One Target. Infinite Hope™

CPRIT
Product Development Showcase
November 13, 2017

TSX: MDNA
OTCQX: MDNAF
Forward Looking Statements

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Treatment Pathway for Glioblastoma (GBM)

GB is uniformly fatal; virtually all tumors will recur (rGBM)

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**GBM Diagnosis**

- Surgery (85-90%)
- Radiotherapy + Temozolomide
- Temozolomide 55% of GB Chemo-Resistant*

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**Relapse**

- OPERABLE rGBM
  - Surgery
  - Add’l Chemotherapy or Experimental Therapies
- NON-OPERABLE rGBM
  - MDNA55 Treatment
    (Direct infusion into tumor - CED)

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*Expression of the DNA repair protein O6-methylguanine-DNA methyltransferase (MGMT) is responsible for resistance to alkylating agents used in GB treatment.

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*One Target. Infinite Hope™*
MDNA55
Targeted Dual-Action Immunotherapeutic

A Powerful Molecular Trojan Horse

Tumor Targeting Domain
Circularly Permutated Interleukin-4 (cpIL-4)

Tumor Killing “Cytotoxic” Domain
Catalytic domain of Pseudomonas Exotoxin A (PE)

- Potently toxic to tumor cells without harming normal cells
- Simultaneously purges the Tumor Microenvironment (TME) and un-blinds the immune system to cancer cells
Mechanism of Action of MDNA55

Efficient intracellular delivery of Toxin Payload

Endocytosis

ADP Ribosylation

Inhibits Protein Synthesis - Apoptosis

MDNA55

IL-4R

EF-2
### Glioblastoma Therapies Do Not Address Key Challenges

<table>
<thead>
<tr>
<th>Therapeutic Challenges</th>
<th>Rationale for MDNA55</th>
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<tbody>
<tr>
<td>55% of GBMs are chemo-resistant</td>
<td>MDNA55 targets resistant tumors</td>
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<tr>
<td>Immunosuppressive tumor microenvironment (TME) comprises 40% of GBM tumor mass</td>
<td>IL4R over-expressed in GBM and its TME (Myeloid Derived Suppressor Cells) but not in normal brain</td>
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<td>Blood Brain Barrier (BBB) blocks transport of therapeutic to tumor</td>
<td>Delivery by direct injection (CED) of MDNA55 by-passes the BBB</td>
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<td>High doses are required due to BBB causing systemic toxicities</td>
<td>Precision delivery achieves high doses without systemic exposure</td>
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Compelling Efficacy in Non-Resected rGBM (n=25)

High Objective Response Rate


9 months

Complete Response (CR): 5/25

Week 26

Partial Response (PR): 9/25
MDNA55 Survival Results Consistent with Immunotherapy Benefits

Non-Resectable Recurrent GBM: Survival of Responders vs Non Responders

- Responders (CR +PR): MS = 379 days (n=14)
- Non-Responders (SD +PD): MS = 98 days (n=11)

SD – Stable disease
PD – Progressive disease

Log-Rank test p-value is 0.9430 (N=57)
Image Guided Delivery Will Improve Outcomes

1\textsuperscript{st} Generation CED: Past Studies

- Inaccurate catheter placement
- Drug leakage due to backflow
- Inadequate tumor coverage

2\textsuperscript{nd} Generation CED: Current Study

- Image-guided catheter placement
- New catheters limit backflow
- Real-time monitoring improves tumor coverage

Images courtesy of John Sampson, Duke University

Real-Time Monitoring of Drug Distribution

Saito and Tominaga (2012), Neurol Med Chir (Tokyo) 52, 531
US Sites Participating in the Study

- OSU (Columbus, OH)
- Cleveland Clinic (Cleveland, OH)
- Weill Cornell + MSKCC (New York, NY)
- Duke (Durham, NC)
- UT Southwestern (Dallas, TX)
- UT San Antonio (San Antonio, TX)
- UCSF (San Francisco, CA)
- JWCI (Santa Monica, CA)
- Marcus Neuroscience Institute (Boca Raton, FL)
One Product: Multiple Opportunities

CANDIDATE | INDICATIONS | DISCOVERY | PRECLINICAL | PHASE 1 | PHASE 2 | PIVOTAL
---|---|---|---|---|---|---
MDNA55 | Recurrent GBM |  |  |  |  |  
 | Brain Metastasis |  |  |  |  |  
 | Newly Diagnosed GBM (MGMT + VE) |  |  |  |  |  
 | Pediatric GBM & Medulloblastoma |  |  |  |  |  
 | Diffuse Intrinsic Pontine Glioma |  |  |  |  |  
MDNA57 | Solid Tumors |  |  |  |  |  

Development Plans

2017/2018
2018/2019
## CPRIT Program Milestones

<table>
<thead>
<tr>
<th>Major Accomplishments to Date</th>
<th>Upcoming Milestones 2017/18</th>
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<tbody>
<tr>
<td>⚫ Secured matching funds of $11M</td>
<td>⚫ Complete P2b enrolment</td>
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<tr>
<td>⚫ Established Texas base and recruited key C-Level executives</td>
<td>⚫ Report top-line results</td>
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<tr>
<td>⚫ Developed MDNA55 commercial scale manufacturing process in Texas</td>
<td>⚫ End of Phase 2 meeting with FDA</td>
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<td>⚫ Initiated enrolment at 9 major clinical centers in US including 2 sites in Texas</td>
<td>⚫ Commence additional clinical trial(s) for other types of brain cancer</td>
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<tr>
<td>⚫ Treated first patient in Texas</td>
<td>⚫ Complete proof of concept pre-clinical studies with MDNA57 for solid tumors</td>
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<td>⚫ Enrolled 15 of 52 patients to date</td>
<td>⚫ Expand Texas development and commercial foot-print</td>
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MDNA55 Commercial Scale Manufacturing Established

Fujifilm Diosynth Biotech Texas (College Station, TX)

- Established *E. coli* based fermentation process
- Improved manufacturing yields
- Process developed to final manufacturing scale
- 50L fermentation process yields ~3 grams of purified MDNA55
- 1 gram of MDNA55 provides treatment for 5,000 patients
Network of Texas Collaborators

Clinical Research and Manufacturing

Contract Development and Manufacturing Organization
- Process development and scale-up
- Manufacturing of GMP clinical batches
- Commercial process established

Clinical CRO
- Medical Monitoring
- Pharmacovigilance
- Data Management

Imaging CRO
- Blinded central read
- Patient screening
- Response assessments

Academic and Clinical Investigators

Michael Rosenblum, PhD
Head, Immunopharmacology and Targeted Therapy
Collaborator: MDNA57

Andrew Brenner, MD
Medical Director; Cancer Therapy and Research Center
Principal Investigator: MDNA55

Toral Patel, MD
Asst Prof of Neurological Surgery
Principal Investigator: MDNA55

One Target. Infinite Hope™.
Medicenna BioPharma: By The Numbers

1
Focused on ONE TARGET: the IL4R

20
Number of Cancers Known to Over-Express the IL4R

1 Million
Annual Incidence of IL4R Positive Cancers

14 Million
CPRIT Grant ($US)

11 Million
Matching Funds Raised ($US)

250,000
Annual Incidence of Glioblastoma and Metastatic Brain Cancer

10,000
Brain Tumor Patients that can be treated with 2 Grams of MDNA55

2 Billion
Potential Market of MDNA55 Market for Brain Cancer ($US)

∞
HOPE
Thank You.

Fahar Merchant, PhD
Chairman, President & CEO
fmerchant@medicenna.com
www.medicenna.com