decreased mobility associated with trough blood levels of levodopa. Waking hours of the day—when the levodopa medication reduces the Parkinson's

symptoms—are described as "ON" times. This period is associated with blood levels of levodopa falling within the therapeutic window. The clinical goals of managing Parkinson's disease relate to prolonging the "ON" period of the anti-Parkinson's-disease effects of levodopa associated with high plasma levels of levodopa, while reducing the "OFF" time, which is associated with the lack of effect or low blood levels of levodopa. LID and its associated movement dysfunction occur as a result of the high levels of dopamine associated with the pharmacokinetics of levodopa therapy in advanced Parkinson's patients.

It is estimated that 40% of Parkinson's patients will experience motor fluctuations within four to six years of onset, increasing by 10% per year after that, according to the Parkinson's Disease Foundation. As Parkinson's disease progresses and dopaminergic neurons further degenerate, most patients require increasing doses of levodopa to achieve an equivalent therapeutic benefit. Along with the increasing doses of levodopa, patients might begin to exhibit unpredictable OFF episodes throughout the day, which can manifest into LID during later stages of the disease.

Exhibit 6
Adamas Pharmaceuticals, Inc.
Terms Used to Describe the Fluctuating Systems of Parkinson's Disease

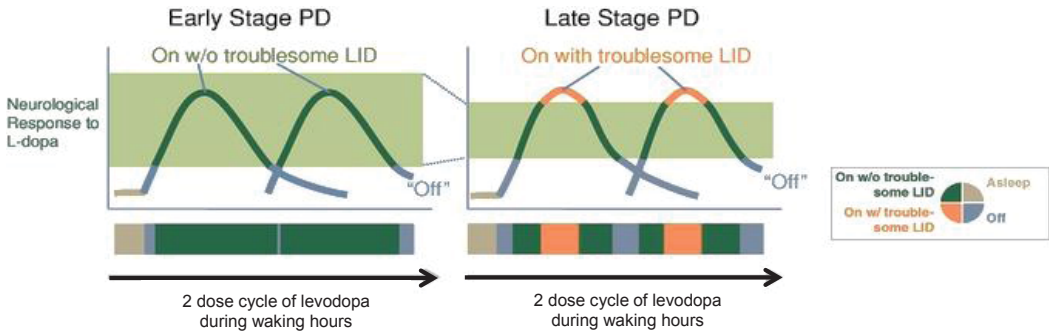
Term	Definition
"ON" time	Refers to periods of adequate control of Parkinson's disease symptoms
"OFF" time	Refers to periods when medication is not working well, causing a worsening of Parkinson's disease symptoms
Dyskinesia	Involuntary twisting, turning movements, and loss of control of voluntary movements
LID	Levodopa-induced dyskinesia, which is a side effect of administration of levodopa and occurs during ON time
Troublesome LID	LID that interferes with the patient's daily function or that causes meaningful discomfort
ON with troublesome LID	Periods of adequate control of Parkinson's disease symptoms, but with troublesome LID
ON without troublesome LID	Periods of adequate control of Parkinson's disease symptoms, but without troublesome LID

Sources: Adamas Pharmaceuticals S-1 and William Blair & Company, L.L.C.

LID is also associated with the pulsatile administration of levodopa treatment, degeneration of key brain structures, the duration of levodopa treatment, and total levodopa exposure. As Parkinson's disease progresses from early to late stage, the frequency and severity of LID increases, taking up the majority of the patient's day. In addition, in the latter stages of the disease, many Parkinson's patients have difficulty swallowing solid food and pills.

LID can be managed by decreasing the amount of levodopa a patient receives, but this can also result in an increase in OFF time and a decrease in ON time. Most patients would rather endure periodic episodes of LID than face unpredictable OFF times. As a result, patients maintain their doses of levodopa even though they experience troublesome LID during their ON periods. Of the roughly 260,000 Parkinson's disease patients in the United States who have significant OFF time, about 140,000 experience LID.

Exhibit 7
Adamas Pharmaceuticals, Inc.
Symptoms in Early-Stage Versus Late-Stage Parkinson's Disease
After Two-Dose Cycle of Levodopa



Source: Adamas Pharmaceuticals S-1

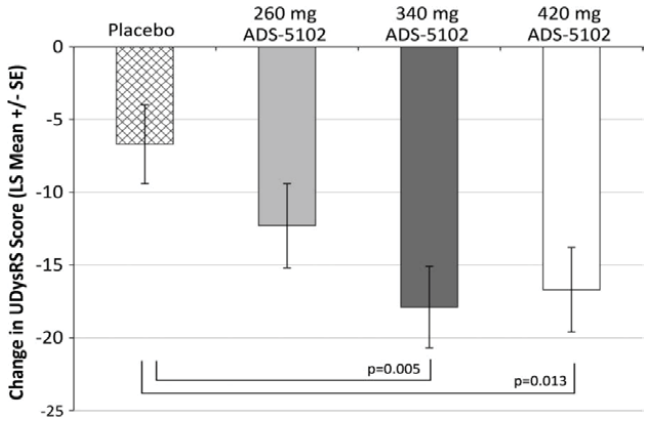
Pipeline Overview

ADS-5102 (Nurelin), a Wholly Owned Adamas Product in Phase III Trials
Adamas Pharmaceuticals' lead wholly owned drug candidate is a controlled-release version of amantadine, referred to as ADS-5102. ADS-5102 addresses the limitations of immediate-release amantadine by allowing high daily doses to be administered once nightly. The extended-release characteristics of ADS-5102 allow for higher levels of amantadine concentrations over the course of a day in comparison with the immediate-release form, allowing the patient to sleep through many of the side effects associated with amantadine use in Parkinson's disease.

The company has conducted one Phase II/III study to date with ADS-5102 and will soon initiate the second Phase III study required for registration of the product. The Phase II/III EASED (extended-release amantadine safety and efficacy study in levodopa-induced dyskinesia) study conducted by Adamas was a randomized, double-blind, multicenter study that tested three different doses of ADS-5102 (260 mg, 340 mg, and 420 mg) as well as placebo. The primary outcome measure for the study was the change from baseline to week eight in the Unified Dyskinesia Rating Scale (UDysRS) total score. Secondary outcome measures included change from baseline in 24-hour Parkinson's disease patient diaries and the MDS-Unified Parkinson's Disease Rating Scale (MDS-UPDRS). We include the data on improved UDysRS scores in exhibit 8, on the following page.

The EASED study met its primary endpoint, wherein both the 340 mg and 420 mg doses significantly reduced LID as measured by the change in UDysRS total score versus placebo at the eight-week point with strong statistical significance (p=0.005 and p=0.013, respectively). In addition, a statistically significant reduction in LID from placebo was seen as early as two weeks following the first dose of ADS-5102. In exhibit 9, we summarize results for several outcomes, including the reductions in the UDysRS total score, the increase in ON time, decreases in OFF time, and reductions in the functional impact of dyskinesia.

Exhibit 8
Adamas Pharmaceuticals, Inc.
Unified Dyskinesia Rating Scale (UDysRS) Score After Eight Weeks
EASED Study



Source: Adamas Pharmaceuticals S-1

Exhibit 9
Adamas Pharmaceuticals, Inc.
EASED Phase II/III Clinical Trial of ADS-5102 Key Efficacy Endpoints

Outcome Measure	260 mg ADS-5102 N=19	340 mg ADS-5102 N=20	420 mg ADS-5102 N=19
	Mean Treatment Difference Versus Placebo (95% CI)		
UDysRS Total Score	-5.6 (-13.4, 2.2) p=0.159	-11.3 (-19.1, -3.5) p=0.005	-10.0 (-17.8, -2.2) p=0.013
ON Time Without Troublesome LID, in Hours	3.3 (1.1, 5.5) p=0.004	3.0 (0.8, 5.2) p=0.008	2.7 (0.5, 5.0) p=0.018
OFF Time, hours	-1.3 (-2.7, 0.1) p=0.074	-0.9 (-2.3, 0.5) p=0.199	0.1 (-1.4, 1.5) p=0.934
MDS-UPDRS (Part I, II, III)	1.2 (-7.7, 10.1) p=0.786	-2.2 (-11.2, 6.9) p=0.636	1.7 (-7.2, 10.6) p=0.705
MDS-UPDRS (Part IV, Item 4.2)	-0.8 (-1.4, -0.2)	-1.0 (-1.6, -0.4)	-1.3 (-2.0, -0.7)
Functional Impact of Dyskinesia	p=0.014	p=0.002	p=<0.001

Sources: Adamas Pharmaceuticals S-1 and William Blair & Company, L.L.C.

The most common adverse events were constipation, dizziness, hallucinations, and dry mouth, and there were no differences from placebo in the incidence of sleep-related adverse events. Treatment-emergent adverse events were common in all treatment groups, with most having mild to moderate severity.

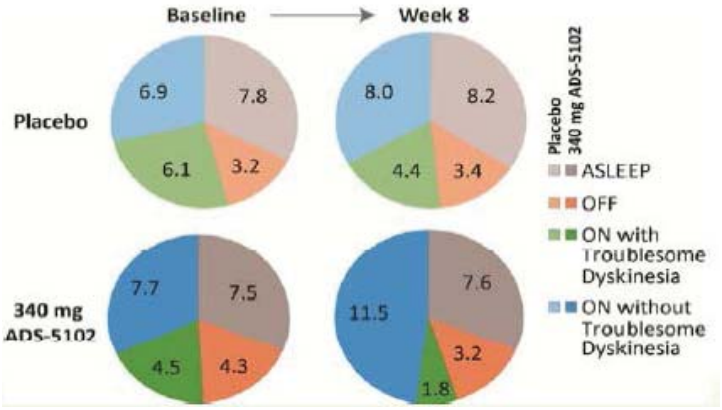
Exhibit 10
Adamas Pharmaceuticals, Inc.
Safety Overview

Outcome Measure	Placebo N=22	260 mg ADS-5102 N=20	340 mg ADS-5102 N=21	420 mg ADS-5102 N=20
Number (%) of Subjects With Any AEs	18 (82%)	16 (80%)	20 (95%)	18 (90%)
Serious AEs	0	1 (5%)	0	4 (20%)
Severe AEs	3 (14%)	1 (5%)	3 (14%)	7 (35%)
Discontinued Due to AEs	0	3 (15%)	3 (14%)	8 (40%)

AE = adverse event
Sources: Adamas Pharmaceuticals S-1 and William Blair & Company, L.L.C.

In the EASED study, the Parkinson's disease patient diaries showed statistically significant differences in ON time without dyskinesia from placebo (11.0 hours, 11.5 hours, and 12.1 hours for the 260 mg, 340 mg, and 420 mg doses, respectively, versus 8.0 hours for placebo). Using MDS-UPDRS, ADS-5102 reduced time spent with dyskinesia and resulted in a statistically significant improvement in the functional impact of dyskinesia in all treatment groups versus placebo.

Exhibit 11
Adamas Pharmaceuticals, Inc.
ON- and OFF-Time Results With 340 mg ADS-5102 Versus Placebo



Source: Adamas Pharmaceuticals S-1

Competitive Landscape

At present, no medications for the treatment of LID are approved for use in the United States or Europe. Clinicians often try to manage LID by cycling through various Parkinson's therapies. Currently approved Parkinson's disease products that are not indicated for LID include, Azilect (Teva), Requip XL (GSK), Mirapex ER (Boehringer Ingelheim), Neupro Patch (UCB), and Comtan (Novartis). Although these therapies produce clinically relevant reductions in OFF time between 0.7 and 1.8 hours, they do not induce significant increases in ON time without troublesome LID. In addition, none of these therapies reduces LID, while most increase LID. In exhibit 12, on the following page, we include the relevant OFF and ON times from the product labels and pivotal studies.

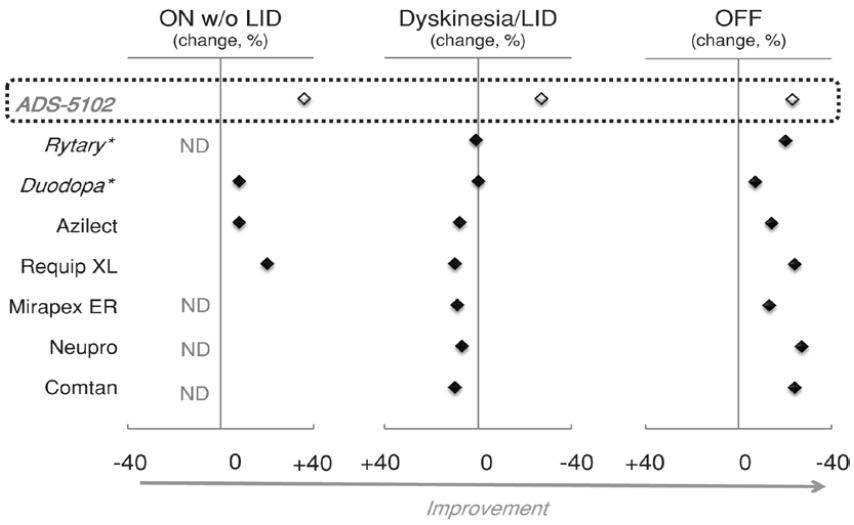
Exhibit 12
Adamas Pharmaceuticals, Inc.
ADS-5102 Versus Competitors' Marketed and Late-Stage Parkinson's Disease Drugs

Drug (Manufacturer)	Indication	Change in OFF Time (% Change in LID)	Generic Name(s)	Mechanism	Phase
ADS-5102 (Adamas)	**Reduced LID, reduced motor fluctuations**	**+3.0 hr ON time w/o TD v. placebo, -1.0 hr OFF time v. placebo (40% decrease)**	**Amantadine Extended Release**	**NMDAr antagonist**	**Phase III**
Azilect (Teva)	Parkinson's, reduced motor fluctuations	-1.0 hr OFF time v. placebo (8%)	Rasagiline	MAO-I	Marketed
Requip XL (GSK)	Parkinson's, reduced motor fluctuations	-1.7 hr OFF time v. placebo (10%)	Ropinirole	Dopamine agonist	Marketed
Mirapex ER (BI)	Parkinson's, reduced motor fluctuations	-0.7 hr OFF time v. placebo (9%)	Pramipexole	Non-ergoline Dopamine agonist	Marketed
Neupro Patch (UCB)	Parkinson's, reduced motor fluctuations	-1.8 hr OFF time v. placebo (7%)	Rotigotine	Dopamine agonist	Marketed
Comtan/Stalevo (Novartis)	Parkinson's, reduced motor fluctuations	-0.9 hr OFF time v. placebo (10%)	Carbidopa/Levodopa/ Entacapone	Dopamine enhancer	Marketed
Rytary (Impax)	Parkinson's, reduced motor fluctuations	+1.0 hr ON time w/o TD v. levodopa/carbidopa, -1.1 hr OFF time v. levodopa/carbidopa, LID rates: not disclosed	Levodopa/Carbidopa	Dopamine replacement	Registration
Duodopa - Intestinal Gel (Abbvie)	Parkinson's, reduced motor fluctuations	+1.9 hr ON time w/o TD v. levodopa/carbidopa, -1.9 OFF time v. levodopa/carbidopa, LID rates: not disclosed	Levodopa/Carbidopa Intestine Gel	Dopamine replacement	Phase III
CVT-301 (Civitas)	Reduced motor fluctiations	OFF Time : not disclosed, LID rates: not disclosed	Inhaled Levodopa/Carbidopa	Dopamine replacement	Phase IIb

LID = Levodopa-induced dyskinesia; TD = tardive dyskinesia
Sources: Company reports and William Blair & Company, L.L.C. estimates

As illustrated in exhibit 13, The Phase II/III EASED study for ADS-5102 is the only study that has shown a meaningful decrease in LID while also showing significant increases in ON time without LID as well as decreases in OFF time.

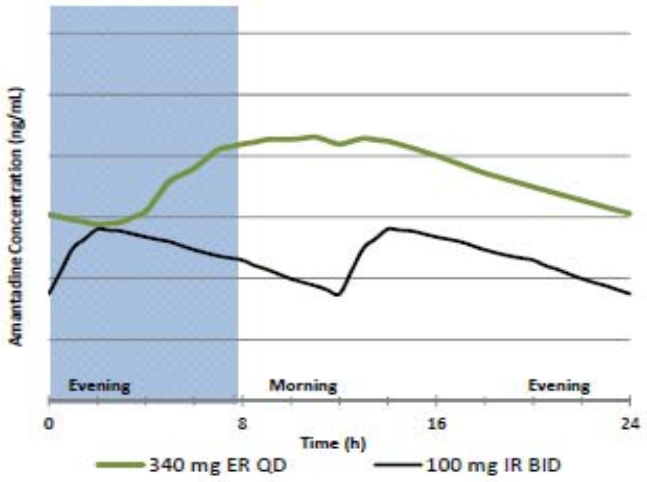
Exhibit 13
Adamas Pharmaceuticals, Inc.
Effect of Approved Drugs and Product Candidates on Changes in ON and OFF TIME Versus Placebo in Parkinson's Disease Patients



Source: Adamas Pharmaceuticals S-1

Amantadine has been explored in the use of dyskinesia in Parkinson's and other movement disorders since the 1970s. However, we believe the dosing and side-effect profile of the therapy has limited its longer-term use and effectiveness. The majority of Parkinson's disease patients can tolerate twice-daily dosing of 100 mg of amantadine; however, this dosing regimen is not sufficient to provide adequate LID symptom relief. The controlled-release formulation of amantadine in ADS-5102 aims to reduce the side effects associated with the spike in serum levels associated with the immediate-release formulation within a few hours of dosing. The nighttime dosing also allows for decreased side effects because the lowest availability of the product occurs at night, while amantadine serum levels increase gradually, before waking hours, allowing daytime control of LID.

Exhibit 14
Adamas Pharmaceuticals, Inc.
Concentrations of ADS-5102 and Immediate-Release Amantadine



IR= immediate release, ER = extended release
Source: Company reports

ADS-5102 (Amantadine ER) Data Compares Well Versus IR Formulation

Aside from the ADS-5102 development program, immediate-release (IR) amantadine has shown to be effective in several small, investigator-led studies in Parkinson's disease patients with LID as well as other types of dyskinesia. In the appendix, on page 26, we cite a number of studies published since 2000 that examined the effects of the immediate-release formulation of amantadine in Parkinson's patients.

While the studies we collected in the appendix confirm the efficacy of amantadine in improving patient scores as measured by several different Parkinson's diagnostic tools, several of the investigator-led studies examined a dose range of 200 mg-300 mg per day for a period of roughly three weeks. In these short-term studies, amantadine met the primary endpoints of the studies. In the longer-term studies, the patients who were randomized to the placebo group after long-term amantadine rated lower on the Unified Parkinson's Disease Rating Scale (UPDRS) and increased ON time with troublesome dyskinesia. These small studies confirm the efficacy observed with ADS-5102; however, the duration of the effect of amantadine therapy has yet to be defined.

Data has been mixed on the duration of benefit for patients over a one-year period. Some smaller, investigator-led studies have suggested that the effects of amantadine wane beyond 30 days (Schwab RS, *JAMA* 1972), while others suggest the efficacy might wane over five to seven months of therapy (Shannon KM, *Clinical Neuropharmacology,* 1987 and Thomas A et al. *J Neurol Neurosurg Psychiatry* 2004) when dosed with the immediate-release formulation at 300 mg per day. However, more

recent studies, using randomized discontinuation of amantadine therapy in patients who had been on therapy for more than one year, suggest that the benefits continued longer term. (Wolf, "Movement Disorders" 2010, Metman, *JAMA Neurology,* 1999).

Similar to what has been observed with the use of the immediate-release formulation, the extended-release formulation being developed by Adamas (ADS-5102) seeks to enhance the ON time without troublesome dyskinesia as well as to decrease OFF time. In exhibit 15, we compared the ON and OFF times from several of the most recent studies included in the appendix with the results observed in the immediate-release amantadine, investigator-led studies and with what was observed during the ADS-5102 Phase II/III study at 340 mg—the dose Adamas is looking to take into the market. The comparison shows that amantadine ER has a 2.0- to 2.5-hour increase in ON time without dyskinesia and an overall improvement in OFF time.

Exhibit 15
Adamas Pharmaceuticals
Efficacy Comparision Between ER Amantadine (ADS-5102) and IR Amantadine from Investigator-Led Studies

Outcome	Adamas Amantadine ER	Ory-Magne et al. 2014 Amantadine IR	Wolf et al. 2010 Amantadine IR	Thomas et al. 2004 Amantadine IR
Dosage	340 x 8 weeks vs. placebo	244-272 mg/day x 3 weeks vs. placebo	307 mg/day x 3 weeks vs. placebo	300 mg/day x 15d, 30d, 60-240d
Change in ON time w/o dyskinesia	+3.0	+0.9	+0.5	15d: +0.7, 30d: +1.0, 60-240d: +0.1
Change in OFF time	-0.9	-0.3	-0.8	15d: -0.8, 30d: -1.6, 60-240d: -0.3

Sources: Ory-Magne et al. 2014, Wolf et al. 2010, Thomas et al. 2004, company reports, and William Blair & Company, L.L.C.

It should be noted that the Ory-Magne et al. 2014 study and the Wolf et al. 2010 study involved patients undergoing long-term amantadine treatment who were subsequently switched to either continue on amantadine or placebo for the doses and periods listed. While the results of these two studies cannot be directly comparable to the results of ADS-5102, the randomized withdrawal study methodology is often employed to determine the effect of a long-term therapy, and we believe these studies have supported the long-term efficacy of amantadine in this patient population. We believe longer-term therapy will likely also be included in the confirmatory Phase III study for ADS-5102, with treatment duration likely exceeding 20 weeks.

While comparisons between trials are always difficult, we believe that the directional data produced to date for ADS-5102 suggests significant improvements over what has been reported from the immediate-release formulation of amantadine for the improvement in controlling the symptoms of Parkinson's disease and LID.

Development of ADS-5102 for Symptoms Associated With Traumatic Brain Injury

Adamas is looking to develop ADS-5102 for several additional indications. The next likely setting for the development of ADS-5102, we believe, is for the treatment of chronic irritability and aggression arising from traumatic brain injury (TBI). TBI occurs through a blow to the head that can disrupt normal brain function; it is a public health problem with a growing level of concern in the United States. Each year, TBI contributes to a substantial number of deaths and permanent injuries. In 2010, 2.5 million TBIs occurred in both isolated incidents and with other injuries (Centers for Disease Control and Prevention, National Center for Health Statistics, 2010). TBIs can range from mild to severe; a mild TBI can involve a brief change in consciousness and a severe TBI can lead to an extended period of unconsciousness or amnesia. Potential long-term effects of TBI can include motor dysfunction presenting in extremity weakness and impaired coordination and balance.

Similar to Parkinson's disease and LID, the immediate-release formulation of amantadine has been studied for the treatment of TBI with some efficacy already described in investigator-initiated studies. For example, a multicenter, double-blind, randomized, placebo-controlled trial of amantadine in severe TBI was published in *The New England Journal of Medicine* (Giacino et al., *NEJM* 2012). In this study, 184 patients who received inpatient rehabilitation 4-16 weeks after TBI were randomly assigned to receive amantadine (N=87) or placebo (N=97) for four weeks and were followed for two weeks after treatment. Patients began their dosing regimen with 100 mg twice daily on the day after randomization for 14 days. The dose was increased to 150 mg twice daily at week three and to 200 mg twice daily at week four if the primary endpoint (i.e., the disability rating scale, or DRS) had not improved by at least two points from baseline. Patients were taken off treatment after week four and followed until week six.

During the treatment period, recovery was significantly faster (-0.24 between-group difference in slope/week) in the amantadine group, compared with placebo, with respect to DRS score (p=0.007). In addition, the rate of improvement in the amantadine group was significantly slower than the rate in the placebo group during the two-week post-treatment period (the between-group difference in slope was 0.30 points, p=0.02). Exhibit 17 offers a breakdown of subjects from each treatment arm by daily dose of drug received in the *NEJM* study. We note that the optimal dose of amantadine in TBI patients has yet to be determined. We expect that Adamas will need to conduct a Phase II/III trial, similar to the EASED study of ADS-5102 in LID in Parkinson's disease (PD-LID), as a next step in receiving a designation for traumatic brain injury.

Exhibit 16
Adamas Pharmaceuticals, Inc.
Doses Received by TBI Patients in Each Study Group at Week Four

Group	200 mg	300 mg	400 mg
Amantadine	47 (54%)	11 (13%)	22 (25%)
Placebo	40 (41%)	20 (21%)	35 (36%)

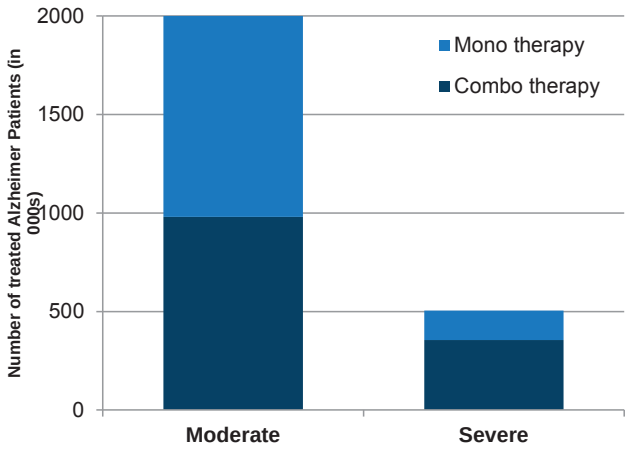
Source: Giacino et al. 2012

In an investigator-initiated, placebo-controlled study, 76 subjects were enrolled in a parallel-group, randomized, double-blind controlled trial (Hammond FM et al., *Journal of Head Trauma Rehabilitation,* 2013). One group received a 100 mg twice-daily dose of amantadine (n=38) versus placebo (n=38). Patients receiving amantadine had a statistically significant reduction in irritability and aggression of roughly 40% compared with placebo (p=0.0085). Roughly 1.7 million people annually in the United States experience a TBI, and roughly 3.2 million people are estimated to have chronic symptoms associated with TBI.

MDX-8704: Daily Fixed-Dose Combination of Memantine Hydrochloride Extended Release and Donepezil Hydrochloride

In collaboration with Forest Laboratories, MDX-8704 is being investigated for the treatment of moderate to severe dementia of the Alzheimer's type for the U.S. market. According to the Alzheimer's Association, an estimated 5.2 million Americans in 2014 have Alzheimer's disease, which includes 200,000 individuals younger than 65 who have younger-onset Alzheimer's disease. Independent of Adamas, two Phase III studies demonstrated improved cognition and function with memantine relative to donepezil alone (Tariot et al., *JAMA* 2004, Grossberg et al., *CNS Drugs* 2013). The benefits of MDX-8704 over immediate-release combination therapy include one pill administered once daily—to replace twice-daily, three-pill administration—as a capsule or sprinkled on food, and a single co-pay to simplify treatment. Based on these studies, Forest expects to submit a new drug application in the first half of 2014 for MDX-8704 for patients who are already being co-administered memantine, branded as either Namenda or Namenda XR, and 10 mg donepezil. We include the number of patients treated with combination therapy in exhibit 17, on the following page.

Exhibit 17
Adamas Pharmaceuticals, Inc.
Number of Moderate to Severe Alzheimer's Patients Treated With Combination Therapy



Sources: Adamas S-1 and William Blair & Company, L.L.C.

Subject to MDX-8704 receiving the initial approval, Forest expects to submit a supplemental application to expand the indication to include patients who are on a stable dose of 10 mg donepezil. This application will include manufacturing information to support two additional doses, a fixed-dose combination of 7 mg Namenda XR/10 mg donepezil, and a fixed-dose combination of 21 mg Namenda XR/10 mg donepezil.

Namenda Double Swap to Extended-Release and Fixed-Dose Combination Will Be Key Value Driver

Namenda is a $1.6 billion franchise for Forest Laboratories, the target of an acquisition by Actavis for $25 billion. The product is the last remaining brand on the market for the treatment of moderate to severe Alzheimer's disease. While this franchise has been significantly profitable for Forest Laboratories, the immediate-release formulation of the product will face generic competition beginning in 2015. Because of this impending generic competition, Forest Laboratories and Actavis are trying to switch the two- to three-times-a-day Namenda immediate-release users to the once-daily Namenda XR, which was approved and became available in U.S. pharmacies in June 2013.

During 2013, Forest management noted in several public statements the likelihood of a "hard switch" from Namenda to Namenda XR during 2014. Amid a recent announcement that Forest Laboratories would discontinue Namenda immediate release by August 2014, the hard switch appears well underway. According to the most recent IMS Health monthly prescription data, Namenda XR holds 18.7% market share in the total Namenda franchise; however, this is up significantly from 16% at the end of 2013.

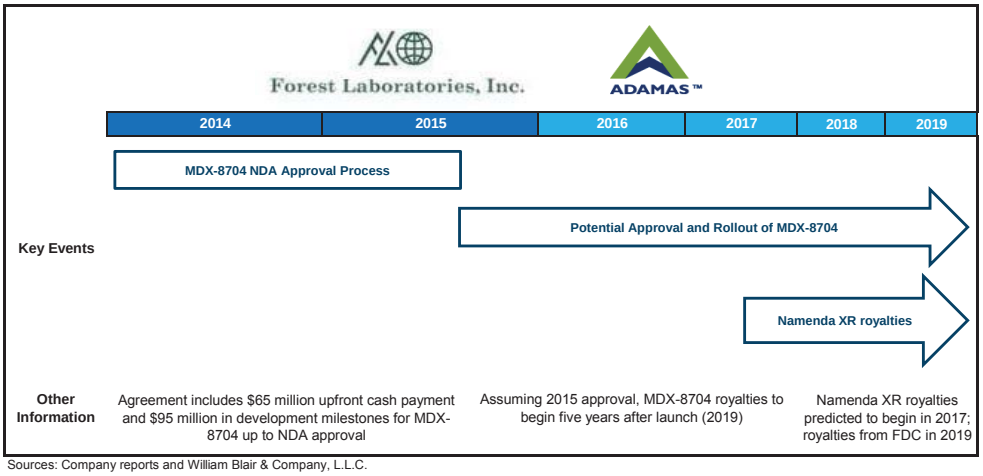
This Namenda/Namenda XR hard-switch is a proxy for what will likely occur during the 2015-2016 time frame, following the approval of the first Namenda XR/donepezil fixed-dose combination, which is anticipated by the end of the year. The FDC Namenda XR/donepezil includes the most common dosage form of donepezil (10 mg) and will bring together in a once-daily pill the most common drug regimen for Alzheimer's patients. While we believe that on the margin Namenda XR and Namenda FDC will face some market share loss during both switches, as well as some price erosion, we also view the Namenda FDC product as an ideal product to expand into more moderate patients and will also aid the franchise through increased compliance, an issue in the Alzheimer's patient population. Later in this report, we discuss our assumptions for these products and our valuation of these low-single-digit (for Namenda XR) to low-double-digit (for Namenda FDC) royalty streams.

ADS-8902 for Treatment of Severe Influenza
ADS-8902 is designed to inhibit viral replication at multiple points in the virus proliferation pathway. ADS-8902 is a proprietary fixed-dose combination product containing amantadine, oseltamivir, and ribavirin. The National Institutes of Health is conducting a 520-patient Phase II/III trial of amantadine, oseltamivir, and ribavirin for the treatment of severe influenza that as of December 2013 had enrolled 73 patients. There is no projected date for completion of the trial; however, if the trial proves successful, Adamas might seek to license the rights to ADS-8902.

Partnership Between Adamas Pharmaceuticals and Forest Laboratories

Adamas and Forest entered a licensing agreement for Namenda XR and MDX-8704 in 2012. The details of the agreement include a $65 million up-front cash payment and $95 million in development milestones for MDX-8704, up to NDA approval. Namenda XR is a controlled-release version of memantine approved in 2010 in the United States for treatment of moderate to severe dementia related to Alzheimer's disease, and it is marketed by Forest Laboratories. MDX-8704 is a once-daily, fixed-dose combination of Namenda XR and donepezil. Royalties on Namenda XR and MDX-8704 will begin five years after launch, predicted to be in 2018 and 2019, respectively. Forest will be responsible for U.S. commercialization and Adamas for global (non-U.S.) commercialization.

Exhibit 18
Adamas Pharmaceuticals, Inc.
Key Events in Adamas Pharmaceuticals/Forest Laboratories Partnership



Sources: Company reports and William Blair & Company, L.L.C.

Key Management

The Adamas management team brings significant experience in pharmaceutical development, regulatory affairs, and commercialization in the biotech industry.

Gregory Went, Ph.D., chairman and chief executive officer. Dr. Went is the founding CEO and chairman of Adamas Pharmaceuticals. Previous experience includes co-founding CuraGen Corporation in 1992 and serving as its executive vice president and director. In addition, Dr. Went serves on the board of directors of Angelica Therapeutics. Dr. Went received his Ph.D. in chemical engineering from the University of California, Berkeley, and a B.S. in chemical engineering from Carnegie Mellon University.

Anthony M. Rimac, chief financial officer. Mr. Rimac became CFO of Adamas Pharmaceuticals in 2011. Previously, he served as the CFO of Aerovance, where he led the company through several equity and debt financings to further the development of its lead therapeutic product. Mr. Rimac also served as the vice president of finance at Artemis and led the sale of the company to Johnson & Johnson in 2004. He also served as vice president of finance and administration at Aesculap, Inc. Mr. Rimac holds a B.A. in business economics from the University of California at Santa Barbara and an M.B.A. from Santa Clara University.

Jeffrey H. Knapp, chief commercial officer. Mr. Knapp recently joined Adamas as its chief commercial officer. Previously, he spent seven years as the chief commercial officer for Affymax, where he led the launch of the company's first product, Omontys. Mr. Knapp has more than 25 years of commercial and operations experience in various roles, including executive vice president of sales and marketing for Abgenix, vice president of sales and marketing for Pharmion, and vice president of sales and marketing for EMD Pharmaceuticals. Mr. Knapp holds a B.S. degree from Wittenberg University.

David Chernoff, M.D., chief medical officer. Dr. Chernoff initially joined Adamas as vice president of medical affairs and serves as chief medical officer. He has served as medical director of Chiron Corporation. Previously, he served at Elan as vice president of corporate technology and has been the acting chief medical officer of several start-up biotech companies; today he serves as chief medical officer of Aquinox Pharmaceuticals Inc., Crescendo Bioscience, and Pulse Health LLC. He serves as a member of the scientific advisory board at Tobira Therapeutics, Inc. and is a member of the clinical advisory board at Inimex Pharmaceuticals, Inc. Dr. Chernoff received a B.S. in biology from Yale University, an M.D. from New York University, and his medical training in internal medicine, rheumatology, and infectious disease at the University of California, San Francisco.

Michael D. Coffee, senior vice president, strategy and planning. Mr. Coffee brings senior pharmaceutical management experience from various companies, including Novartis, Aventis, Bayer, Athena Neurosciences, Elan, Amarin, Avigen, and MediciNova. Mr. Coffee was responsible for the strategic planning and commercialization of products such as Zanaflex, Zonegran, Diastat, and Cipro. Mr. Coffee has undergraduate degrees in biology and chemistry from Siena College and is a graduate of the advanced management program at Amos Tuck School of Business.

Natalie McClure, Ph.D., senior vice president, product development. Dr. McClure's experience includes leadership positions at Cerimon Pharmaceuticals, Amgen Sf Llc, Tularik, Intrabiotics Pharmaceuticals, Matrix Pharmaceuticals, and Syntex Research. Dr. McClure brings experience in pharmaceutical development with regulatory affairs experience from the pharmaceutical and biotechnology industries, where she has been instrumental in the success of numerous new drug applications, marketing authorization applications, and investigational new drugs. Dr. McClure earned her Ph.D. in organic chemistry from Stanford University and her B.S. in chemistry from the University of Michigan.

Valuation and Financial Overview

Valuation

Shares of Adamas have traded up 25% since the company's shares were priced at $16 during the IPO process, the low point of its range of $16 to $18. We believe that shares of Adamas continue to present a strong risk/reward profile, given what we view as two assets held by the company, aside from several additional undisclosed compounds that will enter the pipeline as the company gains comfort with the IP surrounding the products.

We are initiating coverage of Adamas with a $35 price target, which we derive from a risk-adjusted net present value (NPV) for the company's royalty stream from both Namenda XR and the fixed-dose combination, Namenda XR/donepezil. Adamas's royalty stream for both products will not

begin until five years after launch for either product. While we believe that this might be difficult for some near-term-focused investors to include in valuing the company's shares, the eventual low-double-digit royalty stream beginning in 2019 on what should still be a billion-dollar franchise should provide downside protection for shares, on top of the company's significant cash reserves. We include what we view as the stream of royalties from the Namenda brand franchise over the life of the fixed-dose combination patent life.

While we are hesitant to give Adamas the full patent life of the Namenda FDC franchise, it is difficult to ignore the $25 billion acquisition of Forest by Actavis, a Paragraph IV filer for generic Namenda. Despite this validating acquisition, we understand investor hesitation in applying a high probability of success for the fixed-dose-combination patents to remain intact for the life of the patent given the ultracompetitive generic landscape, the likelihood for a Paragraph IV challenge, and the time frame we are forced to value, as the industry could evolve significantly by 2017—the likely end of Hatch-Waxman exclusivity. Therefore, we have taken a significant discount to the fixed-dose royalty stream, taking a 65% probability risk adjustment, which leads us to roughly $16 per share. Exhibit 19, on the following page, includes our valuation of Adamas's royalty stream for Namenda XR and Namenda FDC.

For our valuation of ADS-5102, we assume the product will launch in 2017, following the completion of the company's second Phase III study in 2016 and subsequent filing that year. Given the strength of data to date and the known efficacy of amantadine in Parkinson's disease, we are risk-adjusting the probability of success by 75%. We assume peak-year sales six years after launch, which we believe is conservative given the familiarity of treating physicians with amantadine. However, the largest swing factor for the value of ADS-5102 is the durability of the asset. Adamas has received several patents related to the pharmacokinetics of ADS-5102, and to how those pharmacokinetics are related to the efficacy of the product's best-in-class profile, which we have described in prior sections. We include our market model for ADS-5102 in exhibit 20, on page 21.

We are establishing a price target of $35, based on a risk-adjusted net present value of the company's lead assets. While the company has additional programs in development, we have included only ADS-5102 and the company's Namenda franchise royalty stream in our valuation. Adamas will receive a single-digit royalty on Namenda XR (which we estimate to be 3%) and a low-double-digit royalty for the Namenda XR/donepezil FDC, which we estimate to be 13%; however, as we discussed earlier, these royalties will not begin until five years after the launch of their respective products. This time frame will enable Forest/Actavis to clarify the duration of the asset following likely litigation with generic companies. Given the uncertainty, we have discounted this royalty stream by 11% and taken a 50% probability risk adjustment. This royalty stream is heavily influenced by conversion of the Namenda franchise to Namenda XR and ultimately the Namenda XR/donepezil fixed-dose combination.

For ADS-5102, we assume the company will receive seven years of market exclusivity based on orphan protection, for which Adamas has filed but not yet received. While Adamas holds patents that it believes should be listed on the Orange Book until 2027, these patents will likely be challenged and that challenge will hold risk until either a settlement or favorable court ruling and appeal. We therefore believe a seven-year time frame is reasonable, while the upper, more-bullish range of 20 years of patent life is possible. Three years of Hatch-Waxman exclusivity is the worst-case scenario with a pediatric exclusivity extension. Niaspan XR, which relied on patent coverage based on the product's pharmacokinetic properties, settled with Barr Pharmaceuticals for 14 years over product life, while the marketers of Gralise and Duexis also recently settled with generic challengers for what should lead to more than 12 years of product life.

Exhibit 19
Adamas Pharmaceuticals, Inc.
Namenda Royalty Model

Calendar Model	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2028	2028	2029
Namenda	722.7	180.7	100.4	44.2	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1
Namenda XR	843.2	582.2	301.1	357.3	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
Namenda XR/donepezil (MDX-8704)	0.0	401.5	562.1	562.1	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0	803.0
Namenda Franchise	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0	1606.0
Growth Y/Y	*-3.2%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
% of franchise Namenda	45.0%	11.3%	6.3%	2.8%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
% of franchise Namenda XR	52.5%	36.3%	18.8%	22.3%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%
% of franchise Namenda XR/donepezil	0.0%	25.0%	35.0%	35.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Total Namenda Franchise																		
Namenda XR Royalty (%)	0%	0%	0%	0%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Namenda XR Royalty	0.0	0.0	0.0	0.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Namenda FDC Royalty (%)	0%	0%	0%	0%	0%	0%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%
Namenda FDC Royalty	0.0	0.0	0.0	0.0	0.0	0.0	104.4	104.4	104.4	104.4	104.4	104.4	104.4	104.4	104.4	104.4	104.4	104.4
Milestones	25.0	30.0																
Total Forest Royalty+Milestones	25.0	30.0	0.0	0.0	6.3	6.3	110.7	110.7	110.7	110.7	110.7	110.7	110.7	110.7	110.7	110.7	110.7	110.7

Discount Rate	9%
NPV Valuation (not risk adjusted)	523
Probability adjustment	65%
Risk Adjusted NPV	340.27
Risk Adjusted NPV/share	$ 16.44

Assumptions

Namenda	Namenda Pediatric exclusivity from April 11, 2015 to October 11, 2015
Namenda Conversion	Movement of Namenda XR to MDX-8704 during 2016
Namenda XR timing	June 2016 HW expiration for Namenda XR
Royalty	Royalties on Namenda XR and MDX-8704 begin 5 year post launch
Namenda XR Royalty	5 years post Q2 13 launch, Q2 2018
Namenda FDC Royalty	5 years post Q1 15 launch, Q1 2020

Source: William Blair & Company, L.L.C. estimates

Exhibit 20
Adamas Pharmaceuticals
ADS-5102 Product Buildup

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
U.S. Parkinson's Market											
Population with Parkinson's	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Population with Parkinson's Diagnosed	747,000	747,000	747,000	747,000	747,000	747,000	747,000	747,000	747,000	747,000	747,000
PD patients with motor complications	257,000	257,000	257,000	257,000	257,000	257,000	257,000	257,000	257,000	257,000	257,000
PD patients with Levodopa-induced dyskinesia (LID)	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000
Average Length of Treatment	-	-	-	-	75	130	165	190	240	240	240
Cost per day (dollars)	25	25	25	25	25	25	25	25	25	25	25
Discounts	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total cost of therapy	-	-	-	-	1,594	2,763	3,506	4,038	5,100	5,100	5,100
Penetration into LID patient population (%)	0%	0%	0%	0%	10%	25%	35%	45%	65%	70%	70%
Patients with LID on therapy	-	-	-	-	14,400	36,000	50,400	64,800	93,600	100,800	100,800
Total ADS-5102 Sales ($000)	-	-	-	-	17,228	105,570	176,715	261,630	477,360	514,080	514,080
Growth Yr/Yr				N/A	NM	513%	NM	48%	82%	8%	0%
Growth Q/Q											

Assumptions

U.S. total Parkinson's estimate from Willis (2010), IMS (2013)	1,000,000
U.S. patient population diagnosed	747,000
U.S. with severe motor complications (OFF time)	257,000
U.S. with Levodopa induced dyskinesia; IMS (2013), Schrag (2006)	144,000
U.S. Filling 1H 2016	
Priority Review of ADS-5102 and approval Q4 2016	

Source: William Blair & Company, L.L.C. estimates

Exhibit 21
Adamas Pharmaceuticals, Inc.
ADS-5102 NPV Sensitivity Based on Duration of Asset
(dollars in thousands)

NPV (3.5 years, HW+pediatric, 2020)	$ 138,190
NPV (7 years, 2024)	$ 451,165
NPV (10 years, 2027)	$ 650,198
NPV (12 years, 2029)	$ 817,720

Source: William Blair & Company, L.L.C. estimates

We summarize our sum-of-the parts valuation for Adamas in exhibit 22. As we discussed earlier, the duration of the assets will likely be a major swing factor in valuation; however, we believe we have taken several conservative approaches to our valuation including reasonable penetration estimates and risk adjustments.

Exhibit 22
Adamas Pharmaceuticals, Inc.
Sum-of-the-Parts Valuation

Namenda Royalty	Life of Royalty	Discount Rate	Probability of Success	NPV Value	Value Per Share
Namenda Royalty	2018-2029	9%	65%	$ 340	$ 16.44
Cash ($M)					
$86					$ 4.14
Base Value					$ 20.57
	Peak Sales	**Discount Rate**	**Probability of Success**	**Peak Sales**	**Value Per Share**
ADS-5102	$514	9%	75%	2019	$ 16.35
NPV Value					$ 733.22
NPV of Future Losses Per Share					$ (1.50)
NPV Value Per Share					$ 35.42

Source: William Blair & Company, L.L.C. estimates

Exhibit 23
Adamas Pharmaceuticals, Inc.
Comparable-Company Analysis

Companies	Ticker	Rating	Price	Market Cap	2013 (E)	2014 (E)	Debt	Cash	Enterprise Value
Neurocrine	NBIX	Not Rated	$13.36	$1,013M	$0.08	($0.69)	0	146	868
Portola Pharmaceuticals	PTLA	Not Rated	$23.75	$976M	$0.00	($3.65)	0	269	707
Receptos	RCPT	Not Rated	$34.40	$763M	($0.28)	($4.23)	5	69	698
Relypsa	RLYP	Not Rated	$22.98	$778M	NA	($22.42)	14	95	697
Avanir	AVNR	Not Rated	$4.65	$708M	($0.47)	($0.47)	29	45	692
Auspex	ASPX	Outperform	$25.85	$680M	($0.69)	($1.24)	0	80	600
Raptor	RPTP	Not Rated	$8.23	$514M	($0.60)	($1.20)	50	84	481
PTC Therapeutics	PTCT	Not Rated	$20.52	$617M	$1.58	($4.41)	0	142	475
Chimerix	CMRX	Outperform	$19.03	$515M	($2.04)	($3.65)	10	110	415
Hyperion	HPTX	Not Rated	$24.44	$495M	($4.45)	$0.80	8	102	401
Vanda	VNDA	Not Rated	$14.69	$498M	($0.98)	($0.67)	0	131	367
Aerie Pharmaceuticals	AERI	Not Rated	$15.25	$356M	NA	($6.38)	0	70	286
Adamas	**ADMS**	**Outperform**	**$20.07**	**$330M**	**$5.99**	**$0.95**	**0**	**86**	**244**
Average									533

Sources: FactSet and William Blair & Company, L.L.C.

In exhibit 23, we provide the enterprise values and EV-to-sales and sales multiples of several established and smaller neuroscience-focused biotechnology and specialty pharmaceutical companies, many of which are marketing or developing products that have been approved through the 505(b)(2) development pathway. The average enterprise value for Adamas's peer group (under $1 billion in

market capitalization) is approximately $533 million, twice the enterprise value of Adamas which is approximately $244 million, which we believe suggests significant room for upside from current levels if the company were to execute on the development of ADS-5102 or if Actavis can protect a significant portion of the Namenda XR/Namenda FDC franchise.

Income Statement

The performance of Adamas's shares in the near term will be driven largely by the development of ADS-5102 and the continued conversion of the Namenda franchise to Namenda XR and post-approval Namenda FDC. Given the accounting treatment of Namenda FDC–related milestone payments, Adamas has been profitable for the past two years with fully diluted EPS of $2.34 in 2012 and $5.99 in 2013. We expect this to continue in 2014 and 2015, with EPS of $0.95 and $0.59, respectively. However, those earnings will be driven by a $25 million milestone in 2014 and a $30 million milestone in 2015 from Actavis related to the filing and approval of Namenda FDC. We do not estimate that Adamas will receive any milestone payments from Actavis in 2016 and 2017. In addition, spending will likely accelerate before and during a potential ADS-5102 launch in 2017. As a result, we estimate Adamas will likely slip back to fully diluted losses per share of $2.48 in 2016 and $1.51 in 2017, before breaking into sustainable profitability in 2018 with $1.50 in EPS. This might change as the company progresses additional pipeline candidates and potentially signs additional partnerships.

While Adamas has been quite capital efficient—accumulating losses of only $20.5 million to date—we expect spending to accelerate following the IPO as the company looks to deploy proceeds for additional R&D and product development. During 2013, Adamas spent roughly $7.4 million on R&D, down from $9.2 million in 2012. In 2014, however, we anticipate R&D spending to approximate $15.3 million, up more than double from 2013; we anticipate R&D spending over the 2015-2018 time frame to approximate midteens year-over-year growth. For SG&A expense, we project $13.3 million in 2014, also double the amount in 2013. We expect SG&A expense to outpace R&D growth beyond 2014, approximating a compound annual growth rate of 32% as Adamas prepares for the launch of ADS-5102 in 2017. We estimate Adamas's gross margin will approximate that of small-molecule extended-release compounds, which we conservatively estimate to be 80%. We include our income statement in exhibit 24, on page 25.

Balance Sheet and Cash Flow

We estimate that Adamas holds about $85.6 million in cash on its balance sheet, following the company's raise of more than $41 million based on a pro forma estimate following its IPO. Use of proceeds from the offering includes mostly the clinical costs of taking the company's lead product, ADS-5102, through a second Phase III clinical trial and regulatory approval. Acceleration in R&D spending will also fuel additional development of the company's undisclosed pipeline, which management will provide more information on as its patent coverage matures. Throughout its operating history, Adamas has accumulated net losses of about $20.5 million, after the company produced net income of $35.3 million during 2013. We believe that Adamas will generate cash over the 2014-2015 period; however, over the 2016-2017 time frame, we estimate Adamas will use a little more than $40 million in cash in preparation for and during the initial launch of ADS-5102. We do not believe that Adamas will need to raise additional cash before reaching profitability; however, if additional clinical candidates require larger-than-expected clinical programs, management could raise additional funds opportunistically. If additional funds are needed, however, we believe that management might raise capital in a nondilutive fashion through partnerships similar to the Actavis partnership for Namenda XR and Namenda FDC.

Conclusion

Adamas Pharmaceuticals is developing a pipeline of therapies targeting disorders of the central nervous system, including the company's Alzheimer's disease programs in partnership with Forest as well as the wholly owned ADS-5102 for levodopa-induced dyskinesia. Given that ADS-5102 provides clear benefits over immediate-release amantadine, we believe the product will ultimately gain significant penetration into the moderate and severe Parkinson's disease patient population, and we estimate peak-year sales will exceed $500 million.

Aside from ADS-5102, Adamas is leveraged to two Alzheimer's disease therapies, which are also the keys to the success of the recent Actavis/Forest Laboratories $25 billion acquisition. The combined company is switching Namenda patients to Namenda XR during 2014 and will likely switch patients again in the 2015-2016 time frame as the Namenda XR/donepezil fixed-dose combination product is approved and launched. We believe a conservative value of these assets alone, aside from additional products in Adamas's pipeline, suggest a sum-of-the-parts value of $32, including the company's $86 million in cash on the balance sheet. These estimates include relatively conservative duration assumptions for ADS-5102 or include a significant probability-of-success adjustment given the relatively early stage of the Namenda franchise switching.

Given our sum-of-the-parts estimate of $35 for Adamas and the stock trading at $20, we are initiating coverage with an Outperform rating and Aggressive Growth company profile. Risks include those typically held by developmental-stage drug developers, including competitive, clinical, and regulatory risks.

Exhibit 24
Adamas Pharmaceuticals
Earnings Model
($ in millions except EPS data)

	2011(A)	2012(A)	2013(A)	Q1(E)	Q2(E)	Q3(E)	Q4(E)	2014(E)	2015(E)	2016(E)	2017(E)	2018(E)
Product Revenue	-	-	-					-	-	-	-	-
ADS-5102	-	-	-	-	-	-	-	-	-	-	17,228	105,570
Royalty/Milestone Revenue	1,982	37,471	71,095	4,000	29,000	4,000	4,000	41,000	42,000	6,000	8,000	-
Total Revenue	1,982	37,471	71,095	4,000	29,000	4,000	4,000	41,000	42,000	6,000	25,227.8	105,570.0
yr/yr growth	NA	NA	NM	NA	NA	NA	NA	NM	2.4%	-85.7%	NM	318.5%
q/q growth	NA	NA		NA	625.0%	-94.4%	0.0%					
Cost of Goods Sold	-	-	-	-	-	-	-	-	-	-	1,723	10,557
Gross Profit	1,982	37,471	71,095	4,000	29,000	4,000	4,000	41,000	42,000	6,000	23,505	95,013
SG&A	3,388	8,330	6,667	2,900	3,300	3,500	3,600	13,300	16,000	29,500	35,400	38,940
Growth								99%	20%	40%	20%	10%
R&D	6,652	9,192	7,410	3,075	3,500.0	3,800.0	5,000.0	15,375	17,000	20,000	23,000	25,300
Growth			-19%	-	-	-	-	107%	11%	18%	15%	10%
Total Operating Expenses	10,040	17,522	14,077	5,975	6,800	7,300	8,600	28,675	33,000	49,500	58,400	64,240
growth				NA	NA	NA	NA	104%	15%	50%	18%	10%
Operating Income	(8,058)	19,949	57,018	(1,975)	22,200	(3,300)	(4,600)	12,325	9,000	(43,500)	(34,895.0)	30,773.0
EBIT Margin								NM	NM	NM	NM	29%
growth y/y (%)				NA	NA	NA	NA	NM	NM	NM	NM	NM
Depreciation and Amortization	-	-	1,322.3	250	250	250	250	1,000	1,000	1,000	1,000	1,000
EBITDA			58,340.3	(1,725)	22,450	(3,050)	(4,350)	13,325.0	10,000.0	(42,500.0)	(33,895)	31,773
								NM	NM	NM	NM	30%
Interest and other income (expense)	(138)	(1,537)	(4,818)	750	750.0	750.0	750.0	3,000	2,000	1,500	1,500	8,000
Interest expense	(29)	(376)	(88)									
Income Before Taxes	(8,225.0)	18,036	52,112	(1,225)	22,950	(2,550)	(3,850)	15,325	11,000	(42,000)	(33,395)	38,773
Income Tax Provision	(19)	(300)	(1,191)	225	(1,148)	225	225	(473)	1,000	1,000	(6,679)	10,081
Effective Tax Rate			2.3%	NA	5.0%	NA	NA	NM	NA	NA	20%	26%
Net Income	$(8,244.0)	$17,736.0	$ 33,068	(1,450)	24,098	(2,775)	(4,075)	$15,797.6	10,000	(43,000)	(26,716)	28,692
Net income to common (diluted)	$(8,980.0)	$11,596.0	$ 35,353	(1,450)	24,098	(2,775)	(4,075)	$15,797.6	10,000	(43,000)	(26,716)	28,692
Net income to common per share (diluted)	$ (3.12)	$ 2.34	$ 5.99	(0.09)	1.46	(0.17)	(0.24)	0.95	0.59	(2.48)	(1.51)	1.30
Basic avg. number of shares used in computing net income	2,878	4,744	4,753	15,250	15,350	15,450	15,550	15,400	15,800	16,200	16,600	21,000
Diluted avg. number of shares used in computing net income	2,878	4,962	5,903	16,400	16,500	16,600	16,700	16,550	16,950	17,350	17,750	22,150
Key Ratios (GAAP unless noted)												
Gross Margin		NM	NM	NM	NM	NM	NM	NM	NM	NM	90.0%	90.0%
R&D (% Total Rev.)		NM	NM	NM	NM	NM	NM	NM	NM	NM	91.2%	24.0%
SG&A (% Total Rev.)		NM	NM	NM	NM	NM	NM	NM	NM	NM	140.3%	36.9%
Operating Margin		NM	NM	NM	NM	NM	NM	NM	NM	NM	-138.3%	29.1%
Net Income Margin		NM	NM	NM	NM	NM	NM	NM	NM	NM	-105.9%	27.2%
Revenue Growth												
Growth Yr/Yr		NM	90%	NM	NM	NM	NM	NM	NM	NM	320%	318%
SG&A Growth												
Growth Yr/Yr		NM	-20%	NM	NM	NM	NM	99%	20%	84%	20%	10%
R&D Growth												
Growth Yr/Yr		NM	-19%	NM	NM	NM	NM	107%	11%	18%	15%	10%

Source: William Blair & Company, L.L.C. estimates

Appendix
Adamas Pharmaceuticals, Inc.
Studies on Immediate-Release Amantadine in LID patients

Patient Number/ Trial Design	Dose	Treatment Duration	Endpoint	Outcome	Citation
36, multicenter, double-blind, randomized, placebo-controlled, crossover	300 mg/day (washout for 15 days)	27 days	Primary: RDRS Secondary: UPDRS: IVa for dyskinesias, part IVb for motor fluctuations, and part III for motor function	RDRS significantly improved in 64% (amantadine) and 16% (placebo) of patients UPDRS IVa significantly improved from 0.03 (placebo) to -1.83 (amantadine) No change in UPDRS IVb or III	Sawada et al. PLoS One 2010
18, randomized, double-blind, placebo-controlled	100 mg/day first week, 200 mg/day next two weeks	3 weeks	Primary: CDRS Secondary: UPDRS IVa	UPDRS IVa significantly improved from 4.3 to 2.8 No significant change in CDRS	Da Silva-Junior et al. *Parkinsonism and Related Disorders* 2005
10, double-blind, crossover	Titrated to 100 mg three times/day over three days with daily 100 mg increments (washout for 1 week)	2 weeks	Primary: Subjective dyskinesia intensity (diary) Secondary: UPDRS IV, II, and III	Reduction in dyskinesia score by 53% UPDRS IV reduced from 3.4 to 1.7, UDPRS III was not different	Luginger et al. *Movement Disorders* 2000
24, double-blind, placebo-controlled, crossover	100 mg/day for first week, 200 mg/day for next two weeks	3 weeks	Primary: Total dyskinesias Secondary: UPDRS	Reduction in total dyskinesias from 29 to 22, reduction in maximal dyskinesia from 6.3 to 5.2. UPDRS IVa reduced from 4.3 to 3.2, UPDRS III from 41.7 to 38.4.	Snow et al. *Clinical Neuropharmacology* 2000
40 patients, double-blind	300 mg/day	15, 30, and 60-240 days (also followed 1 week and 1 month after withdrawal)	Primary: Dyskinesia assessed by three clinicians Secondary: UPDRS IV items 32-34, DRS	"OFF" time hours: +0.7 (15 d), +1.0 (30 d), +0.1 (60-240 d), +0.5 (1 wk post), +0.2 (1 month post) "OFF" time hours: -0.8 (15 d), -1.6 (30 d), -0.3 (60-240 d), -0.2 (1 wk post), +0.5 (1 month post) UPDRS items 32-34: -4.7 (15 d), -4.4 (30 d), -0.6 (60-240 d), +0.3 (1 wk post), +0.1 (1 month post) DRS: -9.1 (15 d), -9.3 (30 d), -1.2 (60-240 d), +2.6 (1 wk post), +0.8 (1 month post)	Thomas A et al. *J Neurol Neurosurg Psychiatry* 2004
31 patients, randomized, placebo-controlled, parallel-group	100 mg tablets, patients received individual daily dose	patients on 1 year amantadine randomized to 3 weeks amantadine or placebo	Primary: UPDRS IV items 32-34, and difference between treatment groups of score changes between baseline and end of study Secondary: "ON" time with nontroublesome dyskinesias, "ON" time without dyskinesias, and total daily "OFF" time as assessed in 24-hr diaries, UPDRS III, UPDRS IV 32+33	Increase in disability and duration at three weeks in placebo, no change in active amantadine group (3.2 at baseline vs. 3.6 at three weeks) Increase in "ON" time with troublesome dyskinesia from baseline to week 3 in placebo group (1.7 hrs vs. 3.5 hrs) and UPDRS IV item 32 (1.8 hrs vs. 2.5 hrs)	Wolf et al. *Movement Disorders* 2010
17 patients, 13 treated with amantadine for 1 year, double-blind, placebo-controlled, crossover study, patients returned for follow-up using non-randomized, double-blind, placebo-controlled design	average dose: 362 ± 14 mg, plasma amantadine levels: 9.7 ± 0.9 µmol)	1 year follow-up, 10 days prior to follow-up amantadine was replaced with amantadine or placebo	Primary: Dyskinesia severity, PD symptoms Secondary UPDRS IV items 32-33	Average dyskinesia scores remained over 50% lower than with placebo 1 year earlier. UPDRS IV items 32/33: placebo (initial): 4 v. amantadine (initial): 1 v. amantadine (follow-up): 1	Verhagen Metman et al. *Arch Neurol* 1999
57 patients	dose range: 244-272 mg/day	3 month multicenter, randomized, double-blind, placebo-controlled, parallel-group, washout study	Primary: UPDRS IV items 32+33 Secondary: "responders" analysis, premature dropout for LID, abnormal involuntary movement scale Tertiary: troublesome dyskinesia as measured by diaries, UPDRS III, fatigue, and apathy scores	UPDRS 32+33 Deteriorated more in the placebo group (+1.7 ± 2.0 units) vs. amantadine (+0.2 ± 1.5 units, p=0.003) Significantly more responders, more dropouts for LID, greater increase in "ON" time with troublesome dyskinesia and greater worsening of abnormal involuntary movement scale score No between-group differences in UPDRS III, apathy and fatigue scores tended to worsen more in patients with placebo versus amantadine	Ory-Magne et al. *Neurology* 2014

Sources: Cited references and William Blair & Company, L.L.C.

IMPORTANT DISCLOSURES

William Blair & Company, L.L.C. was a manager or co-manager of a public offering of equity securities within the prior 12 months.

William Blair & Company, L.L.C. is a market maker in the security of this company and may have a long or short position.

William Blair & Company, L.L.C. intends to seek investment banking compensation in the next three months from the subject company covered in this report.

Within the past 12 months William Blair & Company, L.L.C. has provided or is providing investment banking services to or has an investment services relationship with the subject company covered in this report.

Additional information is available upon request.

This report is available in electronic form to registered users via R*Docs™ at www.rdocs.com or www.williamblair.com.

Please contact us at +1 800 621 0687 or consult williamblair.com/Research-and-Insights/Equity-Research/Coverage.aspx for all disclosures.

Tim Lugo attests that 1) all of the views expressed in this research report accurately reflect his personal views about any and all of the securities and companies covered by this report, and 2) no part of his compensation was, is, or will be related, directly or indirectly, to the specific recommendations or views expressed by him in this report. We seek to update our research as appropriate, but various regulations may prohibit us from doing so. Other than certain periodical industry reports, the majority of reports are published at irregular intervals as deemed appropriate by the analyst.

DJIA:	16,512.89
S&P 500:	1,881.14
NASDAQ:	4,123.90

The prices of the common stock of other public companies mentioned in this report follow:

AbbVie Inc.	$51.18
Affymax, Inc.	$0.70
Amarin Corporation plc	$1.71
Aquinox Pharmaceuticals Inc.	$9.61
Bayer AG	€100.00
GlaxoSmithKline plc	$55.13
MediciNova Inc.	$2.05
Novartis AG	$87.36
Teva Pharmaceutical Industries Limited	$49.86

Current Ratings Distribution (as of 4/30/14)

Coverage Universe	Percent	Inv. Banking Relationships*	Percent
Outperform (Buy)	66%	Outperform (Buy)	14%
Market Perform (Hold)	31%	Market Perform (Hold)	2%
Underperform (Sell)	1%	Underperform (Sell)	0%

* Percentage of companies in each rating category that are investment banking clients, defined as companies for which William Blair has received compensation for investment banking services within the past 12 months.

The compensation of the research analyst is based on a variety of factors, including performance of his or her stock recommendations; contributions to all of the firm's departments, including asset management, corporate finance, institutional sales, and retail brokerage; firm profitability; and competitive factors.

OTHER IMPORTANT DISCLOSURES

Stock ratings, price targets, and valuation methodologies: William Blair & Company, L.L.C. uses a three-point system to rate stocks. Individual ratings and price targets (where used) reflect the expected performance of the stock relative to the broader market (generally the S&P 500, unless otherwise indicated) over the next 12 months. The assessment of expected performance is a function of near-, intermediate-, and long-term company fundamentals, industry outlook, confidence in earnings estimates, valuation (and our valuation methodology), and other factors. Outperform (O) – stock expected to outperform the broader market over the next 12 months; Market Perform (M) – stock expected to perform approximately in line with the broader market over the next 12 months; Underperform (U) – stock expected to underperform the broader market over the next 12 months; not rated (NR) – the stock is not currently rated. The valuation methodologies used to determine price targets (where used) include (but are not limited to) price-to-earnings multiple (P/E), relative P/E (compared with the relevant market), P/E-to-growth-rate (PEG) ratio, market capitalization/revenue multiple, enterprise value/EBITDA ratio, discounted cash flow, and others.

Company Profile: The William Blair research philosophy is focused on quality growth companies. Growth companies by their nature tend to be more volatile than the overall stock market. Company profile is a fundamental assessment, over a longer-term horizon, of the business risk of the company relative to the broader William Blair universe. Factors assessed include: 1) durability and strength of franchise (management strength and track record, market leadership, distinctive capabilities); 2) financial profile (earnings growth rate/consistency, cash flow generation, return on investment, balance sheet, accounting); 3) other factors such as sector or industry conditions, economic environment, confidence in long-term growth prospects, etc. Established Growth (E) – Fundamental risk is lower relative to the broader William Blair universe; Core Growth (C) – Fundamental risk is approximately in line with the broader William Blair universe; Aggressive Growth (A) – Fundamental risk is higher relative to the broader William Blair universe.

The ratings, price targets (where used), valuation methodologies, and company profile assessments reflect the opinion of the individual analyst and are subject to change at any time.

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies—to our clients and our trading desks—that are contrary to opinions expressed in this research. Certain outstanding reports may contain discussions or investment opinions relating to securities, financial instruments and/or issuers that are no longer current. Always refer to the most recent report on a company or issuer before making an investment decision. Our asset management and trading desks may make investment decisions that are inconsistent with recommendations or views expressed in this report. We will from time to time have long or short positions in, act as principal in, and buy or sell the securities referred to in this report. Our research is disseminated primarily electronically, and in some instances in printed form. Electronic research is simultaneously available to all clients. This research is for our clients only. No part of this material may be copied or duplicated in any form by any means or redistributed without the prior written consent of William Blair & Company, L.L.C.

THIS IS NOT IN ANY SENSE A SOLICITATION OR OFFER OF THE PURCHASE OR SALE OF SECURITIES. THE FACTUAL STATEMENTS HEREIN HAVE BEEN TAKEN FROM SOURCES WE BELIEVE TO BE RELIABLE, BUT SUCH STATEMENTS ARE MADE WITHOUT ANY REPRESENTATION AS TO ACCURACY OR COMPLETENESS OR OTHERWISE. OPINIONS EXPRESSED ARE OUR OWN UNLESS OTHERWISE STATED. PRICES SHOWN ARE APPROXIMATE.

THIS MATERIAL HAS BEEN APPROVED FOR DISTRIBUTION IN THE UNITED KINGDOM BY WILLIAM BLAIR INTERNATIONAL, LIMITED, REGULATED BY THE FINANCIAL CONDUCT AUTHORITY (FCA), AND IS DIRECTED ONLY AT, AND IS ONLY MADE AVAILABLE TO, PERSONS FALLING WITHIN COB 3.5 AND 3.6 OF THE FCA HANDBOOK (BEING "ELIGIBLE COUNTERPARTIES" AND "PROFESSIONAL CLIENTS"). THIS DOCUMENT IS NOT TO BE DISTRIBUTED OR PASSED ON TO ANY "RETAIL CLIENTS." NO PERSONS OTHER THAN PERSONS TO WHOM THIS DOCUMENT IS DIRECTED SHOULD RELY ON IT OR ITS CONTENTS OR USE IT AS THE BASIS TO MAKE AN INVESTMENT DECISION.

Equity Research Directory

John F. O'Toole, Partner Manager and Director of Research +1 312 364 8612
Kyle Harris, CFA, Partner Operations Manager +1 312 364 8230

CONSUMER

Sharon Zackfia, CFA, Partner +1 312 364 5386
Group Head–Consumer
Apparel and Accessories, Leisure, Restaurants

Jon Andersen, CFA, Partner +1 312 364 8697
Consumer Products

Daniel Hofkin +1 312 364 8965
Hardlines, Specialty Retail

Mark Miller, CFA, Partner +1 312 364 8498
E-commerce, Broad Assortment and Hardlines, Health and Beauty

Amy Noblin +1 415 248 2874
Apparel and Accessories

FINANCIAL SERVICES AND TECHNOLOGY

Adam Klauber, CFA +1 312 364 8232
Co-Group Head–Financial Services and Technology
Insurance Brokers, Property & Casualty Insurance

Robert Napoli, Partner +1 312 364 8496
Co-Group Head–Financial Services and Technology
Business Development Companies, Financial Technology, Specialty Finance

Christopher Shutler, CFA +1 312 364 8197
Asset Management, Financial Technology

GLOBAL INDUSTRIAL INFRASTRUCTURE

Nick Heymann +1 212 237 2740
Co-Group Head–Global Industrial Infrastructure
Multi-industry

Larry De Maria, CFA +1 212 237 2753
Co-Group Head–Global Industrial Infrastructure
Capital Goods

Nate Brochmann, CFA +1 312 364 5385
Commercial Services, Logistics/Transportation

Brian Drab, CFA, Partner +1 312 364 8280
Filtration and Water Management, Industrial Technology

Chase Jacobson +1 212 237 2748
Engineered Equipment, Engineering and Construction

Ryan Merkel, CFA +1 312 364 8603
Commercial Services, Industrial Distribution

GLOBAL SERVICES

Brandon Dobell, Partner +1 312 364 8773
Group Head–Global Services
Energy Services, Information Services, Marketing Services, Real Estate Services and Technology

Timo Connor, CFA +1 312 364 8441
Education Services and Technology

Timothy McHugh, CFA, Partner +1 312 364 8229
Consulting, HR Technology, Information Services, Staffing

HEALTHCARE

Ben Andrew, Partner +1 312 364 8828
Group Head–Healthcare
Medical Devices

Ryan Daniels, CFA, Partner +1 312 364 8418
Healthcare Information Technology, Healthcare Services

Margaret Kaczor +1 312 364 8608
Medical Devices

John Kreger, Partner +1 312 364 8597
Distribution, Outsourcing, Pharmacy Benefit Management

Tim Lugo +1 415 248 2870
Therapeutics

Amanda Murphy, CFA +1 312 364 8951
Diagnostic Services, Life Sciences, Pharmacy Benefit Management

Matthew O'Brien +1 312 364 8582
Medical Devices

John Sonnier, Partner +1 312 364 8224
Biotechnology

Brian Weinstein, CFA +1 312 364 8170
Diagnostic Products

Y. Katherine Xu, Ph.D. +1 212 237 2758
Biotechnology

TECHNOLOGY, MEDIA, AND COMMUNICATIONS

Jason Ader, CFA, Partner +1 617 235 7519
Co-Group Head–Technology, Media, and Communications
Hardware and Software Infrastructure

Bhavan Suri, Partner +1 312 364 5341
Co-Group Head–Technology, Media, and Communications
IT and Business Process Services, Software, Software as a Service

Rahul Bhangare +1 312 364 5066
IT and Business Process Services

Jim Breen, CFA +1 617 235 7513
Internet Infrastructure and Communication Services

Anil Doradla +1 312 364 8016
Semiconductors and Wireless

Justin Furby, CFA +1 312 364 8201
Software as a Service

Jonathan Ho +1 312 364 8276
Cybersecurity, Security Technology

Dmitry Netis +1 212 237 2714
Communications Equipment

Ralph Schackart III, CFA, Partner +1 312 364 8753
Digital Media, Internet

EDITORIAL

Steve Goldsmith, Head Editor +1 312 364 8540
Maria Erdmann +1 312 364 8925
Beth Pekol Porto +1 312 364 8924
Kelsey Swanekamp +1 312 364 8174
Lisa Zurcher +44 20 7868 4549

William Blair