

Calithera Biosciences, Inc. (CALA)

Promising In-licensed Early Stage Metabolomics Program

MARKET DATA

Price	\$13.31
52-Week Range:	\$6.51 - \$33.48
Shares Out. (M):	17.4
Market Cap (\$M):	\$231.6
Average Daily Vol. (000):	85.0
Cash (M):	\$103
Cash/Share:	\$5.75
Enterprise Value (M):	\$287
Float (M):	17.8
LT Debt (M):	\$0

Source: Thomson Reuters and JMP Securities LLC

MARKET OUTPERFORM | Price: \$13.31 | Target Price: \$20.00

INVESTMENT HIGHLIGHTS

Calithera Biosciences licenses promising cancer metabolism inhibitor program from TransTech Pharma; reiterate our Market Outperform rating and \$20 price target based on a synthesis of our discounted cash flow, sum-of-the-parts, and CAGR valuation methodologies. Calithera Biosciences has exclusively licensed a comprehensive portfolio of inhibitors targeting an important step in cancer cell metabolism, hexokinase-II, with the potential to target numerous indications, including hematologic malignancies, breast cancers, multiple myeloma, small cell lung cancer, hepatocarcinoma, prostate cancer, and renal cell carcinomas. These preclinical compounds, including several that are orally bioavailable, will likely be entering clinical studies after IND submission by YE2015. Calithera will pay an undisclosed upfront payment to TransTech, and will be responsible for future development and commercialization milestones, as well as royalties on sales of approved products. We believe these compounds represent potential upside to our valuation, and we look forward to the progress Calithera makes advancing them into the clinic.

An early stage metabolism target with significant potential. Generally, a normal cell takes up glucose, where it is irreversibly phosphorylated into glucose-6-phosphate by hexokinase, and further metabolized to produce pyruvate in a process known as glycolysis. The flux of one molecule of glucose through glycolysis produces the energy molecule, adenosine triphosphate (ATP), nicotinamide adenine dinucleotide (NADH,H+), and pyruvate. Pyruvate is then shuttled in the Kreb's Cycle to generate ATP equivalents through oxidative phosphorylation. In order to meet intense energy demands, cancer cells significantly ramp up their glycolysis and amplify up to 200-fold the regulated hexokinase isoform hexokinase II. Calithera believes that this specific requirement can be exploited to develop a therapeutic index, selectively killing cancerous cells. Studies with low affinity inhibitors of hexokinase have demonstrated synergistic activity with numerous targeted chemotherapies, including trastuzumab in the models of breast cancer, and interestingly, a number of bcl-2 inhibitors, including ABT-263/ABT-737 in the preclinical models of leukemia, and venetoclax (ABBV, NC) in the treatment of multiple myeloma. Studies have shown that dual targeting of glycolysis 2-DG and Bcl-2 by venetoclax, in multiple myeloma cell lines or primary samples, is highly efficient to induce apoptosis regardless of molecular subtype.

We are bullish on CALA. Calithera is an early stage, oncology-focused drug discovery and development company attempting to exploit the increasing knowledge of the cancer cell's ability to hijack the energy production mechanisms required for the utilization of energy from a variety of sources. The company's first product candidate, CB-839, is a novel inhibitor of glutaminase, an enzyme that converts glutamine to glutamate, the latter of which is a critical feedstock for the cell's energy production system.

FY DEC	2013A	2014E	2015E
Revenue (\$M) 1Q	--	\$0.0A	\$0.0
2Q	--	\$0.0A	\$0.0
3Q	--	\$0.0	\$0.0
4Q	--	\$0.0	\$0.0
FY	--	\$0.0	\$0.0
EPS 1Q	--	--	(\$0.37)
2Q	--	(\$1.22)A	(\$0.37)
3Q	--	(\$0.29)	(\$0.37)
4Q	--	(\$0.31)	(\$0.37)
FY	(\$3.03)	(\$1.39)	(\$1.49)
P/E	NM	NM	NM
Previous FY	NC	NC	(\$1.27)

Source: Company reports and JMP Securities LLC

STOCK PRICE PERFORMANCE



The company was founded by Susan and Chris Molineaux, two of the founders of Proteolix, the company that developed Kyprolis (carfilzomib), which was eventually sold to Onyx for \$700MM. Onyx, in turn, was sold to Amgen (AMGN, NC) in 2013 for \$10 billion.

Company Description

Calithera Biosciences, based in San Francisco, CA, is a clinical-stage biotechnology company focused on the discovery and development of novel small molecules directed against cancer and immune cell metabolism to treat both solid tumor and hematologic malignancies. The company's lead product candidate, CB-839, is an internally discovered and wholly owned potent, oral selective inhibitor of glutaminase. Inhibition of glutaminase by CB-839, in effect, starves cancer cells of glutamate - a critical substrate for cancer cell metabolism, growth, and survival. CB-839 is currently in Phase I analysis in both solid and hematologic tumors. Planned Phase Ib cohorts in combination with standard of care agents in triple negative breast cancer and multiple myeloma are expected to be initiated. A second wholly owned pre-clinical candidate is Calithera's first-in-class arginase inhibitor, directed at immune checkpoint modulation and engaging the activation of cytotoxic T-cells. Calithera intends to submit an IND to the FDA for the arginase program in late 2015.

Investment Risks

Potential risks to our price target include, but are not limited to, clinical, regulatory, commercial, and competitive factors.

Scientific and clinical. Drug development is an inherently risky business. Cancer metabolism, and specifically, the role of glutaminase in cancer pathogenesis, remains largely unproven, creating significant risk associated with Calithera's scientific platform. Like all clinical trials, CB-839 clinical development carries some risk of failure. CB-839 may fail to maintain the requisite safety or to demonstrate meaningful efficacy to warrant further development through to regulatory approval.

Regulatory and commercial. The ability of Calithera or its potential partners to market its drugs depends on those drugs obtaining approval from the FDA and foreign regulatory agencies. Failure to achieve approval or delays in the timelines to approval could negatively impact the company's share price.

Competitive. Oncology drug development is an increasingly competitive field. Calithera faces competition from companies developing small molecule therapies also directed at cancer cell metabolism in ways that may resemble those of Calithera's pipeline. Small molecule oncology therapies employing other mechanisms of action are also in development by several biopharma companies to treat similar patient populations to that of CB-839 and may yield superior risk-benefit outcomes. Some of these companies may have access to greater resources, development, and commercial expertise compared to Calithera.

Financial. We anticipate that Calithera may seek additional equity financing in the form of a secondary offering in order to complete the development of CB-838 and advance its future pipeline candidates, exposing existing shareholders to some degree of dilution risk.

JMP FACTS AND DISCLOSURES

Analyst Certification:

The research analyst(s) who prepared this report does/do hereby certify that the views presented in this report are in accordance with my/our personal views on the securities and issuers discussed in this report. As mandated by SEC Regulation AC no part of my/our compensation was, is or will be directly or indirectly related to the specific views or recommendations expressed herein. This certification is made under the obligations set forth in SEC Regulation AC. Any other person or entity may not use it for any other purpose. This certification is made based on my/our analysis on the date of this report's publication. I/We assume no obligation to update this certification to reflect any facts, circumstances or events that may subsequently come to my/our attention. Signed Michael G. King

JMP Securities Disclosures:

JMP Securities currently makes a market in the security of Calithera Biosciences, Inc.

JMP Securities was manager or co-manager of a public offering of securities for Calithera Biosciences, Inc. (CALA) in the past 12 months, and received compensation for doing so.

JMP Securities Investment Opinion Definitions:

Market Outperform (MO): JMP Securities expects the stock price to outperform relevant market indices over the next 12 months.

Market Perform (MP): JMP Securities expects the stock price to perform in line with relevant market indices over the next 12 months.

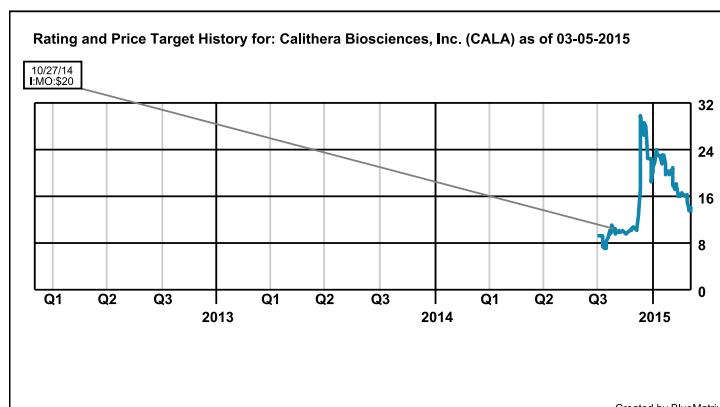
Market Underperform (MU): JMP Securities expects the stock price to underperform relevant market indices over the next 12 months.

JMP Securities Research Ratings and Investment Banking Services: (as of March 6, 2015)

JMP Rating	Regulatory Equivalent	# Co's Under Coverage	% of Total	Regulatory Equivalent	# Co's Under Coverage	% of Total	# Co's Receiving IB Services in Past 12 Months	% of Co's With This Rating
MARKET OUTPERFORM	Buy	283	63.03%	Buy	283	63.03%	87	30.74%
MARKET PERFORM	Hold	156	34.74%	Hold	156	34.74%	23	14.74%
MARKET UNDERPERFORM	Sell	8	1.78%	Sell	8	1.78%	0	0%
COVERAGE IN TRANSITION		1	0.22%		1	0.22%	0	0%
TOTAL:		449	100%		449	100%	110	24.50%

Stock Price Chart of Rating and Target Price Changes:

Note: First annotation denotes initiation of coverage or 3 years, whichever is shorter. If no target price is listed, then the target price is N/A. In accordance with NASD Rule 2711, the chart(s) below reflect(s) price range and any changes to the rating or price target as of the end of the most recent calendar quarter. The action reflected in this note is not annotated in the stock price chart. Source: JMP Securities.



JMP Disclaimer:

JMP Securities LLC (the "Firm") compensates research analysts, like other Firm employees, based on the Firm's profitability, which includes revenues from the Firm's institutional sales, trading, and investment banking departments as well as on the quality of the services and activities performed that are intended to benefit the Firm's institutional clients. These data have been prepared by JMP Securities LLC for informational purposes only and are based on information available to the public from sources that we believe to be reliable, but we do not guarantee their accuracy or completeness. Any opinions and projections expressed herein reflect our judgment at this date and are subject to change without notice. These data are neither intended nor should be considered as an offer to sell or a solicitation or a basis for any contract for the purchase of any security or other financial product. JMP Securities LLC, its affiliates, JMP Group LLC, Harvest Capital Strategies LLC, and their respective partners, directors, officers, and associates may have a long or short position in, may act as a market maker for, or may purchase or sell a position in the securities mentioned herein. JMP Securities LLC or its affiliates may be performing, have performed, or seek to perform investment banking, advisory, or other services and may have acted as manager or co-manager for a public offering of securities for any company mentioned herein. The reader should assume that JMP Securities LLC will solicit business from the company covered in this report. Members of our Sales and Trading Department provide oral and/or written market opinions and trading strategies to our clients that reflect their personal opinions about stocks that are the subject of the firm's research reports. Our research analysts discuss trading strategies with clients that sometimes reflect short-term expectations for the price of the securities that are the subject of research reports. These trading strategies are distinct from the analysts' fundamental rating for the stock, which is based upon the analysts' view compared to other stocks under coverage for the relevant time period. © Copyright 2015. All rights reserved by JMP Securities LLC. JMP Securities LLC is a member of FINRA, NASDAQ, and SIPC.

Jeffrey H. Spurr
Director of Research
 (415) 835-3903

RESEARCH PROFESSIONALS

FINANCIAL SERVICES

Alternative Asset Managers

Devin Ryan	(212) 906-3578
Brian McKenna	(212) 906-3545

Commercial & Specialty Finance

Christopher York	(415) 835-8965
Hannah Kim, CFA	(415) 835-8962

Consumer Finance

David M. Scharf	(415) 835-8942
Douglas Greiner	(212) 906-3525

Financial Processing & Outsourcing

David M. Scharf	(415) 835-8942
Douglas Greiner	(212) 906-3525

Insurance

Matthew J. Carletti	(312) 768-1784
Christine Worley	(312) 768-1786

Investment Banks & Brokers

Devin Ryan	(212) 906-3578
Brian McKenna	(212) 906-3545

Mortgage Operating Companies

REITs: Agency, Hybrid, & Commercial Mortgage

Steven C. DeLaney	(404) 848-7773
Trevor Cranston, CFA	(415) 869-4431
Charter Robinson	(757) 613-8955
Benjamin Zucker	(212) 906-3529

HEALTHCARE

Biotechnology

Liisa A. Bayko	(312) 768-1785
Masha Chapman	(415) 835-8944
Bhumika Sharma, PhD	(312) 768-1795
Jason N. Butler, PhD	(212) 906-3505
Michael G. King, Jr.	(212) 906-3520
Bryan Czyzewski, PhD	(212) 906-3577
Naureen Quibria, PhD	(212) 906-3514

Healthcare Services & Facilities

Peter L. Martin, CFA	(415) 835-8904
Aaron Hecht	(415) 835-3963
Arthur Kwok	(415) 835-8908

Life Science Tools & Diagnostics

J. T. Haresco, III, PhD	(415) 869-4477
Marie T. Casey, PhD	(415) 835-3955

Medical Devices

J. T. Haresco, III, PhD	(415) 869-4477
Marie T. Casey, PhD	(415) 835-3955

Medical Devices & Supplies

David Turkaly	(212) 906-3563
John Gillings	(212) 906-3564

Specialty Pharmaceuticals

Oren G. Livnat, CFA	(212) 906-3566
Nazibur Rahman	(212) 906-3519

REAL ESTATE

Housing & Land Development

Peter L. Martin, CFA	(415) 835-8904
Aaron Hecht	(415) 835-3963
Bharathwajan Iyengar	(415) 835-3902

Lodging & Leisure

Robert A. LaFleur	(212) 906-3510
Whitney Stevenson	(212) 906-3538

Property Services

Mitch Germain	(212) 906-3546
Peter Lunenburg	(212) 906-3537

REITs: Healthcare, Residential, & Specialty

Peter L. Martin, CFA	(415) 835-8904
Aaron Hecht	(415) 835-3963
Arthur Kwok	(415) 835-8908

REITs: Office, Industrial, & Diversified

Mitch Germain	(212) 906-3546
Peter Lunenburg	(212) 906-3537

Residential Services

Peter L. Martin, CFA	(415) 835-8904
Aaron Hecht	(415) 835-3963
Bharathwajan Iyengar	(415) 835-3902

TECHNOLOGY

Internet Security & Communications Infrastructure

Erik Suppiger	(415) 835-3918
John Lucia	(415) 835-3920

Internet & Digital Media

Ronald V. Josey III	(212) 906-3528
Ignatius Njoku	(415) 835-8960
Andrew Boone, CFA	(415) 835-3957
Michael Wu	(415) 835-8996

Software

Patrick Walravens	(415) 835-8943
Peter Lowry	(415) 869-4418
Mathew Spencer	(415) 835-8930
Greg McDowell	(415) 835-3934
Rishi Jaluria	(415) 835-3961

Wireless & Cloud Computing Technologies

Alex Gauna	(415) 835-8998
------------	----------------

ADDITIONAL CONTACTS

Thomas R. Wright
Director of Equities
 (212) 906-3599

Thomas Healy
Head of Institutional Sales
 (212) 906-3533

600 Montgomery Street, Suite 1100
 San Francisco, CA 94111
www.jmpsecurities.com