

## Sage Therapeutics

### 4Q Snapshot & Model Update

We are updating our SAGE model based on the company's 4Q results (there was no conference call). After the SAGE-547 data update in January (see note [here](#)), we view today's quarterly release as largely incremental. Overall, everything is proceeding on schedule, and we continue to expect further clarity on the regulatory path for SAGE-547 in ~1H15. Bottom line, we are maintaining our OW rating ahead of pending clinical and regulatory updates, which we anticipate could provide further upside for shares.

- **Upcoming events: Full Phase 1/2 547 data in 2015.** SAGE expects to report final results from the Phase 1/2 trial of SAGE-547 in SRSE before initiating a pivotal trial by mid-year. The company also plans to report data from the ongoing POC trials of SAGE-547 in essential tremor and severe postpartum depression also in mid-2015. The next two candidates – SAGE-217 and SAGE-689 – are expected to enter the clinic by year end.
- **4Q results.** 4Q EPS was \$(0.48) vs. JPMe of (\$0.44). 4Q OpEx of \$12.4M was higher than JPMe of \$11.4M. That said, SAGE is not yet an earnings story.
- **Estimate changes.** We have updated our model for 4Q results; changes were minimal. We are maintaining our YE15 \$51 target.
- **Balance sheet update.** SAGE ended 4Q with \$128M in cash (and no debt) after completing an IPO in July 2014 (J.P. Morgan acted as joint book-running manager) generating \$94M in net proceeds.

## Overweight

**SAGE, SAGE US**

Price: \$43.45

**Price Target: \$51.00**

### Biotechnology

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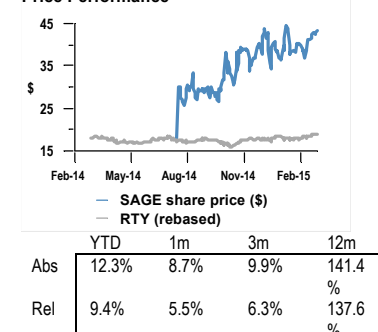
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### Price Performance



### Sage Therapeutics, Inc. (SAGE;SAGE US)

FYE Dec	2012A	2013A	2014A	2015E (Prev)	2015E (Curr)
EPS reported (\$)					
Q1 (Mar)	-	(0.76)	(1.17)	-	(0.49)
Q2 (Jun)	-	-	(4.57)	-	(0.55)
Q3 (Sep)	-	-	(0.50)	-	(0.64)
Q4 (Dec)	-	-	(0.48)	-	(0.78)
FY	(2.74)	(2.15)	(1.67)	(2.26)	(2.48)

Source: Company data, Bloomberg, J.P. Morgan estimates.

### Company Data

Price (\$)	43.45
Date Of Price	27 Feb 15
52-week Range (\$)	47.76-24.25
Market Cap (\$ mn)	1,120.71
Fiscal Year End	Dec
Shares O/S (mn)	26
Price Target (\$)	51.00
Price Target End Date	31-Dec-15

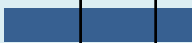


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## Pipeline

Figure 1: SAGE Pipeline

### Product Pipeline Highlights

Program	P/C	Ph 1	Ph 2	Ph 3	FDA	Mkt.	Partner Comments
<b>SAGE 547</b> SRSE							Phase 1/2 ongoing
<b>SAGE 217</b> RSE							IND anticipated in late 2015
<b>SAGE 689</b> SE							IND anticipated in late 2015

Source: Company reports and J.P. Morgan estimates.

## Upcoming Events

Figure 2: SAGE Upcoming Events

### Anticipated Newsflow Highlights

Program	Event	Expected Timing	Significance
<b>SAGE 547</b>	Full Data from Phase 1/2 Trial Update	1H15	High
	Potential Pivotal trial Start	mid-2015	Low
	Potential Pivotal Data	2016	High
	Potential NDA/MAA Filings	2016	Low
<b>SAGE 217</b>	IND Filing	late 2015	Low
<b>SAGE 689</b>	Potential IND Filing	late 2015	Low

Source: Company reports and J.P. Morgan estimates.

Figure 3: SAGE Income Statement

Sage Therapeutics Income Statement

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	2013A	2014A	1Q15E	2Q15E	3Q15E	4Q15E	2015E	2016E	2017E	2018E	2019E
US 547 Revenues		-					-	-	26.5	195.5	389.2
EU 547 Revenues		-					-	-	-	2.2	21.51
<b>Total Product Revenue</b>		-					-	-	26.5	197.7	410.7
License & Milestone		-					-	-	-	-	-
Contract, Grant & Collaboration		-					-	-	-	-	-
<b>Total Revenues</b>		-	-	-	-	-	-	-	26.5	197.7	410.7
COGS	-	-					-	-	3.4	21.5	42.8
R&D	14.4	23.46	9.1	10.6	14.1	19.1	52.9	56.0	67.5	79.5	32.2
SG&A	3.9	9.4	3.3	3.4	3.5	3.6	13.8	61.3	67.4	68.8	90.6
Collaboration Expense	-	-					-	-	-	-	-
<b>Total Operating Expenses</b>	<b>18.3</b>	<b>32.8</b>	<b>12.4</b>	<b>14.0</b>	<b>17.6</b>	<b>22.7</b>	<b>66.7</b>	<b>117.3</b>	<b>138.4</b>	<b>169.8</b>	<b>165.6</b>
<b>Operating Income</b>	<b>(18.3)</b>	<b>(32.8)</b>	<b>(12.4)</b>	<b>(14.0)</b>	<b>(17.6)</b>	<b>(22.7)</b>	<b>(66.7)</b>	<b>(117.3)</b>	<b>(111.9)</b>	<b>28.0</b>	<b>245.1</b>
Net interest & other income	(0.0)	(0.0)	-	-	-	-	-	-	-	-	-
Accretion of redeemable conv. pref stock	(0.0)	(2.3)					-	-	-	-	-
Income Tax (benefit)	-	-	-	-	-	-	-	-	-	-	-
<b>GAAP Net Income</b>	<b>(18.3)</b>	<b>(35.1)</b>	<b>(12.4)</b>	<b>(14.0)</b>	<b>(17.6)</b>	<b>(22.7)</b>	<b>(66.7)</b>	<b>(117.3)</b>	<b>(111.9)</b>	<b>28.0</b>	<b>245.1</b>
<b>GAAP Basic EPS</b>	<b>(3.89)</b>	<b>(2.69)</b>	<b>(0.47)</b>	<b>(0.53)</b>	<b>(0.63)</b>	<b>(0.77)</b>	<b>(2.43)</b>	<b>(3.69)</b>	<b>(3.20)</b>	<b>0.74</b>	<b>6.17</b>
<b>GAAP Diluted EPS</b>	<b>(2.15)</b>	<b>(2.69)</b>	<b>(0.47)</b>	<b>(0.53)</b>	<b>(0.63)</b>	<b>(0.77)</b>	<b>(2.43)</b>	<b>(3.69)</b>	<b>(3.20)</b>	<b>0.71</b>	<b>5.95</b>
Basic Shares Outstanding	4.7	13.1	26.0	26.2	28.0	29.7	27.5	31.8	35.0	38.0	39.7
Shares added		25.1	0.2	1.0	1.7	1.0	2.0	2.0	2.0	2.0	2.0
Diluted Shares Outstanding	8.5	13.1	26.0	26.2	28.0	29.7	27.5	31.8	35.0	39.5	41.2
<b>Margin Analysis:</b>											
Gross margin	NM	NM	NM	NM	NM	NM	NM	NM	87%	89%	90%
Operating margin	NM	NM	NM	NM	NM	NM	NM	NM	NM	14.14%	59.69%
Net margin	NM	NM	NM	NM	NM	NM	NM	NM	NM	14.14%	59.69%
Tax Rate	0.0%	0.0%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Cost Analysis:</b>											
COGS as % of tot. prod. sales	NM	0.00%	NM	NM	NM	NM	15%	15%	13%	11%	11.00%
R&D as % of tot. revenue	NM	NM	NM	NM	NM	NM	NM	NM	254.41%	40.20%	7.84%
SG&A as % of tot. revenue	NM	NM	NM	NM	NM	NM	NM	NM	254.17%	34.78%	22.05%
<b>Year-over-year growth:</b>											
Total revenue	NM	NM	NM	NM	NM	NM	NM	NM	NM	645.30%	107.71%
R&D Expense	98.60%	63.37%	118.07%	141.95%	113.60%	130.12%	125.54%	5.86%	20.54%	17.78%	-59.50%
SG&A Expense	63.28%	139.50%	101.30%	89.14%	22.70%	16.96%	47.12%	343.81%	9.96%	1.97%	31.69%
Total operating expenses	89.79%	79.70%	113.39%	126.53%	86.06%	99.35%	103.11%	75.86%	17.95%	22.68%	-2.48%
Operating income	NM	79.70%	NM	NM	NM	NM	103.11%	75.86%	-4.67%	-125.00%	776.66%
Net income	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
EPS	NM	24.81%	NM	NM	NM	NM	-9.69%	52.13%	-13.42%	-122.15%	739.45%
Basic Shares	33.44%	178.14%	399.85%	1443.50%	42.85%	15.06%	110.22%	15.59%	10.11%	8.58%	4.61%
Diluted Shares	NM	#DIV/0!	NM	16234.38%	1437.70%	15.07%	#DIV/0!	15.05%	13.16%	7.41%	4.83%

Source: J.P. Morgan estimates, Company data.

## Investment Thesis, Valuation and Risks

### Sage Therapeutics (Overweight; Price Target: \$51.00)

#### Investment Thesis

We have an OW rating on SAGE based on the potential of SAGE-547 for the treatment of super-refractory status epilepticus (SRSE) – a life-threatening state of persistent seizure that is unresponsive to currently available therapies (and an orphan indication). We believe SAGE-547's unique mechanism of action should continue to generate positive data and that the significant unmet need in SRSE will drive uptake of SAGE-547 upon commercialization. Follow-on candidates SAGE-689 and SAGE-217 for earlier lines of SE could grow the top line with significant infrastructure synergy.

#### Valuation

Our probability-weighted Dec-15 PT of \$51 is based on a blended average of our proprietary probability-adjusted sum-of-the-parts scenario analysis (50% weighting) and risk-adjusted NPV model (50% weighting).

#### SAGE Valuation Summary

SAGE Valuation Summary			
Discount rate	12%		
4Q15 Fully Diluted Shares (m)	29.0		
<b>Main value drivers</b>	Prob of approval	Peak WW sales est (avg. scenario)	Avg peak yr
SAGE-547- Status Epilepticus - US	60%	\$ 1,032	2022
SAGE-547- Status Epilepticus - G7	50%	\$ 582	2024
<b>Valuation methodology</b>	Value / share	Weighting	Adj. value/ share
DCF			
P/E 2016			
Real options scenario analysis	\$ 55.45	50%	27.73
Risk adjusted NPV analysis	\$ 47.24	50%	23.62
Total			\$ 51.35
Catalyst/liquidity discount			0%
<b>YE15 Price Target</b>			<b>\$ 51</b>

Source: J.P. Morgan estimates.

#### Risks to Rating and Price Target

SAGE is susceptible to the standard risks that apply to the entire biotech industry, including development, regulatory, commercial, manufacturing, financing, and IP pitfalls. More specific risks to the downside include clinical setbacks for the key pipeline product SAGE-547 and pre-clinical candidates SAGE-689 and SAGE-217, regulatory hurdles, commercial setbacks and personnel risk.

## Sage Therapeutics: Summary of Financials

Income Statement - Annual	FY14A	FY15E	FY16E	FY17E	Income Statement - Quarterly	1Q15E	2Q15E	3Q15E	4Q15E
Revenues	0	0	-	-	Revenues	0	0	0	0
Cost of products sold	0	0	-	-	Cost of products sold	0	0	0	0
Gross profit	-	-	-	-	Gross profit	-	-	-	-
SG&A	(10)	(15)	-	-	SG&A	(4)	(4)	(4)	(4)
R&D	(24)	(53)	-	-	R&D	(9)	(11)	(14)	(19)
Operating income	(34)	(68)	-	-	Operating income	(13)	(14)	(18)	(23)
EBITDA	(34)	(68)	-	-	EBITDA	(13)	(14)	(18)	(23)
Net interest (income) / expense	-	-	-	-	Net interest (income) / expense	-	-	-	-
Other income / (expense)	(0)	0	-	-	Other income / (expense)	0	0	0	0
Income taxes	0	0	-	-	Income taxes	0	0	0	0
Net income - GAAP	(36)	(68)	-	-	Net income - GAAP	(13)	(14)	(18)	(23)
Net income - recurring	(36)	(68)	-	-	Net income - recurring	(13)	(14)	(18)	(23)
Diluted shares outstanding	22	27	41	-	Diluted shares outstanding	26	26	28	30
EPS - excluding non-recurring	(1.67)	(2.48)	-	-	EPS - excluding non-recurring	(0.49)	(0.55)	(0.64)	(0.78)
EPS - recurring	(1.67)	(2.48)	-	-	EPS - recurring	(0.49)	(0.55)	(0.64)	(0.78)
Balance Sheet and Cash Flow Data	FY14A	FY15E	FY16E	FY17E	Ratio Analysis	FY14A	FY15E	FY16E	FY17E
Cash and cash equivalents	120	173	-	-	Sales growth	-	-	-	-
Accounts receivable	-	-	-	-	EBIT growth	84.9%	101.4%	-	-
Inventories	-	-	-	-	EPS growth - recurring	(22.3%)	48.1%	-	-
Other current assets	0	0	-	-	Gross margin	-	-	-	-
Current assets	120	174	-	-	EBIT margin	-	-	-	-
PP&E	0	0	-	-	EBITDA margin	-	-	-	-
Total assets	120	174	-	-	Tax rate	0.0%	0.0%	-	-
Total debt	0	0	-	-	Net margin	-	-	-	-
Total liabilities	3	3	-	-	Net Debt / EBITDA	354.1%	253.8%	-	-
Shareholders' equity	118	171	-	-	Net Debt / Capital (book)	6796.2%	8941.1%	-	-
Net income (including charges)	(36)	(68)	-	-	Return on assets (ROA)	(56.0%)	(46.3%)	-	-
D&A	0	0	-	-	Return on equity (ROE)	(58.2%)	(47.2%)	-	-
Change in working capital	0	0	-	-	Enterprise value / sales	-	-	-	-
Other	1	1	-	-	Enterprise value / EBITDA	NM	NM	-	-
Cash flow from operations	(35)	(67)	-	-	Free cash flow yield	(3.7%)	(5.6%)	-	-
Capex	0	0	-	-					
Free cash flow	(35)	(67)	-	-					
Cash flow from investing activities	0	0	-	-					
Cash flow from financing activities	147	120	-	-					
Dividends	-	-	-	-					
Dividend yield	-	-	-	-					

Source: Company reports and J.P. Morgan estimates.

Note: \$ in millions (except per-share data). Fiscal year ends Dec

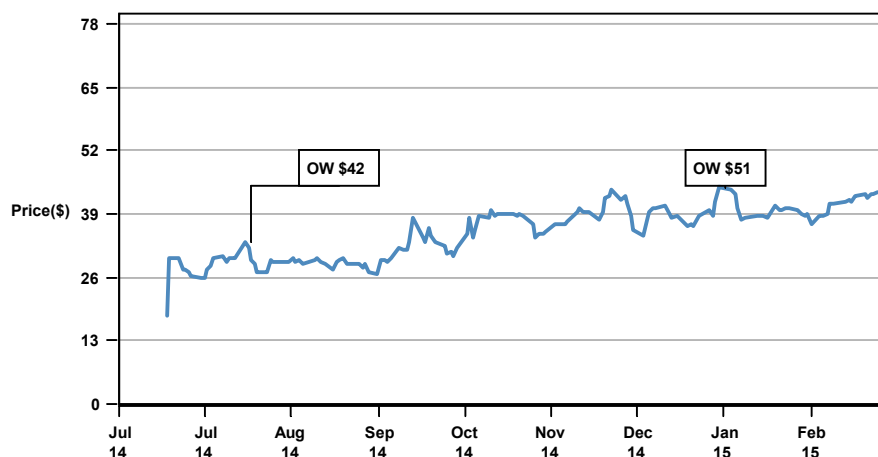
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Sage Therapeutics (SAGE, SAGE US) Price Chart



Date	Rating	Share Price (\$)	Price Target (\$)
12-Aug-14	OW	33.40	42.00
09-Jan-15	OW	44.39	51.00

Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends.  
Initiated coverage Aug 12, 2014.

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IB clients*	75%	67%	52%

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