November 7, 2014

OUTPERFORM

Reason for report:

EARNINGS

Michael Schmidt, Ph.D.
(617) 918-4588
Michael.Schmidt@Leerink.com

Jonathan Chang, Ph.D.
(617) 918-4015
Jonathan.Chang@Leerink.com

LEERINK

DICERNA PHARMACEUTICALS, INC.

3Q Recap – Second DCR-MYC Trial Set to Start in 4Q

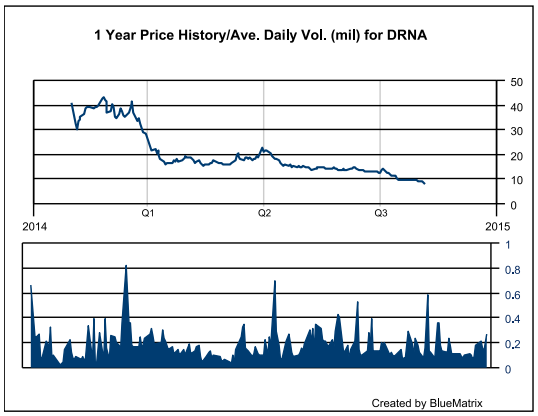
• **Bottom Line:** DRNA reported 3Q14 financial results and provided a pipeline update. With $116M in cash and equivalents, mgmt reiterated prior guidance to be sufficiently capitalized to fund operations through the end of 2016. DRNA plans to commence the second Phase I trial for DCR-MYC in hepatocellular cancer (HCC) in the US and Asia by the end of this year. Key clinical catalysts in 2H15 include Phase I data from both DCR-MYC studies, as well as Phase I data from DCR-PH1, which will go into the clinic next year. We are adjusting our estimates to reflect 3Q14 financial results and are lowering our DCF-based price target to $25/share, which still represents significant upside to the current market valuation. We believe DRNA has an attractive pipeline strategy, proven management team, and strong cash position, which we believe should suffice to advance the pipeline through several value inflection points. **Maintain Outperform rating.**

• **Cash guidance maintained.** DRNA ended 3Q14 with $116M in cash and equivalents and expects to have sufficient cash to fund operations through 2016. DRNA reported no 3Q14 revenue (consistent with consensus and our estimate), net loss of $11.2M and EPS of ($0.63).

• **Proprietary pipeline programs remain on track.** In April 2014 DRNA initiated the Phase 1 DCR-MYC study in patients with solid tumors, multiple myeloma, or lymphoma. Management expects to have top-line data from this trial no later than 2H15. We believe positive data from this first-in-man study could significantly de-risk DRNA's platform. The initiation of the second Phase 1 trial for DCR-MYC in hepatocellular carcinoma (HCC) is expected in 4Q14 in Asia and the US. The Phase 1 trial of DCR-PH1 for Primary Hyperoxaluria 1 (PH1) is expected to initiate in 2015. Mgmt expects to announce a third rare disease program in 2015.

• **Our new price target reflects:** (1) slower progress on the KRAS-targeted RNAi program by DRNA's partner KHK than we had expected, (2) potential future competition in PH1, and (3) IP risk on DCR-MYC.

Key Stats:	**(NASDAQ:DRNA)**
S&P 600 Health Care Index:	**1,370.82**
Price:	**$8.14**
Price Target:	$25.00 from $42.00
Methodology:	Sum-of-the parts DCF analysis
52 Week High:	$46.00
52 Week Low:	$8.00
Shares Outstanding (mil):	17.7
Market Capitalization (mil):	$144.1
Book Value/Share:	$7.97
Cash Per Share:	$6.20
Dividend (ann):	$0.00
Dividend Yield:	0.0%



Dec Yr	1Q	2Q	3Q	4Q	FY Rev	1Q	2Q	3Q	4Q	FY EPS	P/E
2013A	--	--	0.0	0.0	0.0	--	--	($505.45)	($200.00)	($710.00)	NM
2014E - New	**0.0A**	**0.0A**	**0.0A**	**$3.3**	**$3.3**	**($1.02)A**	**($0.64)A**	**($0.63)A**	**($0.52)**	**($2.73)**	**NM**
2014E - Old	0.0A	0.0A	0.0A	$3.3	$3.3	($1.02)A	($0.64)A	($0.73)	($0.55)	($2.81)	NM
2015E - New	**--**	**--**	**--**	**--**	**$1.1**	**--**	**--**	**--**	**--**	**($2.94)**	**NM**
2015E - Old	--	--	--	--	$1.1	--	--	--	--	($2.95)	NM

Source: Company Information and Leerink Partners LLC Research
Revenues in millions.
GAAP EPS; 1Q-3Q:13, 2013, pre-IPO. Quarterly EPS may not total to annual figure due to change in shares outstanding.

Please refer to pages 6 - 8 for Important Disclosures, Price Charts and Analyst Certification.

INVESTMENT THESIS

We rate Dicerna Pharmaceuticals (DRNA) Outperform with a $21/share price target (PT). We believe DRNA is uniquely positioned within the therapeutic RNAi landscape in that it has developed its own proprietary RNAi platform based on Dicer substrates, which we believe are differentiated from other technologies. We believe two key value drivers for DRNA are first-in-man Phase I data expected in late 2015 from its two lead proprietary pipeline products. We believe that data would not only provide early biomarker proof-of-concept for DRNA's first two products but also de-risk DRNA's platform, which should be attractive for potential future partners.
DRNA is uniquely positioned in the RNAi space. DRNA is one of only a few companies that have been able to develop their own proprietary RNAi platform consisting of DsiRNA payloads and a proprietary delivery technology. DRNA's main differentiation from other RNAi technologies is that it is using Dicer substrates as therapeutic siRNA molecules, which allows DRNA to sidestep key patents that represent high barriers to entry in the RNAi space. In addition, we believe DRNA's payloads are generally more potent than traditional siRNAs and allow conjugation of targeting agents potentially allowing subcutaneous and tissue-targeted delivery in the near future. We thus believe DRNA is positioned well to close additional product development partnerships in the near future, which could serve as further validation of its platform.
Proprietary pipeline focused on orphan diseases and oncology with major de-risking events in late 2015. DRNA expects Phase I clinical data in 2H15 for its first two proprietary pipeline drugs, DCR-PH1 and DCR-M1711, which we believe could serve as early proof-of-concept for these products and also de-risk DRNA's platform, in particular with respect to successful human delivery and target knock-down efficiency. In 2015 DRNA also plans to expand its pipeline with one additional drug targeting a genetically defined disease involving the liver. DCR-PH1 is being developed to treat Primary Hyperoxaluria Type 1 (PH1), a rare, genetic disease of the liver with a strong scientific rationale, in our view. DCR-M1711 targets Myc that is being developed initially in liver cancer (HCC) but could potentially have activity across a large number of solid tumor indications. The potential of Myc as a therapeutic target has been recognized for decades, but the undruggable nature of Myc has been a significant barrier to traditional small molecule and antibody-based approaches.

VALUATION

Our $25 price target for DRNA shares in 12 months is based on a discounted cash flow (DCF) sum-of-parts analysis. Based on our DCF analysis, we attribute $18/share to the pipeline and the rest to net cash. We use a 15% discount rate for probability of success-weighted pipeline products. We probability-weight the MYC program at 20% and the PH1 program at 25% probability-of-success. The KRAS program partnered with KHK and additional product candidates generated by DRNA's platform are sources of upside to our valuation.

RISKS TO VALUATION

DRNA faces significant clinical and regulatory risks since all of its product candidates are currently in development. DRNA specifically also faces clinical development risk since none of its products have been tested in humans, and the company is developing first-in-class RNAi-based drugs with a novel proprietary delivery mechanism. In addition to that, DRNA's product candidates address new, clinically invalidated targets. Similar to many other developmental stage Biopharma companies, DRNA also faces manufacturing, competitive, commercial, regulatory, and safety risks, as well as risks to its intellectual property. In addition, DRNA faces financing risk dilutive to shareholders since we don't believe the company will be profitable for the foreseeable future. We see additional risks for investors since the company is closely held and substantially all of DRNA's outstanding shares are not subject to lock-up agreements in connection with its IPO.

DRNA Income Statement	2011	2012	2013	1Q14A	2Q14A	3Q14A	4Q14E	2014E	2015E	2016E
Product revenue	-	-	-	-	-	-	-	-	-	-
License fee and research funding	2.5	-	-	-	-	-	-	-	-	-
Fees, milestones (p/w)	5.0	6.5	-	-	-	-	3.3	3.3	1.1	1.6
Total Revenues	**7.9**	**7.0**	**-**	**-**	**-**	**-**	**3.3**	**3.3**	**1.1**	**1.6**
COGS	-	-	-	-	-	-	-	-	-	-
R&D	10.7	11.6	11.6	5.3	6.8	7.5	7.5	28.0	33.0	55.0
SG&A	4.8	4.7	5.8	2.8	4.4	3.7	5.0	15.9	20.0	22.0
Total costs and expenses	15.5	16.3	17.4	8.1	11.2	11.2	12.5	43.9	53.0	77.0
Operating Income (Loss)	**(7.6)**	**(9.3)**	**(17.4)**	**(8.1)**	**(11.2)**	**(11.2)**	**(9.2)**	**(40.7)**	**(52.0)**	**(75.4)**
Income before taxes	(8.6)	(10.1)	(18.5)	(10.8)	(11.4)	(11.2)	(9.2)	(43.6)	(52.1)	(75.5)
Income tax expense	-	-	-	-	-	-	-	-	-	-
Net income (Loss)	**(8.6)**	**(10.1)**	**(18.5)**	**(10.8)**	**(11.4)**	**(11.2)**	**(9.2)**	**(43.6)**	**(52.1)**	**(75.5)**
Less: accretion and dividends on redeemable convertible preferred stock	(4.1)	(4.1)	(2.4)	(0.2)	-	-	-	(0.2)	-	-
Net loss attributable to common stockholders	(12.7)	(14.2)	(20.9)	(11.0)	(11.4)	(11.2)	(9.2)	(43.8)	(52.1)	(75.5)
EPS	**(493)**	**(516)**	**(710)**	**(1.02)**	**(0.64)**	**(0.63)**	**(0.52)**	**(2.73)**	**(2.94)**	**(3.33)**
Shares outstanding	0.0	0.0	0.0	10.8	17.7	17.7	17.7	16.0	17.7	22.7

BS & CFS	2011	2012	2013	1Q14A	2Q14A	3Q14A	4Q14E	2014E	2015E	2016E
Cash & investments	22.5	3.7	46.6	133.8	120.3	116.0	109.8	109.8	69.2	208.1
Debt	11.6	8.8	4.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0

Change in Cash	(2.1)	(18.8)	42.9	87.2	(56.1)	(8.6)	(6.3)	16.3	(40.6)	138.9
Cash from operations	(8.9)	(15.7)	(10.9)	(6.4)	(7.8)	(8.5)	(6.1)	(28.8)	(40.2)	(60.7)
Net income (loss)	(8.6)	(10.1)	(18.5)	(10.8)	(11.4)	(11.2)	(9.2)	(43.6)	(52.1)	(75.5)
Share based comp	0.2	0.1	0.5	2.2	2.4	1.6	2.0	8.2	6.4	9.2
D&A	0.8	0.8	0.5	0.2	0.1	0.1	0.1	0.4	0.4	0.4
Other (Change in WC)	(1.3)	(6.5)	6.6	2.0	1.0	1.0	1.0	5.1	5.1	5.1
Cash from investing	(0.5)	(0.1)	(0.4)	(0.2)	(44.3)	(0.2)	(0.2)	(44.8)	(1.1)	(1.1)
CapEx	(0.5)	(0.1)	(0.4)	(0.2)	(0.7)	(0.2)	(0.2)	(1.1)	(1.1)	(1.1)
Acquisitions	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	(43.7)	-	-	(43.7)	-	-
Cash from financing	7.3	(3.0)	54.3	93.8	(3.9)	-	-	89.9	0.8	200.8
Equity issue (buyback)	0.1	0.0	57.0	94.1	-	-	-	94.1	-	200.0
Debt issue (principal payment)	8.6	(3.0)	3.0	(1.1)	(3.9)	-	-	(5.0)	-	-
Other	(1.4)	-	(5.7)	0.8	0.0	-	-	0.8	0.8	0.8

Source: Company filings and Leerink Partners Estimates

Pipeline and Upcoming Events			
Product Candidate (proprietary)	**Target**	**Event**	**Timing**
DCR-PH1	HAO1	Initiate Phase I	2015
		Phase I data	4Q15
DCR-M1711	MYC	Phase I data non-HCC	2015
		Initiate Phase I HCC	4Q15
		Phase I HCC data	2015
Undisclosed	Liver/orphan	Initiate Phase I	2015
Product Candidate (KHK partnership)	**Target**	**Event**	**Timing**
Undisclosed	KRAS	Initiate Phase I	2015
		Phase I data	2016
Undisclosed	Cancer	Initiate Phase I	2016
		Phase I data	2017

Source: SEC filings and Leerink Partners estimates

DRNA Valuation (p/w)	POS	P/W NPV	Per Share
Total		**435**	**25**
Pipeline		**319**	**18**
MYC	20%	222	13
PH1	25%	97	5
Cash	100%	116	7

Source: Leerink Partners Estimates

Disclosures Appendix

Analyst Certification

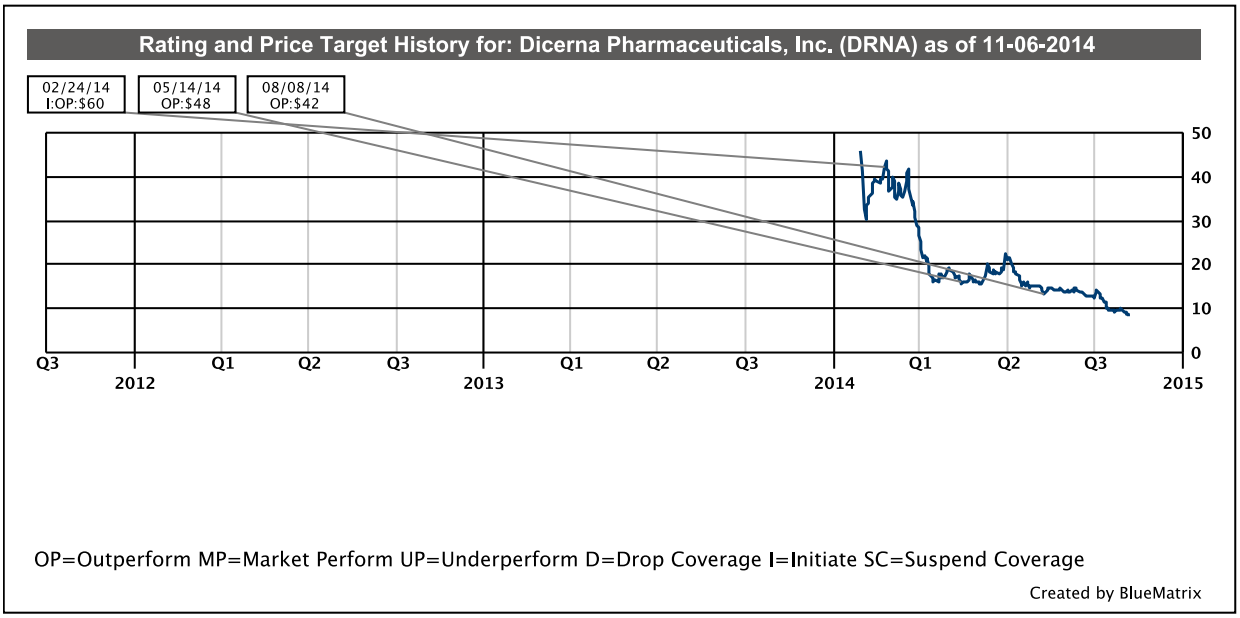
I, Michael Schmidt, Ph.D., certify that the views expressed in this report accurately reflect my views and that no part of my compensation was, is, or will be directly related to the specific recommendation or views contained in this report.

Valuation

Our $25 price target for DRNA shares in 12 months is based on a discounted cash flow (DCF) sum-of-parts analysis. Based on our DCF analysis, we attribute $18/share to the pipeline and the rest to net cash. We use a 15% discount rate for probability of success-weighted pipeline products. We probability-weight the MYC program at 20% and the PH1 program at 25% probability-of-success. The KRAS program partnered with KHK and additional product candidates generated by DRNA's platform are sources of upside to our valuation.

Risks to Valuation

DRNA faces significant clinical and regulatory risks since all of its product candidates are currently in development. DRNA specifically also faces clinical development risk since none of its products have been tested in humans, and the company is developing first-in-class RNAi-based drugs with a novel proprietary delivery mechanism. In addition to that, DRNA's product candidates address new, clinically invalidated targets. Similar to many other developmental stage Biopharma companies, DRNA also faces manufacturing, competitive, commercial, regulatory, and safety risks, as well as risks to its intellectual property. In addition, DRNA faces financing risk dilutive to shareholders since we don't believe the company will be profitable for the foreseeable future. We see additional risks for investors since the company is closely held and substantially all of DRNA's outstanding shares are not subject to lock-up agreements in connection with its IPO.



Distribution of Ratings/Investment Banking Services (IB) as of 09/30/14				
			IB Serv./Past 12 Mos.	
Rating	Count	Percent	Count	Percent
BUY [OP]	138	69.30	51	37.00
HOLD [MP]	61	30.70	2	3.30
SELL [UP]	0	0.00	0	0.00

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.

Important Disclosures

This information (including, but not limited to, prices, quotes and statistics) has been obtained from sources that we believe reliable, but we do not represent that it is accurate or complete and it should not be relied upon as such. All information is subject to change without notice. This is provided for information purposes only and should not be regarded as an offer to sell or as a solicitation of an offer to buy any product to which this information relates. The Firm, its officers, directors, employees, proprietary accounts and affiliates may have a position, long or short, in the securities referred to in this report, and/or other related securities, and from time to time may increase or decrease the position or express a view that is contrary to that contained in this report. The Firm's salespeople, traders and other professionals may provide oral or written market commentary or trading strategies that are contrary to opinions expressed in this report. The Firm's proprietary accounts may make investment decisions that are inconsistent with the opinions expressed in this report. The past performance of securities does not guarantee or predict future performance. Transaction strategies described herein may not be suitable for all investors. Additional information is available upon request by contacting the Editorial Department at One Federal Street, 37th Floor, Boston, MA 02110.

Like all Firm employees, analysts receive compensation that is impacted by, among other factors, overall firm profitability, which includes revenues from, among other business units, Institutional Equities, and Investment Banking. Analysts, however, are not compensated for a specific investment banking services transaction.
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.

In the past 12 months, the Firm has received compensation for providing investment banking services to Dicerna Pharmaceuticals, Inc. .

Leerink Partners LLC makes a market in Dicerna Pharmaceuticals, Inc.

LEERINK

Leerink Partners LLC has acted as the manager for a public offering of Dicerna Pharmaceuticals, Inc. in the past 12 months.

Leerink Partners LLC Equity Research

Director of Equity Research	**John L. Sullivan, CFA**	(617) 918-4875	john.sullivan@leerink.com
Associate Director of Research	**Alice C. Avanian, CFA**	(617) 918-4544	alice.avanian@leerink.com
Healthcare Strategy	**John L. Sullivan, CFA**	(617) 918-4875	john.sullivan@leerink.com
	Alice C. Avanian, CFA	(617) 918-4544	alice.avanian@leerink.com
Biotechnology	**Howard Liang, Ph.D.**	(617) 918-4857	howard.liang@leerink.com
	Joseph P. Schwartz	(617) 918-4575	joseph.schwartz@leerink.com
	Michael Schmidt, Ph.D.	(617) 918-4588	michael.schmidt@leerink.com
	Gena Wang, Ph.D., CFA	(212) 277-6073	gena.wang@leerink.com
	Paul Matteis	(617) 918-4585	paul.matteis@leerink.com
	Jonathan Chang, Ph.D.	(617) 918-4015	jonathan.chang@leerink.com
	Richard Goss	(617) 918-4059	richard.goss@leerink.com
Life Science Tools	**Dan Leonard**	(212) 277-6116	dan.leonard@leerink.com
and Diagnostics	Justin Bowers, CFA	(212) 277-6066	justin.bowers@leerink.com
Pharmaceuticals/Major	**Seamus Fernandez**	(617) 918-4011	seamus.fernandez@leerink.com
	Ario Arabi	(617) 918-4568	ario.arabi@leerink.com
	Aneesh Kapur	(617) 918-4576	aneesh.kapur@leerink.com
Specialty Pharmaceuticals	**Jason M. Gerberry, JD**	(617) 918-4549	jason.gerberry@leerink.com
	Derek C. Archila	(617) 918-4851	derek.archila@leerink.com
Medical Devices, Cardiology	**Danielle Antalffy**	(212) 277-6044	danielle.antalffy@leerink.com
	Puneet Souda	(212) 277-6091	puneet.souda@leerink.com
& Orthopedics	**Richard Newitter**	(212) 277-6088	richard.newitter@leerink.com
	Ravi Misra	(212) 277-6049	ravi.misra@leerink.com
Healthcare Services	**Ana Gupte, Ph.D.**	(212) 277-6040	ana.gupte@leerink.com
Healthcare Technology	**David Larsen, CFA**	(617) 918-4502	david.larsen@leerink.com
& Distribution	Christopher Abbott	(617) 918-4010	chris.abbott@leerink.com
Digital Health	**Steven Wardell**	(617) 918-4097	steven.wardell@leerink.com
Sr. Editor/Supervisory Analyst	**Mary Ellen Eagan, CFA**	(617) 918-4837	maryellen.eagan@leerink.com
Supervisory Analysts	Robert Egan		bob.egan@leerink.com
	Amy N. Sonne		amy.sonne@leerink.com
Editorial	Cristina Diaz-Dickson	(617) 918-4548	cristina.diaz-dickson@leerink.com
Research Associate	Carmen Augustine	(212) 277-6012	carmen.augustine@leerink.com

New York
299 Park Avenue, 21st floor
New York, NY 10171
(888) 778-1653

Boston
One Federal Street, 37th Floor
Boston, MA 02110
(800) 808-7525

San Francisco
201 Spear Street, 16th Floor
San Francisco, CA 94105
(800) 778-1164