Zacks Small-Cap Research
Sponsored – Impartial - Comprehensive

July 11, 2019
David Bautz, PhD
(312) 265-9471
dbautz@zacks.com

scr.zacks.com
10 S. Riverside Plaza, Chicago, IL 60606

Medicenna Therapeutics Corp. (T.MDNA-TSX)

T.MDNA: MDNA109 Shows Synergy with Checkpoint Inhibitors in Preclinical Models…

Based on our probability adjusted DCF model that takes into account potential future revenues of MDNA55 and MDNA109, MDNA.T is valued at CAD$5.00/share. This model is highly dependent upon continued clinical success of those compounds and will be adjusted accordingly based upon future clinical results.

Current Price (07/11/19)	CAD$1.50
Valuation	**CAD$5.00**

INITIATION

In June 2019, Medicenna Therapeutics Corp. (MDNA.TO) presented new preclinical data for its lead IL-2 Superkine program, MDNA109, in a poster session at the Inaugural Immuno-Oncology Pharma Congress. The data showed that treatment with long-acting versions of MDNA109 resulted in durable tumor control, a strong memory response, and the potential for weekly dosing. These data strongly support the continued development of MDNA109 and show the potential for its use with checkpoint inhibitor therapy.

SUMMARY DATA

52-Week High	**$2.38**
52-Week Low	**$0.64**
One-Year Return (%)	**13.64**
Beta	**1.54**
Average Daily Volume (sh)	**55,70**
Shares Outstanding (mil)	**29**
Market Capitalization ($mil)	**$44**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**0**
Insider Ownership (%)	**N/A**
Annual Cash Dividend	**$0.00**
Dividend Yield (%)	**0.00**
5-Yr. Historical Growth Rates	
Sales (%)	**N/A**
Earnings Per Share (%)	**N/A**
Dividend (%)	**N/A**
P/E using TTM EPS	**N/A**
P/E using 2018 Estimate	**N/A**
P/E using 2019 Estimate	**N/A**

Risk Level	**High**
Type of Stock	**Small-Value**
Industry	**Med-Biomed/Gene**

ZACKS ESTIMATES

Revenue
(In millions of $CAD)

	Q1 (Jun)	Q2 (Sep)	Q3 (Dec)	Q4 (Mar)	Year (Mar)
2019	0 A	0 A	0 A	0 A	0 A
2020	0 E	0 E	0 E	0 E	0 E
2021					0 E
2022					0 E

Earnings per Share

	Q1 (Jun)	Q2 (Sep)	Q3 (Dec)	Q4 (Mar)	Year (Mar)
2019	-$0.04 A	- $0.04 A	-$0.07 A	-$0.04 A	-$0.18 A
2020	-$0.04 E	-$0.04 E	-$0.04 E	-$0.04 E	-$0.17 E
2021					-$0.15 E
2022					-$0.14 E

© Copyright 2019, Zacks Investment Research. All Rights Reserved.

WHAT'S NEW

Business Update

MDNA109 Long Acting Variants Show Synergism with Checkpoint Inhibitors

On June 20, 2019, Medienna Therapeutics Corp. (MDNA) announced the presentation of new preclinical data for long-acting versions of the company's lead IL-2 Superkine program, MDNA109, in a poster session at the inaugural Immuno-Oncology Pharma Congress.

MDNA109 is an engineered version of IL-2 designed to increase the ability of T cells to fight cancer. IL-2 (Proleukin®) was one of the first cancer immunotherapies approved by the FDA based on data showing a 16% ORR in patients with metastatic melanoma (Atkins *et al*., 2000). IL-2 activates a wide range of leukocytes, including T cells and natural killer (NK) cells. While effective as an anti-cancer agent, its use has been limited by a range of adverse side effects, including the potentially deadly capillary leak syndrome, as well as its necessity for frequent dosing and ability to stimulate regulatory T cells along with effector T cells (Boyman *et al*., 2012).

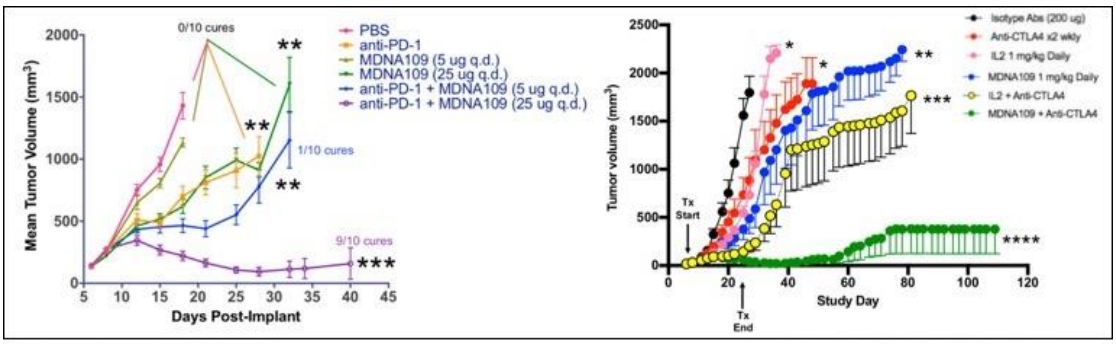
IL-2 is a 16 kDa protein that exerts its effects through binding various IL-2Rs (IL-2Rα, IL-2Rβ, and IL-2Rγ), with the arrangement of these receptors dictating the response seen. Binding of IL-2 to a heterodimer consisting of IL-2Rβ and IL-2Rγ is relatively 'low affinity', whereas a heterotrimer consisting of all three IL-2Rs is a 'high affinity' complex. The heterotrimer is typically found on activated T cells (including regulatory T cells) while naïve T cells and NK cells only express the heterodimer. Thus, modifying IL-2 signaling to enhance binding to the β–γ complex could enhance T cell activation while diminishing the effect of regulatory T cells.

An engineered version of IL-2 that exhibited increased affinity to IL-2Rβ was first described in 2012 (Levin *et al*., 2012). The researchers used *in vitro* evolution in which point mutations were randomly created in the IL-2 coding sequence, with each of the mutated versions of IL-2 tested for IL-2Rβ affinity. Following the first round of *in vitro* evolution, a predominant IL-2 variant was identified containing a L85V mutation in the hydrophobic core of the protein, and not a direct IL-2Rβ contact residue. For the second round of *in vitro* evolution, mutations were restricted to six amino acids in the hydrophobic core. The following table shows the consensus sequence that resulted in the identification of MDNA109 (denoted as H9 in the table), which exhibited high affinity binding to IL-2Rβ.

									Affinity for IL-2Rβ		
residue #	**74**	**80**	**81**	**85**	**86**	**89**	**92**	**93**	**K_d(nM)**	**k_{on}(1/ms)**	**k_{off}(1/s)**
WT hIL-2	Q	L	R	L	I	I	I	V	280	$7.9x10^5$	0.22
6-6			I	V					49	$1.2x10^6$	0.061
D10	H	F	D	V	V		F		1.3	$4.1x10^6$	0.0051
H9		F	D	V	V		F		1.4	$4.1x10^6$	0.0056
CONSENSUS		F	D	V	V		F				

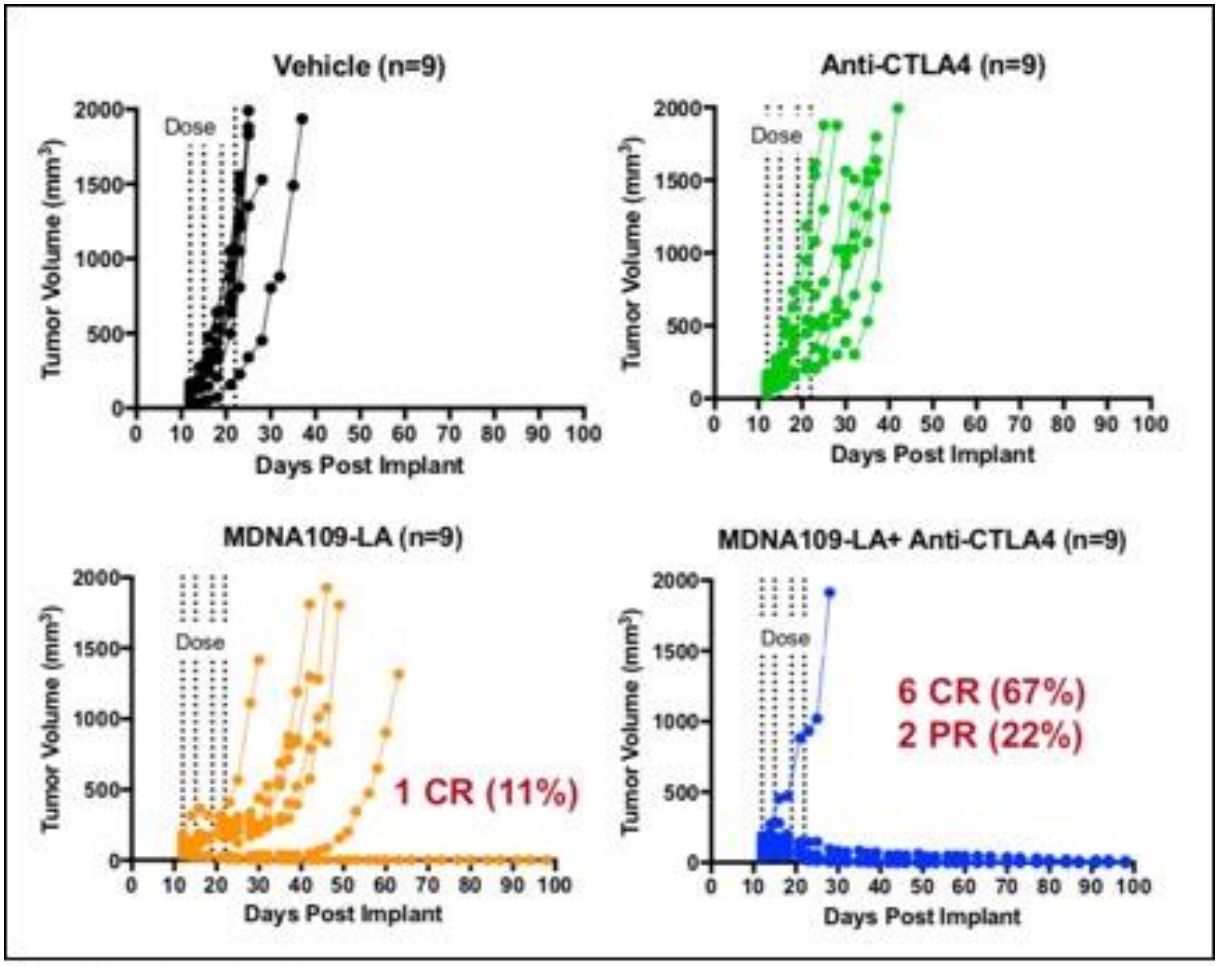
Source: Levin *et al*., 2012

MDNA109 shows excellent *in vivo* synergism with the checkpoint inhibitor (CPI) antibodies targeted against PD-1 and CTLA-4. The following figures show synergistic anti-tumor activity of MDNA109 when combined with anti-PD-1 in a syngeneic M38 murine colon cancer model (left panel) and also when combined with anti-CTLA-4 in a CT26 colon cancer model (right panel).



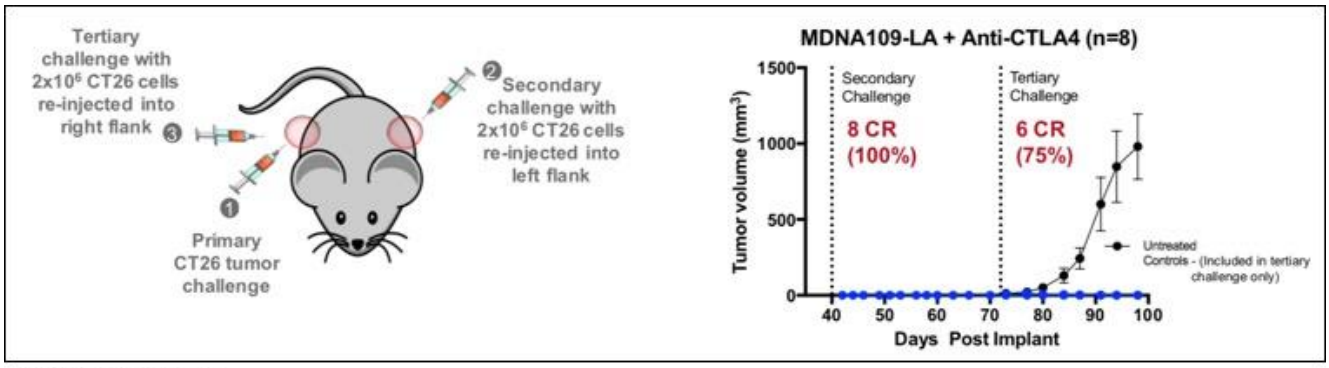
Source: Medicenna Therapeutics Corp.

The new data presented by Medicenna has to do with the production of long-acting versions of MDNA109, MDNA109-LA and MDNA-LA1 (which has low IL-2Rα affinity). MDNA109-LA was shown to synergize with anti-CTLA-4 therapy in a CT26 colon cancer mouse model, as shown in the following figures. MDNA109-LA treatment showed minimal activity as a monotherapy (1 complete response [CR] out of 9 mice treated), however the combo therapy of MDNA109-LA and anti-CTLA-4 resulted in 6 CR and 2 partial responses (PR) out of 9 mice treated.



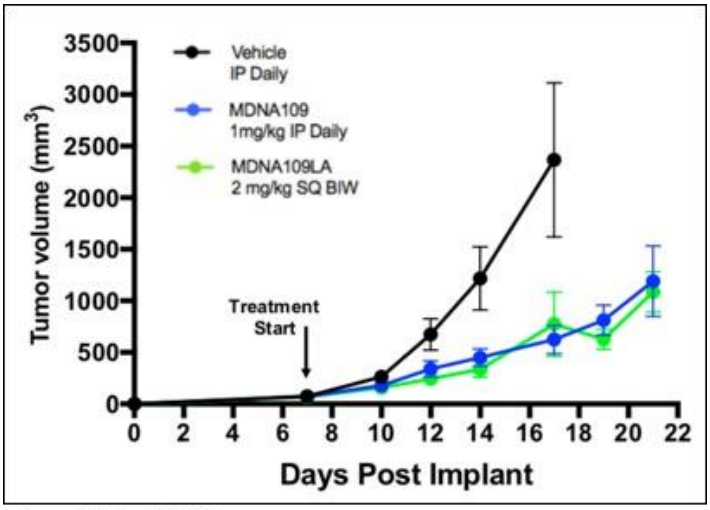
Source: Rafei *et al.*, 2019

MDNA109-LA treatment results in immunological memory as shown by tumor rejection upon re-challenge. The following figure shows the experimental design for tumor re-challenge in mice that achieved a CR upon treatment with MDNA109-LA and anti-CTLA-4 following injection with CT26 tumor cells. All mice maintained a CR upon the secondary challenge and 75% maintained a CR on the tertiary challenge. Note that there was no additional treatment with MDNA109-LA following the secondary or tertiary tumor challenges.



Source: Rafei *et al.*, 2019

In addition, MDNA109-LA exhibits superior pharmacokinetics (PK) compared to MDNA109. The following figure shows that MDNA109-LA gives similar tumor control in an aggressive B16F10 melanoma tumor model when dosed biweekly compared to MDNA109 dosed daily. Finally, MDNA109-LA1, with reduced binding to CD25, achieved similar tumor control with a weekly dosing schedule, which is similar to what is seen with other long-acting IL-2 variants in development, such as Nektar Therapeutics' NKTR-214.



Source: Rafei *et al.*, 2019

Financial Update

On June 25, 2019, Medicenna announced financial results for fiscal year 2019 ending March 31, 2019. The company reported a net loss for fiscal year 2019 of CAD$4.7 million, or CAD$0.18 per share, compared to a net loss of CAD$7.5 million, or CAD$0.31 per share, for fiscal year 2018. R&D expenses in fiscal 2019 were CAD$3.0 million compared to CAD$5.1 million in fiscal 2018. The decrease was primarily due to decreased regulatory costs, clinical trial costs, salaries and benefits, and stock-based compensation. G&A expenses in fiscal 2019 were CAD$1.7 million compared to CAD$2.3 million in fiscal 2018. The decrease was primarily due to lower stock-based compensation and reduced legal, professional, and finance expenses.

Medicenna exited fiscal 2019 with approximately CAD$2.4 million in cash and cash equivalents. In May 2019 and July 2019, the company received payments of US$0.76 million (approximately CAD$1.02 million) and US$1.9 million (approximately CAD$2.5 million), respectively, from the Cancer Prevention and Research Institute of Texas (CPRIT), which are part of a US$14.1 million grant related to the development of MDNA55. Medicenna has approximately US$1.4 million remaining on the grant. The company also recently received approximately CAD$0.3 million from the exercise of warrants. We estimate that the company has sufficient capital to fund operations through the end of 2019.

Medicenna has approximately 28.8 million shares outstanding and when factoring in the approximately 3.3 million stock options and 5.1 million warrants a fully diluted share count of approximately 37.2 million.

Conclusion

Medicenna continues to produce encouraging data with its pipeline candidates, and we are excited for the potential of MDNA109 based on its synergism with checkpoint inhibitor therapy in preclinical models. We look forward to additional updates on the MDNA109 program later in 2019. We also anticipate an update on the MDNA55 program following the company's 'end-of-Phase 2' meeting with the FDA in the second half of 2019 and the potential for 12-month survival data in the first quarter of 2020. We are maintaining our valuation of CAD$5.00 per share.

PROJECTED FINANCIALS

Medicenna Therapeutics Corp.
Income Statement

Medicenna Therapeutics Corp. In Canadian Dollars	**FY 2019 A**	**Q1 FY20 E**	**Q2 FY20 E**	**Q3 FY20 E**	**Q4 FY20 E**	**FY 2020 E**	**FY 2021 E**	**FY 2022 E**
MDNA55	$0	$0	$0	$0	$0	$0	$0	$0
YOY Growth	-	-	-	-	-	-	-	-
MDNA109	$0	$0	$0	$0	$0	$0	$0	$0
YOY Growth	-	-	-	-	-	-	-	-
Other Income	$0	$0	$0	$0	$0	$0	$0	$0
YOY Growth	-	-	-	-	-	-	-	-
Total Revenues	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
YOY Growth	-	-	-	-	-	-	-	-
Cost of Sales	$0	$0	$0	$0	$0	$0	$0	$0
Product Gross Margin	-	-	-	-	-	-	-	-
Research & Development	$3.0	$0.7	$0.9	$1.0	$1.1	$3.7	$4.0	$4.1
General & Administrative	$1.7	$0.4	$0.4	$0.4	$0.4	$1.7	$2.0	$2.2
Other (Income) Expense	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Operating Income	($4.7)	($1.1)	($1.3)	($1.4)	($1.5)	($5.4)	($6.0)	($6.3)
Operating Margin	-	-	-	-	-	-	-	-
Non-Operating Expenses (Net)	($0.0)	($0.0)	$0.0	($0.0)	$0.0	$0.0	$0.0	$0.0
Pre-Tax Income	($4.7)	($1.1)	($1.4)	($1.4)	($1.5)	($5.4)	($6.0)	($6.3)
Income Taxes	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Cumulative translation adjustment	$0.0	$0.0	$0.0	$0.1	$0.0	$0.0	$0.0	$0.0
Net Income	**($4.7)**	**($1.1)**	**($1.4)**	**($1.4)**	**($1.5)**	**($5.4)**	**($6.0)**	**($6.3)**
Net Margin	-	-	-	-	-	-	-	-
Reported EPS	**($0.18)**	**($0.04)**	**($0.04)**	**($0.04)**	**($0.04)**	**($0.17)**	**($0.15)**	**($0.14)**
YOY Growth	-	-	-	-	-	-	-	-
Basic Shares Outstanding	25.7	28.5	33.0	33.3	35.0	32.5	40.0	45.0

Source: Zacks Investment Research, Inc. *David Bautz, PhD*

© Copyright 2019, Zacks Investment Research. All Rights Reserved.

HISTORICAL STOCK PRICE



© Copyright 2019, Zacks Investment Research. All Rights Reserved.

DISCLOSURES

The following disclosures relate to relationships between Zacks Small-Cap Research ("Zacks SCR"), a division of Zacks Investment Research ("ZIR"), and the issuers covered by the Zacks SCR Analysts in the Small-Cap Universe.

ANALYST DISCLOSURES

I, David Bautz, PhD, hereby certify that the view expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the recommendations or views expressed in this research report. I believe the information used for the creation of this report has been obtained from sources I considered to be reliable, but I can neither guarantee nor represent the completeness or accuracy of the information herewith. Such information and the opinions expressed are subject to change without notice.

INVESTMENT BANKING AND FEES FOR SERVICES

Zacks SCR does not provide investment banking services nor has it received compensation for investment banking services from the issuers of the securities covered in this report or article.
Zacks SCR has received compensation from the issuer directly or from an investor relations consulting firm engaged by the issuer for providing non-investment banking services to this issuer and expects to receive additional compensation for such non-investment banking services provided to this issuer. The non-investment banking services provided to the issuer includes the preparation of this report, investor relations services, investment software, financial database analysis, organization of non-deal road shows, and attendance fees for conferences sponsored or co-sponsored by Zacks SCR. The fees for these services vary on a per-client basis and are subject to the number and types of services contracted. Fees typically range between ten thousand and fifty thousand dollars per annum. Details of fees paid by this issuer are available upon request.

POLICY DISCLOSURES

This report provides an objective valuation of the issuer today and expected valuations of the issuer at various future dates based on applying standard investment valuation methodologies to the revenue and EPS forecasts made by the SCR Analyst of the issuer's business.
SCR Analysts are restricted from holding or trading securities in the issuers that they cover. ZIR and Zacks SCR do not make a market in any security followed by SCR nor do they act as dealers in these securities. Each Zacks SCR Analyst has full discretion over the valuation of the issuer included in this report based on his or her own due diligence. SCR Analysts are paid based on the number of companies they cover. SCR Analyst compensation is not, was not, nor will be, directly or indirectly, related to the specific valuations or views expressed in any report or article.

ADDITIONAL INFORMATION

Additional information is available upon request. Zacks SCR reports and articles are based on data obtained from sources that it believes to be reliable, but are not guaranteed to be accurate nor do they purport to be complete. Because of individual financial or investment objectives and/or financial circumstances, this report or article should not be construed as advice designed to meet the particular investment needs of any investor. Investing involves risk. Any opinions expressed by Zacks SCR Analysts are subject to change without notice. Reports or articles or tweets are not to be construed as an offer or solicitation of an offer to buy or sell the securities herein mentioned.

This research report is a product of Zacks SCR and prepared by a research analyst who is employed by or is a consultant to Zacks SCR. The research analyst preparing the research report is a resident outside of Canada and is not an associated person of any Canadian registered adviser and/or dealer and, therefore, the analyst is not subject to supervision by a Canadian registered adviser and/or dealer, and is not required to satisfy the regulatory licensing requirements of any Canadian provincial securities regulators, the Investment Industry Regulatory Organization of Canada and is not required to otherwise comply with Canadian rules or regulations.