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# Medicenna Therapeutics Corp. (T.MDNA-TSX)

***T.MDNA: 'End of Phase 2' Meeting for MDNA55 in September 2020…***

Based on our probability adjusted DCF model that takes into account potential future revenues of MDNA55 and MDNA11, MDNA.T is valued at CAD$15/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 (08/07/20) | CAD$5.65 |
| **Valuation** | **CAD$15.00** |

## OUTLOOK

On August 4, 2020, Medicenna Therapeutics Corp. (MDNA) announced financial results for the first quarter of fiscal year 2021 that ended June 30, 2020 and provided a business update. The company will be holding an 'End-of-Phase 2' meeting with the FDA on Sep. 29, 2020 to obtain guidance on the regulatory path forward for MDNA55. We anticipate the meeting minutes being available in the fourth quarter of calendar 2020. We anticipate IND-enabling studies to commence in this quarter for MDNA11, the company's lead IL-2 super-agonist such that an IND can be filed in the first half of 2021. Lastly, the company has applied to list its shares on the Nasdaq stock exchange and we expect trading to begin during the third quarter of calendar 2020.

## SUMMARY DATA

| | |
|---|---|
| **52-Week High** | **$7.25** |
| **52-Week Low** | **$0.94** |
| **One-Year Return (%)** | **334** |
| **Beta** | **0.44** |
| **Average Daily Volume (sh)** | **88,120** |
| **Shares Outstanding (mil)** | **48.8** |
| **Market Capitalization (C$mil)** | **$276** |
| **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** | **Above Avg.** |
| **Type of Stock** | **Small-Growth** |
| **Industry** | **Med-Biomed/Gene** |

## ZACKS ESTIMATES

**Revenue**
(In millions of $CAD)

| | Q1 (Jun) | Q2 (Sep) | Q3 (Dec) | Q4 (Mar) | Year (Mar) |
|---|---|---|---|---|---|
| 2020 | 0 A | 0 A | 0 A | 0 A | 0 A |
| 2021 | 0 A | 0 E | 0 E | 0 E | 0 E |
| 2022 | | | | | 0 E |
| 2023 | | | | | 0 E |

**Earnings per Share**

| | Q1 (Jun) | Q2 (Sep) | Q3 (Dec) | Q4 (Mar) | Year (Mar) |
|---|---|---|---|---|---|
| 2020 | -$0.05 A | - $0.07 A | -$0.07 A | -$0.07 A | -$0.26 A |
| 2021 | -$0.05 A | -$0.06 E | -$0.06 E | -$0.06 E | -$0.23 E |
| 2022 | | | | | -$0.26 E |
| 2023 | | | | | -$0.33 E |

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**Business Update**

*MDNA55 Update*

Medicenna Therapeutics, Inc. (MDNA) is developing MDNA55 for the treatment of recurrent glioblastoma (rGBM). The company recently completed a Phase 2b clinical trial in patients experiencing either first or second GBM relapse (NCT02858895). It was a multi-center, open label, single arm study with the primary endpoint of median overall survival (mOS) and a secondary endpoint of objective response rate (ORR) following a single intra-tumoral infusion of MDNA55 in adult rGBM subjects.

The company presented updated results from the trial at ASCO 2020. A copy of the presentation can be found here. A total of 44 subjects were evaluable for this analysis. To compare the survival of patients receiving MDNA55, a synthetic control arm (SCA) was established to identify rGBM patients matched on eligibility and prognostic characteristics including those with *de novo* GBM, wild-type IDH, and not eligible for resection. A propensity score weighting was then used to balance the baseline characteristics between the MDNA55 cohort and the SCA. Propensity scoring is a statistical method utilized to better align a treated group and an observational cohort.

The following table shows that when compared with the propensity weighted SCA, patients treated with MDNA55 exhibited a 72% improvement in mOS. When the patient population is stratified by IL4R status, IL4R High patients showed a 116% increase in mOS.

| Propensity-Weighted Groups | N | mOS | Improvement in mOS | HR |
|---|---|---|---|---|
| MDNA55 All-comers | 43 | 12.4 | 72% | 0.63 |
| SCA All-comers | 40.8 | 7.2 | | |
| MDNA55 IL4R High | 17 | 13.2 | 116% | 0.52 |
| SCA IL4R High | 16.8 | 6.1 | | |

*Source*: Medicenna Therapeutics Corp.

Interestingly, patients with low IL4R expression had a similar tumor control rate (TCR) as patients with high IL4R expression (75% vs. 76%). The majority of IL4R Low patients (11/16) received high doses of MDNA55, while only a minority of IL4R High patients (8/21) received a high dose of MDNA 55. Almost all of those who exhibited tumor control in the IL4R low group received a high dose of MDNA55. Conversely, there was no association with the amount of MDNA55 received and response in those with high IL4R expression. What this signifies is that in the IL4R low group a sufficient amount of MDNA55 is required in order to see a response as there are a limited amount of receptors available for the drug to bind. In contrast, in the IL4R high group, the amount of MDNA55 given is of less importance because there are more receptors available for the drug to interact with.

Thus, the Proposed Population (n=32) consists of all IL4R High patients as well as the IL4R Low patients that received a high dose of MDNA55. The following table shows that median survival and OS-12 for this group of patients was 15.8 months and 62% compared to 7.0 months and 18% for the eligibility matched SCA.

| Eligibility-Matched | N | mOS | Improvement in mOS | HR | OS-12 |
|---|---|---|---|---|---|
| Proposed Population | 32 | 15.8 | 126% | 0.45 | 62% |
| SCA | 40 | 7.0 | | | 18% |
| **Propensity-Weighted** | | | | | |
| Proposed Population | 32 | 15.7 | 118% | 0.52 | NA |
| SCA | 33.9 | 7.2 | | | NA |

*Source*: Medicenna Therapeutics Corp.

Medicenna will be conducting an 'End-of-Phase 2' meeting with the FDA on September 29, 2020. At that time the company will present data from the IL4R high subjects along with the IL4R low subjects that received a high dose of MDNA55 (the 'proposed population' discussed above), with the goal now being to target 'all comer' rGBM patients regardless of IL4R status. This will alleviate the company from having to develop and validate an IL4R expression assay and increases the addressable market for MDNA55. We anticipate the company receiving the minutes from that meeting in the fourth quarter of 2020.

*Preclinical Data on MDNA11 Presented at ASCO 2020*

On May 29, 2020, Medicenna announced that preclinical data on MDNA11, one of the lead candidates from the interleukin (IL)-2 Superkine program, was presented at ASCO 2020. A copy of the presentation can be found here. 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 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, Tregs) while naïve T cells and Natural Killer (NK) cells only express the heterodimer. Thus, modifying IL-2 signaling to enhance binding to the CD122/CD132 heterodimer 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.

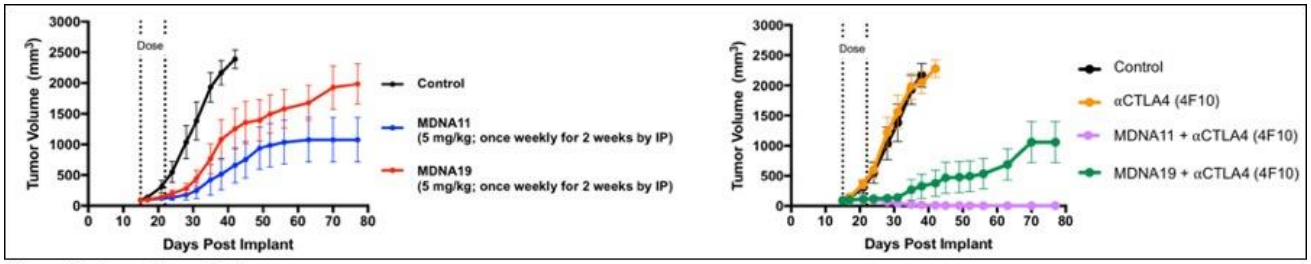
We previously discussed another lead candidate from the company's IL-2 Superkine program, MDNA19, which is differentiated from IL-2 in that it has enhanced affinity for CD122, which results in increased signaling in CD8 T cells, and does not bind to CD25, leading to substantially decreased signaling in Tregs. MDNA19 consists of the modified IL-2 fused to the Fc domain of IgG, which is intended to increase its pharmacokinetic (PK) profile and extend its half-life. MDNA11 consists of the same modified IL-2 domain fused to human albumin, which is another means to increase the compound's half-life and limit the frequency of infusions.

Similar to MDNA19, MDNA11 shows high affinity binding to CD122 ($K_D$ = 6.6 nM) and no binding to CD25. In addition, MDNA11 shows enhanced potency on CD8+ T cells and NK cells along with reduced activity on Tregs. The following table shows the $EC_{50}$ values (a measure of potency with greater potency (corresponding to smaller numbers) for recombinant, human IL-2 and MDNA11 on naïve CD8+ T cells and Tregs.

| | Naïve $CD8^+$ T cells ($EC_{50}$, pM) | Treg ($EC_{50}$, pM) |
|---|---|---|
| **rhIL-2** | **3390** | **5.6** |
| **MDNA11** | **460** | **160** |

*Source*: Medicenna Therapeutics Corp.

Interestingly, as a monotherapy MDNA11 shows enhanced activity in a CT26 tumor model compared to MDNA19, as shown in the following figure on the left. MDNA11 also shows enhanced activity when used in combination with αCTLA4 therapy, as shown in the following figure on the right. All nine mice treated with MDNA11 + αCTLA4 exhibited complete regression of tumor while only 3/9 mice treated with MDNA19 + αCTLA4 showed complete regression of tumor.




*Source*: Medicenna Therapeutics Corp.

There are multiple factors that may contribute to the enhanced *in vivo* activity of MDNA11 compared to MDNA19. MDNA11 shows a longer half-life than MDNA19 in non-human primates (NHP), with a $T_{1/2}$ of 12.8 – 24.7 hours for MDNA11 compared to 7.3 – 9.1 hours for MDNA19. In addition, MDNA11 has a stronger effect on lymphocyte expansion and on non-Treg CD4 T cell expansion in NHPs at multiple doses. Lastly, the use of albumin to extend the half-life of MDNA11 could allow accumulation of the compound at tumor sites, as tumor cells are known to use albumin as a major energy source and a source of nitrogen (Stehle *et al*., 1997). The following chart shows various phenotypes and how MDNA11 and MDNA19 compare in regards to those phenotypes, with MDNA11 superior in a number of attributes.

| Phenotype/Parameter | Comparison |
|---|---|
| Activity in Human PBMC P-STAT5 Assay | MDNA11 ~ MDNA19 |
| Receptor Selectivity Based on Affinity Studies | MDNA11 ~ MDNA19 |
| Efficacy: Monotherapy in CT26 Tumor Model | MDNA11 > MDNA19 |
| Efficacy: Combination with Anti-CTLA4 in CT26 Tumor Model | MDNA11 >> MDNA19 |
| Half-Life in Mice | MDNA11 ≥ MDNA19 |
| Half-Life in NHP | MDNA11 >> MDNA19 |
| Effect on Lymphocyte Expansion in NHP | MDNA11 ≥ MDNA19 |
| Effect on CD8 T-cell vs. Treg Proliferation in NHP | MDNA11 ~ MDNA19 |
| Effect on CD4 T-cell Expansion in NHP | MDNA11 ≥ MDNA19 |
| Low Immunogenicity (ADA response) in NHP | MDNA11 ~ MDNA19 |
| Overall Safety Profile in NHP | MDNA11 ~ MDNA19 |

*Source*: Medicenna Therapeutics Corp.

We anticipate IND-enabling studies to initiate this quarter for MDNA11, an IND being filed in the first half of 2021, and a Phase 1 trial to initiate in mid-2021.

**Financial Update**

On August 4, 2020, Medicenna announced financial results for the first quarter of fiscal year 2021 that ended June 30, 2020. The company reported a net loss for the first quarter of fiscal year 2021 of CAD$2.4 million, or CAD$0.05 per share, compared to a net loss of CAD$1.3 million, or CAD$0.05 per share, for the three months ending June 30, 2019. R&D expenses for the first quarter of fiscal year 2021 were CAD$1.8 million compared to CAD$0.8 million for the first quarter of fiscal year 2020. The increase in expenses was primarily due to no reimbursement under the CPRIT grant in the current quarter compared to a reimbursement of CAD$0.9 million in the prior year period. G&A expenses for the first quarter of fiscal year 2021 were CAD$0.7 million compared to CAD$0.5 million for the three months ending June 30, 2019. The increase was due to no reimbursement from CPRIT along with higher legal expenses.

As of June 30, 2020, Medicenna had approximately CAD$40.6 million in cash and cash equivalents. We estimate this is sufficient to fund operations into late 2022. As of June 30, 2020, Medicenna had approximately 48.8 million shares outstanding and, when factoring in options and warrants, a fully diluted share count of approximately 60.0

million. The company has filed for uplisting its shares to the Nasdaq and we anticipate an update on that process during the third quarter of calendar 2020.

**Conclusion**

We are very interested to hear the outcome of the 'End-of-Phase 2' meeting with the FDA regarding the regulatory pathway for MDNA55, particularly on the possibility for accelerated approval. While still a low probability event, there is precedent for receiving accelerated approval following a successful single arm, open-label Phase 2 clinical trial. Morphosys AG was recently granted accelerated approval by the FDA for tafasitamab, the company's anti-CD19 antibody, based on positive results from the company's Phase 2 L-MIND clinical trial and the retrospective observational matched control cohort RE-MIND trial. This is a very similar situation to what Medicenna has with the results of the Phase 2b clinical trial and the SCA, however the L-MIND trial had results from 80 patients while Medicenna is going to the FDA with results from 32 patients. Regardless of whether Medicenna is allowed to apply for accelerated approval or not, we believe MDNA55 is a very promising clinical candidate for rGBM.

The news for the IL-2 Superkine program continues to get better as MDNA11 appears to be superior to MDNA19 and thus will be advanced into clinical testing in 2021. The IL-2 Superkine platform has enormous potential for the company as shown by the acquisition of SynthoRx, and the enhanced IL-2 THOR-707, by Sanofi for $2.5 billion. With multiple suitors bidding on SynthoRx we believe there are other companies who are eager to have an enhanced IL-2 asset, particularly one like MDNA11, which we view as having potential 'best-in-class' attributes.

With no changes to our model, our valuation remains at CAD$15.

## PROJECTED FINANCIALS

**Medicenna Therapeutics Corp.**
Income Statement

| Medicenna Therapeutics Corp.<br>In Canadian Dollars | FY 2020 E | Q1 FY21 A | Q2 FY21 E | Q3 FY21 E | Q4 FY21 E | FY 2021 E | FY 2022 E | FY 2023 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 | $5.9 | $1.8 | $2.0 | $2.0 | $2.0 | $7.8 | $10.0 | $13.0 |
| General & Administrative | $2.4 | $0.7 | $0.7 | $0.8 | $0.8 | $3.0 | $3.3 | $3.8 |
| Other (Income) Expense | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 |
| Operating Income | ($8.2) | ($2.5) | ($2.7) | ($2.8) | ($2.8) | ($10.8) | ($13.3) | ($16.8) |
| *Operating Margin* | - | - | - | - | - | - | - | - |
| Non-Operating Expenses (Net) | ($0.0) | ($0.2) | $0.0 | $0.0 | $0.0 | ($0.1) | $0.1 | $0.1 |
| Pre-Tax Income | ($8.3) | ($2.4) | ($2.7) | ($2.8) | ($2.8) | ($11.0) | ($13.2) | ($16.7) |
| Income Taxes | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 |
| Cumulative translation adjustment | $0.1 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 | $0.0 |
| **Net Income** | **($8.2)** | **($2.4)** | **($2.7)** | **($2.8)** | **($2.8)** | **($11.0)** | **($13.2)** | **($16.7)** |
| *Net Margin* | - | - | - | - | - | - | - | - |
| **Reported EPS** | **($0.26)** | **($0.05)** | **($0.06)** | **($0.06)** | **($0.06)** | **($0.23)** | **($0.26)** | **($0.33)** |
| *YOY Growth* | - | - | - | - | - | - | - | - |
| Basic Shares Outstanding | 31.9 | 48.3 | 48.8 | 49.0 | 49.0 | 48.8 | 50.0 | 50.0 |

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

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## HISTORICAL STOCK PRICE




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