Zacks Small-Cap Research
Sponsored – Impartial - Comprehensive

March 30, 2020
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: Encouraging MDNA19 Data in Non-Human Primates; Financing Funds Company Through End of 2022…

Based on our probability adjusted DCF model that takes into account potential future revenues of MDNA55 and MDNA19, MDNA.T is valued at CAD$13/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 (03/30/20)	CAD$3.18
Valuation	**CAD$13.00**

OUTLOOK

On March 25, 2020, Medicenna Therapeutics Corp. (MDNA) announced encouraging results from the company's preclinical data, including non-human primate (NHP) data, for its lead Superkine program MDNA19. Highlights from the studies show that MDNA19 leads to absolute increases in circulating CD8 T cells with no stimulation of Treg cells or eosinophils. While other companies have developed modified IL-2 molecules that have reduced binding to CD25, only MDNA19 has both no affinity to CD25 with enhanced affinity to CD122.

The company also recently announced the closing of a CAD$35 million overnight marketed offering of common shares, in which the company is selling 11,290,323 shares at a price of CAD$3.10 per share. We anticipate net proceeds of approximately CAD$32.6 million, not considering the 30-day over-allotment for the agents to sell up to an additional 15% of the number of offered shared.

SUMMARY DATA

52-Week High	**$4.86**
52-Week Low	**$0.64**
One-Year Return (%)	**294**
Beta	**2.17**
Average Daily Volume (sh)	**174,840**
Shares Outstanding (mil)	**46**
Market Capitalization ($mil)	**$146**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**25**
Insider Ownership (%)	**33**
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 A	0 A	0 A	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	-$0.05 A	-$0.07 A	-$0.07 A	-$0.04 E	-$0.23 E
2021					-$0.15 E
2022					-$0.14 E

© Copyright 2020, Zacks Investment Research. All Rights Reserved.

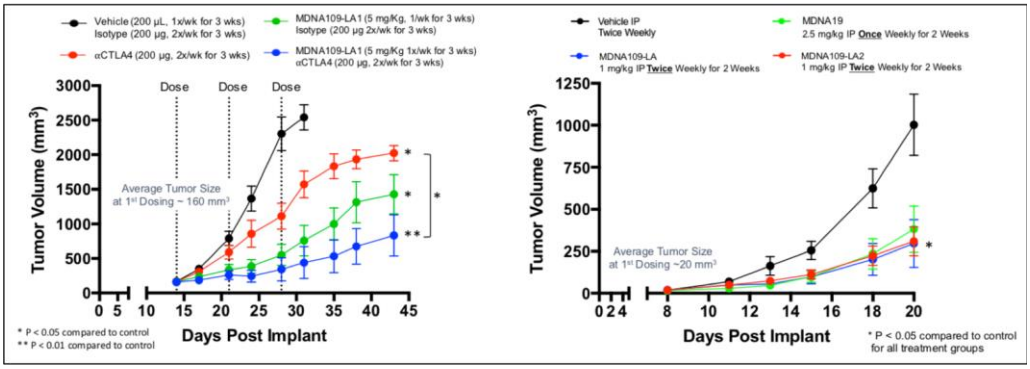
WHAT'S NEW

Business Update

On March 25, 2020, Medicenna Therapeutics Corp. (MDNA) announced encouraging results from the company's preclinical studies on MDNA19, the lead 'Superkine' program. MDNA19 is a long-acting variant of IL-2 that is engineered to have enhanced binding to CD122 with no affinity for CD25.

IL-2 is a 16 kDa protein that activates a wide range of leukocytes, including T cells and natural killer (NK) cells through binding IL-2 receptors (IL-2Rα [CD25], IL-2Rβ [CD122], and IL-2Rγ [CD132]), with the arrangement of these receptors dictating the response seen. Binding of IL-2 to a heterodimer consisting of CD122 and CD132 is of "intermediate 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 CD122/CD132 complex could enhance T cell activation while diminishing the effect of regulatory T cells. An enhanced version of IL-2 that exhibited increased affinity to CD122 was first described in 2012 (Levin *et al*., 2012) and additional work has yielded a family of long-acting 'IL-2 Superkines' with enhanced features compared to IL-2.

Medicenna previously presented preclinical data for MDNA19 at the International Cancer Immunotherapy Conference in Sep. 2019 that showed the compound has no affinity for CD25, enhanced affinity for CD122, and is active as both a monotherapy and in combination with checkpoint inhibitors. The following figure on the left shows decreased tumor growth in mice treated with MDNA19 (green line) and enhanced anti-tumor activity when MDNA19 is administered along with an α-CTLA4 antibody (blue line). The figure on the right shows that MDNA19 achieves similar efficacy to other MDNA109 family members with less frequent dosing in an aggressive B16F10 melanoma mouse model.



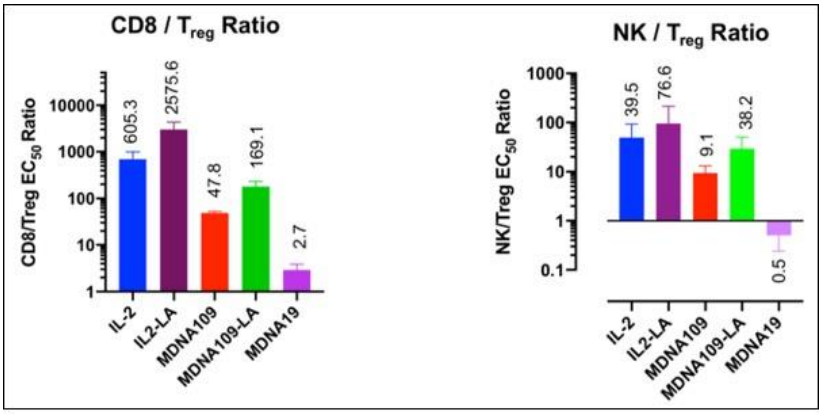
Source: Rafei *et al*., 2019

New data presented for MDNA19 showed affinity values for CD25 and CD122 for IL-2, NKTR-214, THOR-707, and MDNA19. The following table shows that MDNA19 has no affinity for CD25 (i.e., it does not bind at all) and the highest affinity (i.e., lowest value) binding to CD122 of all the IL-2 compounds examined. MDNA109 and MDNA109-LA are second generation compounds that have enhanced binding to CD122 but were not optimized to eliminate binding to CD25.

	K_D [CD25 (IL-2Rα)]	K_D [CD122 (IL-2Rβ)]
IL-2	25 nM	586 nM
IL2-LA	26 nM	135 nM
NKTR-214 (1-PEG)[1]	190 nM	1770 nM
THOR-707[2]	No binding	> IL-2
Neo-2/15[3]	No binding	11.2 nM
MDNA109	52 nM	8 nM
MDNA109-LA	14 nM	2.7 nM
MDNA19	**No binding**	**2.1 nM**

Source: Medicenna Therapeutics Corp.

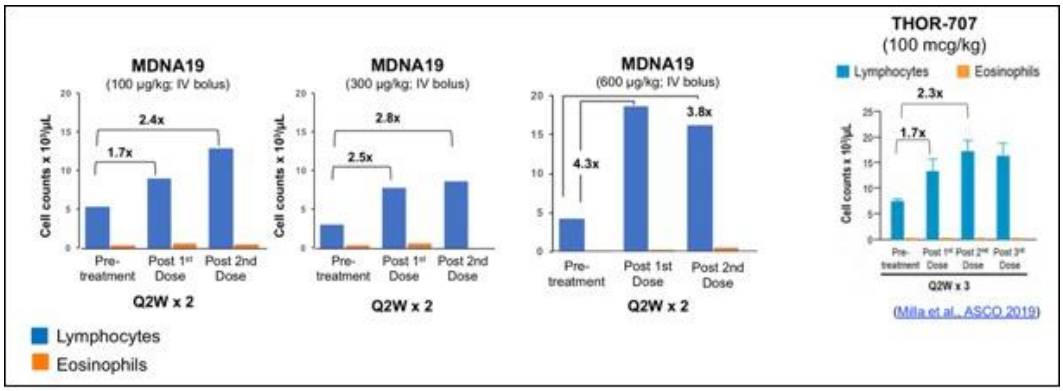
The following figure shows EC50 ratios for CD8 and Treg cells (lower left) and for NK and Treg cells (lower right). The EC50 is the half maximal concentration that gives a desired response, thus in this case the lower the EC50 then the greater the activity of the IL-2 molecule. So the CD8/Treg ratio is inversely related to the activity for the tested compound. The data shows that in comparison to IL-2 or the second generation MDNA109, MDNA19 has greater activity on CD8 and NK cells compared to Treg cells.



Source: Medicenna Therapeutics Corp.

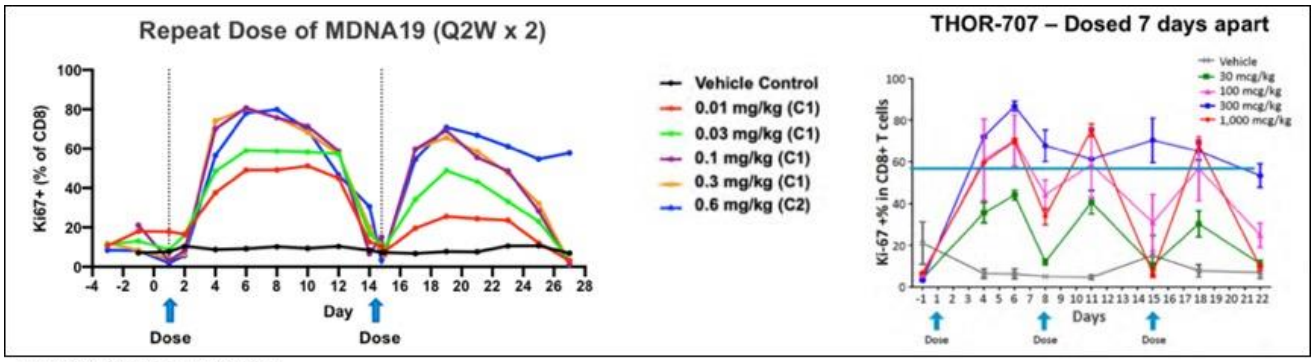
For the NHP studies, a group of cynomolgus monkeys received two doses of MDNA19 14 days apart and were monitored for 28 days. One monkey each received 0.01, 0.03, 0.1, 0.3 or 0.6 mg/kg and study measurements included clinical observations, clinical chemistry, hematology, immune profiling, pharmacokinetics, and chemokine/cytokine profiling.

The following figure shows a dose response relationship between MDNA19 and the amount of lymphocyte expansion compared to pre-treatment. Data for THOR-707 dosed at 0.1 mg/kg is very similar to the same dose of MDNA19 (Milla *et al*., 2019), while increased doses of MDNA19 result in even greater proliferation of lymphocytes. Importantly, the expansion of lymphocytes is not coupled with expansion of eosinophils, which can contribute to the serious side effects of using native IL-2, including vascular leak syndrome.



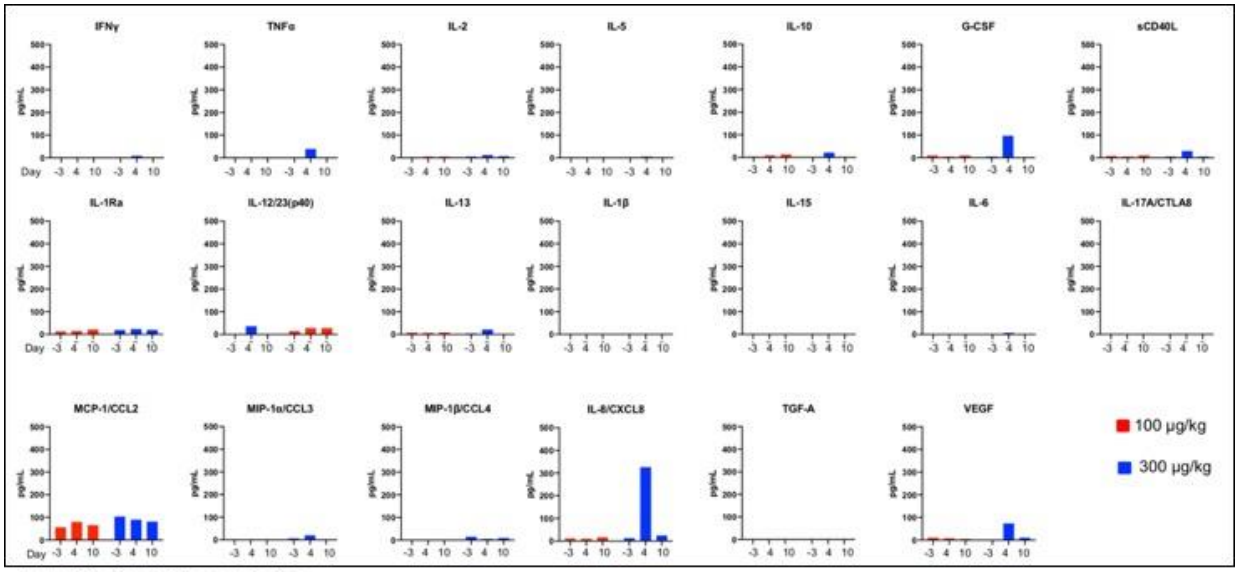
Source: Medicenna Therapeutics Corp.

In addition to looking at absolute cell counts, Medicenna also examined the percentage of CD8+ T cells that expressed Ki67, a marker of proliferation (Scholzen *et al*., 2000). The following graph on the left shows that following a dose of MDNA19 the percentage of T cells expressing Ki67 increases in a dose-dependent fashion before returning to baseline approximately two weeks later. A second dose of MDNA19 gives the same result. It is quite similar to what is seen following dosing of THOR-707, which also induces expression of Ki67 in a similar manner (lower right). However, the duration of the effect (examined by looking at the blue horizontal line in the THOR-707 chart) with MDNA19 is longer than that observed with THOR-707.



Source: Medicenna Therapeutics Corp.

One potential complication of immunotherapy is the generation of a 'cytokine storm' or a sudden and rapid increase in cytokines and chemokines in the bloodstream that can result in serious side effects. The following graphs show that there does not appear to be any significant sustained increase (with the exception of a transient increase in IL-8 following the 0.3 mg/kg dose) in the cytokines and chemokines tested following a single dose of 0.1 mg/kg and 0.3 mg/kg MDNA19.



Source: Medicenna Therapeutics Corp.

Lastly, the company showed the pharmacokinetic (PK) parameters for various IL-2 agents, and in particular showed that MDNA19 and THOR-707 have a very similar profile. In regards to safety, Medicenna reported that there was no change in body weight, which could indicate an adverse event(s) that was not readily apparent, or any change in blood pressure, which would be a sign of vascular leak syndrome.

End-of-Phase 2 Meeting for MDNA55 in 2Q20

Medicenna will be conducting an 'End-of-Phase 2' meeting with the U.S. FDA in the second quarter of 2020 regarding the regulatory path forward for MDNA55. At this meeting the company will present all of the data compiled from the Phase 2b trial of MDNA55 in patients with recurrent glioblastoma (rGBM), a population for which few if any effective treatment options exist.

We anticipate the following to be topics of discussion at the meeting:

- Is there a path for accelerated approval for MDNA55 in patients with high expression of IL-4R?
- Does the FDA want a Phase 3 trial conducted or to just expand the number of patients in the Phase 2b trial?
- If a Phase 3 trial is required, what will the control arm look like? Will Medicenna be able to use a synthetic control arm?

The company will likely announce the outcome of the meeting following receipt of the official minutes, which we anticipate being in late-2020.

Highly Encouraging Results for MDNA55 When Comparing with Synthetic Control Arm

In January 2020, Medicenna announced encouraging data for the company's Phase 2b clinical trial of MDNA55, an IL-4 targeted toxin, in patients with recurrent glioblastoma (rGBM) when compared to an eligibility-matched arm of control subjects (n=81) who were treated with approved therapies, including Avastin®, lomustine, and temozolomide. The control subjects had similar baseline features as patients treated with MDNA55 including *de novo* grade IV GBM at 1st or 2nd relapse following standard 1st-line treatments with surgery and radio-chemotherapy, tumors between 1 cm x 1 cm to 4 cm x 4 cm, Karnofsky Performance Status (KPS) of ≥ 70, not eligible for surgery/resection at relapse, and no known mutations of IDH1 and/or IDH2. In this study, survival results for both arms were computed from the date of relapse rather than from the date of treatment, which was how results were previously reported by the company.

The results showed that:

- Median overall survival (mOS) for patients with high expression of IL-4R was 15.8 months for the MDNA55-treated cohort (n=21) compared to 6.2 months for the control arm (n=17).
    - Note: Medicenna only had access to 40 archived tissue samples for the control arm, thus the percentage of patients in that arm who had high expression of IL-4R (43%) was similar to that seen in the Phase 2b trial (48%).
- For patients with high expression of IL-4R, 12-month OS for the MDNA55-treated cohort was 62% compared to 24% for the control arm.
- When considering all patients, mOS in the MDNA55-treated cohort was 12.4 months compared to 7.7 months in the control arm.
- When considering all patients, 12-month OS for the MDNA55-treated cohort was 53% compared to 25% for the control arm.

We believe this data is very compelling, particularly for those patients with high expression of IL-4R and we eagerly await word on the regulatory path forward following the 'End-of-Phase 2' meeting.

Financial Update

On March 17, 2020, Medicenna announced the closing of a CAD$35 million public offering of common shares. The company issued 11,290,323 shares at a price of $3.10 per share. We estimate net proceeds of approximately CAD$32.6 million, however this does not take into consideration the 30-day over-allotment option to sell up to an additional 15% of the number of offered shares, which could result in additional gross proceeds of CAD$5.25 million.

We estimate that the company is now funded through the end of 2022 and most importantly has sufficient capital to generate first-in-human clinical data for MDNA19. In addition, following the financing we believe the company will qualify for an eventual listing on the Nasdaq through the multijurisdictional disclosure system (MJDS) and that efforts toward a Nasdaq listing will commence shortly. We estimate shares in Medicenna could begin trading on the Nasdaq in the Fall of 2020.

Valuation and Conclusion

The NHP data presented by Medicenna is very encouraging as MDNA19 clearly has a number of attributes that could make it a 'best-in-class' compound. Given that SynthoRx was acquired by Sanofi for $2.5 billion, and the fact that MDNA19 is comparable in many ways to THOR-707 and superior in others, we find Medicenna's current approximately $100 million market cap to grossly undervalue the company. This doesn't even take into account the potential for MDNA55, which we anticipate an update on in mid-2020. The coronavirus-induced sell-off in the market has created a number of outstanding buying opportunities, and we would put Medicenna near the top of that list. Our current valuation is CAD$13.

PROJECTED FINANCIALS

Medicenna Therapeutics Corp.
Income Statement

Medicenna Therapeutics Corp. In Canadian Dollars	FY 2019 A	Q1 FY20 A	Q2 FY20 A	Q3 FY20 A	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	$0.8	$1.2	$1.7	$1.1	$4.8	$4.0	$4.1
General & Administrative	$1.7	$0.5	$0.6	$0.7	$0.4	$2.2	$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)	($1.3)	($1.9)	($2.4)	($1.5)	($7.1)	($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)	($1.3)	($1.9)	($2.4)	($1.5)	($7.1)	($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	$0.0	$0.0	$0.0	$0.0	$0.0
Net Income	**($4.7)**	**($1.3)**	**($1.9)**	**($2.4)**	**($1.5)**	**($7.1)**	**($6.0)**	**($6.3)**
Net Margin	-	-	-	-	-	-	-	-
Reported EPS	**($0.18)**	**($0.05)**	**($0.07)**	**($0.07)**	**($0.05)**	**($0.23)**	**($0.15)**	**($0.14)**
YOY Growth	-	-	-	-	-	-	-	-
Basic Shares Outstanding	25.7	28.6	28.8	33.2	33.2	31.0	40.0	45.0

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

© Copyright 2020, Zacks Investment Research. All Rights Reserved.

HISTORICAL STOCK PRICE



© Copyright 2020, 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.

CANADIAN COVERAGE

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.