September 12, 2016

MARKET PERFORM

Reason for report:

FLASH NOTE

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CELGENE CORPORATION

Mongersen Shows Something but Prior Efficacy Doesn't Bridge to Real World

• Bottom Line: Today Celgene (CELG, MP) released nondescript top-line results for mongersen in Crohn's disease from the phase 2 endoscopy trial; this study in 63 individuals with active moderate to severe Crohn's disease from multiple centers and countries showed a reduction of the mean baseline Simplified Endoscopic Activity Score for Crohn's disease (SES-CD) by 25% for a "proportion of patients" at week 12; however, there was no control arm for the trial to demonstrate statistical significance or show if the efficacy signal was drug-induced. At baseline, patients with Crohn's required a SES-CD above 7, but we note the score can range from 0-60, which makes it difficult to calculate the significance of a 25% reduction. The results also described that mongersen produced clinical remission for an undefined number of patients at week 4 using a patient-reported clinical remission endpoint, compared to the 72% rate of remission reported in the previous IGON-1 phase 2 trial that lacked endoscopy confirmation. In our view, while the drug could be active in some patients, it seems that the impressive data from the previous phase 2 trial will not translate to the phase 3 patient population, or to the real world which mainly consists of patients with active, longstanding, treatment resistant disease, similar to today's endoscopy trial patients. Importantly, however, the relatively clean safety profile reported from previous studies was apparently maintained in this study. We spoke with Celgene this morning, and the company stated that there would be no changes to ongoing and planned phase 3 trials as a result of this analysis.

• FDA originally requested this endoscopy study to test if mongersen's reported clinical effects were matched by the harder endpoint of endoscopic healing and remission; Consistent with our preview of the mongersen data on July 25, 2016 (CELG's Imminent GED0301 Crohn's Endoscopy Data Unlikely to Match Earlier Result), this announcement suggests substantially lower remission rates than the IGON-1 phase 2 trial. This altered outcome may be due to different degree of disease in this trial, the more objective nature of some of the endpoints in this trial or the different centers and investigators involved. We had previously warned that the correlation between clinical improvement and endoscopic improvement in published literature was low, which suggested the high Crohn's Disease Activity Index (CDAI) scores from the phase 2 would not translate to similar levels of endoscopic disease remission or response. While the lack of placebo control and the absence of defined numbers do not allow for a true analysis of the data, we remain cautious about the full dataset expected to be presented later this year, likely at United European Gastroenterology Week (UEG) in mid-October. We reported that our expectations would be for a 30-50% CDAI remission rate and SES-CD remission rates of 20-30%, both of which may not be met based on the nondescript nature of today's disclosure. It is hard to understand how big "a proportion of patients" is from a study such as this. Normally "a proportion" of patients would actually experience a response to placebo,

Key Stats:	**(NASDAQ :CELG)**
Sector:	**Biotechnology**
S&P 500 Health Care Index:	**824.40**
Price :	**$104.47**
52 Week High:	$128.39
52 Week Low:	$93.05
Shares Outstanding (mil):	801.5
Market Capitalization (mil):	$83,732.7

Completion: September 12, 2016, 9:40AM EDT.
Distribution: September 12, 2016, 9:40AM EDT.
Est LT EPS Growth: CAGR 2016E-2019E
Cash Per Share: net cash presented

given the waxing and waning nature of the disease and the high placebo effect.

• **Lack of new safety signals represents the most important disclosure from today's release.** On the heels of Otezla's (apremilast, psoriatic arthritis) blockbuster launch, Celgene has demonstrated a market opportunity for modestly effective oral drugs for chronic inflammatory conditions that offer a substantially improved safety and tolerability profile. Like psoriatic arthritis, Crohn's patients are often offered steroids, immunomodulatory agents, and biologics (such as anti-TNFs) that are associated with side effects and lifestyle and dosing limitations. We are encouraged by the lack of any safety signals out to one year during the 11-month observational period, as the phase 3 trial will test a 12-week loading dose of 160mg daily, then three different maintenance doses of either 40mg or 160mg at various treatment intervals for a total treatment exposure of up to 52 weeks. Our conversations with Crohn's specialists suggested that there is a commercial opportunity for a novel, safe, marginally active oral medicine for Crohn's even if remission rates are lower than biologics. If the rate is materially lower, however, then it is likely to raise questions about the program's value.

• **Today's results highlight risk of phase 3 trial.** CELG has moved forward with the initiation of a 1,000-patient phase 3 trial before obtaining endoscopy results. The phase 3 trial has a 52-week duration with both CDAI and SES-CD endpoints; that study (which has apparently just opened to enrollment), with another 12-week phase 3 that is planned to start by year-end, will provide the data package for regulatory submissions in the first half of 2018. In our view, today's data increase our conviction that the final results, and label, will fall well short of the earlier results from the Italian phase I/II trial. Further, the phase 3 trial of mongersen is currently enrolling all Crohn's patients, while the endoscopy study excluded patients with a diagnosis of Crohn's colitis restricted to the left colon. As the mechanism of delivery for mongersen is designed to specifically deliver the oligo drug to the terminal ileum and right colon, the inclusive protocol of the phase 3 creates an even higher hurdle for the drug as a small but material percentage of patients in the active treatment arm may not respond to mongersen due to location of disease. Pending presentation and review of this trial's results, we remain cautious about ascribing much value to this program in our Celgene model.

• **Our under-consensus thesis remains intact after today's announcement**. Current consensus forecasts peak sales for mongersen approaching $2bn in the mid-2020's, and the asset represents an important growth driver to potentially offset the lost revenue in the post-Revlimid period. Today's data, coupled with the lack of standard-of-care comparator data in the current pivotal phase-3, leads us to maintain our more cautious forecast for mongersen of $1.2bn in 2026 sales. We reiterate our Market Perform rating and $135 price target for Celgene.

VALUATION

Our price target for Celgene Corp (CELG) is $135 and the stock is rated Market Perform. Celgene has transformed the treatment of one form of cancer (myeloma) and is aiming to transform the treatment of others in the future. Its core technology has been the development of small molecule drugs based on the chemistry of iMIDs, or forms and variants of thalidomide. These drugs have proven tremendously effective in myeloma, and today the company generates $7.5bn in revenue from hematology product sales, almost all from myeloma and iMID products. This franchise should continue to grow through Revlimid's patent expiry in 2026 given the structural characteristics of the market and its position in myeloma. Celgene is hoping that Revlimid has similar utility in lymphoma, which is another indication of equal or greater size, but we see the drug as being in a less advantaged position in that disease. Beyond the iMIDs, Celgene is invested in rights to a broad array of novel technologies and products in hematology, oncology and inflammatory diseases. The potential of these products remains to be seen, but 2017 is shaping up as a critical year for assessing the value, and likely return, from these investments.

RISKS TO VALUATION

The risks to our view, outlook and valuation for Celgene include any major change in the price or reimbursement coverage or for Revlimid, the company's main product today. Other risks include commercial or development disappointments for the company's diversifying programs, Otezla, GED0301 and ozanimod. Lastly, any further challenges to the company's Revlimid patent position would be viewed negatively by investors, as would further dilutive acquisitions and research investments which could further undermine the company's operating profitability and return on invested capital. Opportunities for greater upside than we currently forecast include duplication of early clinical trial results with GED0301 in expanded trials, successful development and commercialization of any programs from the company's collaboration with Juno, and early or impressive results, or accelerated development, for the company's PD-1 antibody durvalumab, partnered with AstraZeneca (MP). While Revlimid's potential in lymphoma is already included in our model on a probability of success adjusted basis, better-than-expected results in the ongoing Phase III trials that suggest that Revlimid should become a standard of care in that disease would also offer significant upside over and above our current forecast and valuation.

Disclosures Appendix

Analyst Certification

I, Geoffrey C. Porges, MBBS, certify that the views expressed in this report accurately reflect my views and that no part of my compensation was, is, or will be directly related to the specific recommendation or views contained in this report.

Valuation

Our $135 price target for Celgene (CELG) is based on a simple average of three approaches that we believe are a reasonable basis for valuing the stock today. These approaches are simple price to earnings multiples for comparable high growth large cap medical products (drugs and devices) companies; growth adjusted near term earnings multiples (PEG ratio) and discounted cash flow (DCF). Using an average peer large cap medical products (Pharma, Biotech, MedTech) company (MRK, PFE, JNJ, ABBV, AZN, GSK, NVS, RHHBY, SNY, MDT, STJ, SYK, A, BSX, AMGN, BIIB, CELG) multiple of 2017 consensus EPS of ~15.2x, applied to our 2018 EPS estimate for Celgene of $9.11, supports a one year target price of $138. Using exclusively biotech (ALXN, AMGN, BIIB, CELG, GILD, MDVN, REGN, VRTX) price to sales multiples of 2017E revenue of ~6.4x, applied to our 2018 revenue estimates of $15.8bn, gives fair value of $128/share. Lastly our DCF, using our estimate for the company's current WACC of 8.7%, applied to our periodic cash flows through 2026E and then assuming a 4% annual decline in cash flows in the terminal value, and adjusted for cash and debt, gives a present value per share of $140. The average of these three approaches is occur current target price of $135.

Risks to Valuation

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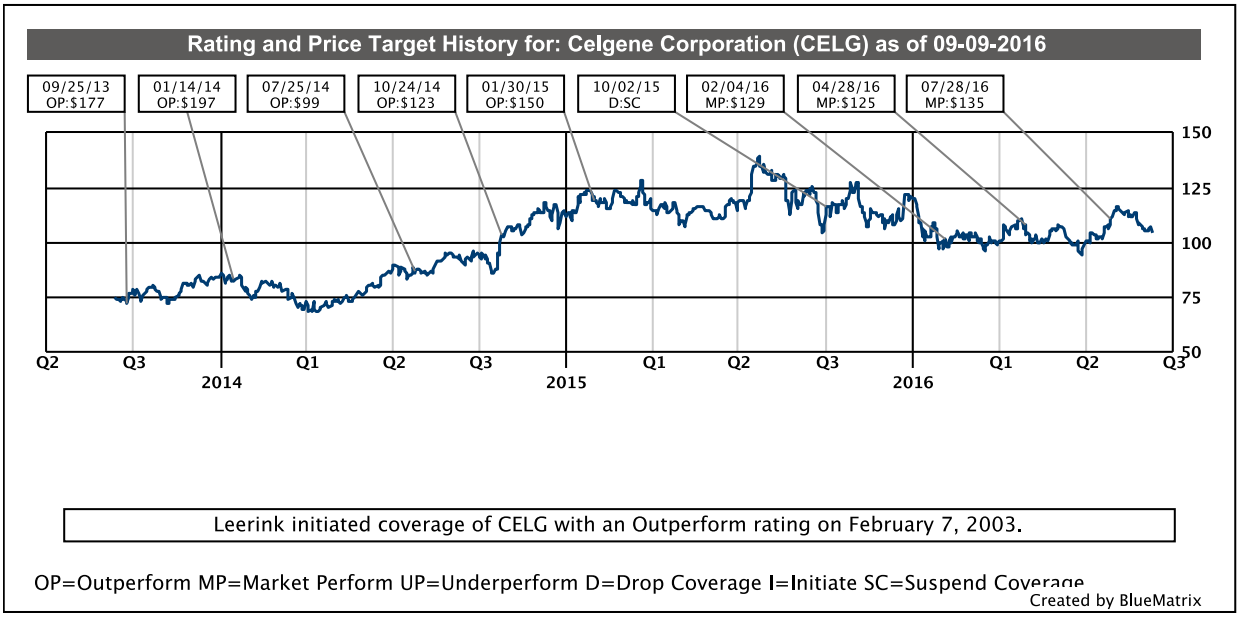
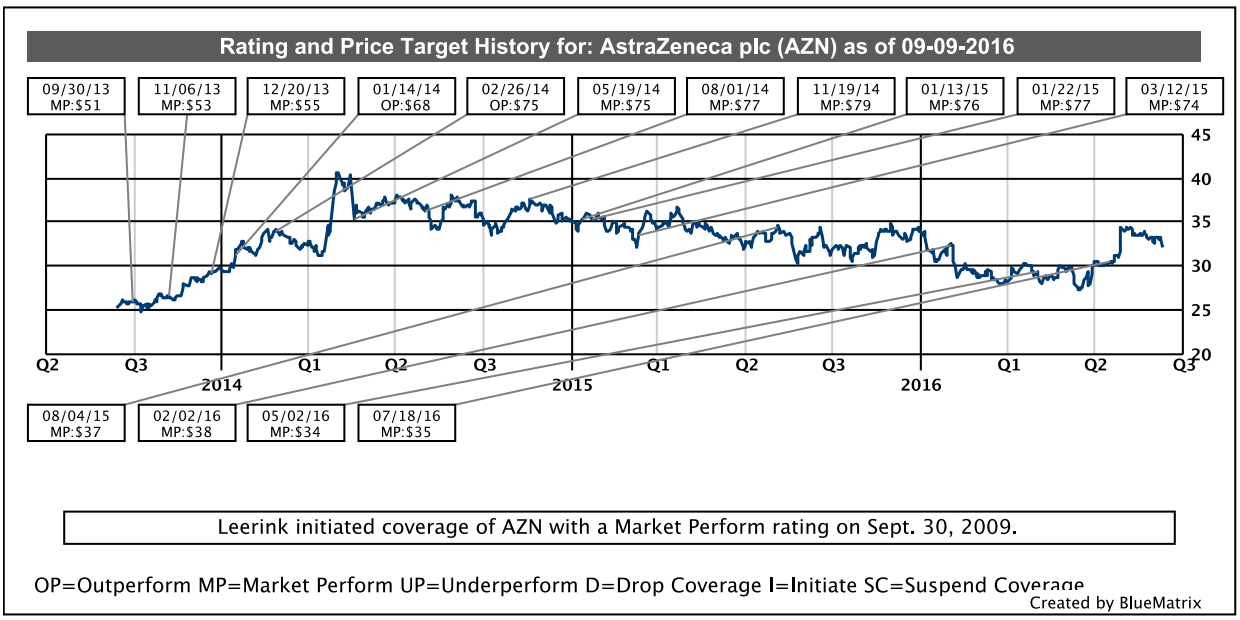

Rating and Price Target History for: Celgene Corporation (CELG) as of 09-09-2016
09/25/13 OP:$177
01/14/14 OP:$197
07/25/14 OP:$99
10/24/14 OP:$123
01/30/15 OP:$150
10/02/15 D:SC
02/04/16 MP:$129
04/28/16 MP:$125
07/28/16 MP:$135
150
125
100
75
50
Q2 Q3 Q1 Q2 Q3 Q1 Q2 Q3 Q1 Q2 Q3
2014
2015
2016
Leerink initiated coverage of CELG with an Outperform rating on February 7, 2003.
OP=Outperform MP=Market Perform UP=Underperform D=Drop Coverage I=Initiate SC=Suspend Coverage
Created by BlueMatrix


Rating and Price Target History for: AstraZeneca plc (AZN) as of 09-09-2016
09/30/13 MP:$51
11/06/13 MP:$53
12/20/13 MP:$55
01/14/14 OP:$68
02/26/14 OP:$75
05/19/14 MP:$75
08/01/14 MP:$77
11/19/14 MP:$79
01/13/15 MP:$76
01/22/15 MP:$77
03/12/15 MP:$74
45
40
35
30
25
20
Q2 Q3 Q1 Q2 Q3 Q1 Q2 Q3 Q1 Q2 Q3
2014
2015
2016
08/04/15 MP:$37
02/02/16 MP:$38
05/02/16 MP:$34
07/18/16 MP:$35
Leerink initiated coverage of AZN with a Market Perform rating on Sept. 30, 2009.
OP=Outperform MP=Market Perform UP=Underperform D=Drop Coverage I=Initiate SC=Suspend Coverage
Created by BlueMatrix

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Distribution of Ratings/Investment Banking Services (IB) as of 06/30/16				
			IB Serv./Past 12 Mos.	
Rating	Count	Percent	Count	Percent
BUY [OP]	151	68.6	40	26.5
HOLD [MP]	68	30.9	5	7.4
SELL [UP]	1	0.5	0	0.0

Explanation of Ratings

Outperform (Buy): We expect this stock to outperform its benchmark over the next 12 months.

Market Perform (Hold/Neutral): We expect this stock to perform in line with its benchmark over the next 12 months.

Underperform (Sell): We expect this stock to underperform its benchmark over the next 12 months.The degree of outperformance or underperformance required to warrant an Outperform or an Underperform rating should be commensurate with the risk profile of the company.

For the purposes of these definitions the relevant benchmark will be the S&P 600® Health Care Index for issuers with a market capitalization of less than $2 billion and the S&P 500® Health Care Index for issuers with a market capitalization over $2 billion.

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Important Disclosures

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MEDACorp is a network of healthcare professionals, attorneys, physicians, key opinion leaders and other specialists accessed by Leerink and it provides information used by its analysts in preparing research.

Leerink Partners LLC makes a market in Celgene Corporation.

Leerink Partners LLC is willing to sell to, or buy from, clients the common stock of AstraZeneca plc on a principal basis.

Leerink initiated coverage of AZN with a Market Perform rating on Sept. 30, 2009.

Leerink initiated coverage of CELG with an Outperform rating on February 7, 2003.

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