

# Sepsis pathogen testing in 45 min without a culture

Investment Opportunity  
June 2022

Neil Gordon, President  
Guanine Inc.



Guanine Inc.



# Mission

**To save lives by  
rapidly detecting multiple  
low level pathogens  
with a portable sensor**

# Problem

## Target 1: SEPSIS INFECTIONS

*Every hour delay from effective treatment  
has a 6% drop in patient survival*

Patient  
Sample



**12 hour culture**

*reproduce bacteria*



**Up to 42% False Negative**

Patient has sepsis but culture was negative. Treatment is delayed and survival drops.



**Up to 30 - 50% False Positive**

Patient does not have sepsis but culture was positive. Antimicrobials are needlessly given.



**72 hour sub-cultures**

*Identify one or more bacteria  
and drug resistance*



**Up to 38 - 83% are drug resistant**

Patient has sepsis and pathogen is resistant to many antimicrobials. Effective treatment is delayed and survival drops

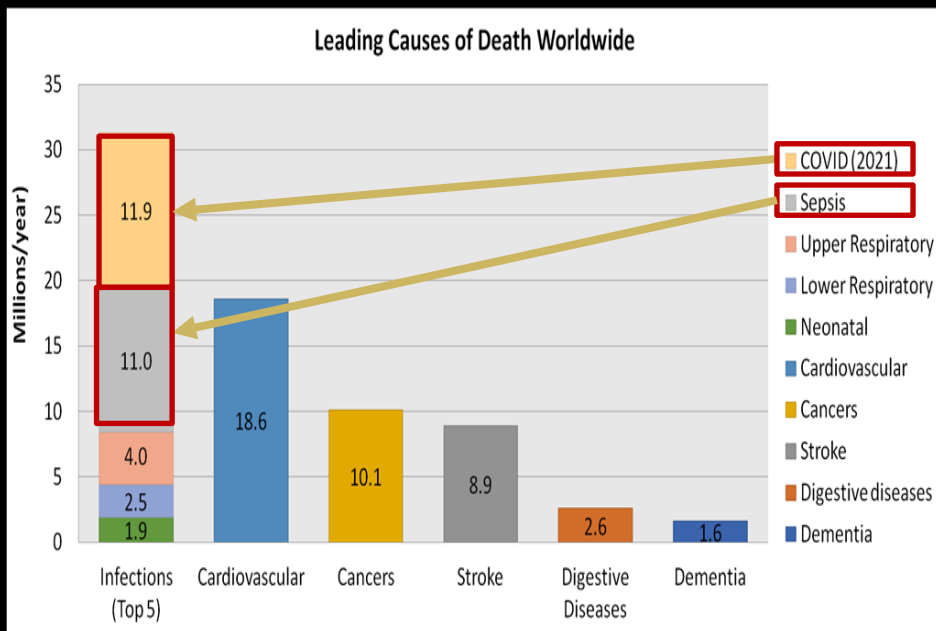
# Solution

## Guanine will revolutionize sepsis testing by ELIMINATING THE CULTURE

	Current Technologies	Guanine
<b>Time to Results</b>	<u>4 day</u> Microbiology cultures <u>or</u> <u>15 hour</u> multiplex PCR with 12 hour culture	<u>45 min</u> without culture
<b>Culture Errors</b>	High incidence of <u>false results</u> <u>No viral pathogens</u> detected	None
<b>Instrument Cost</b>	<u>\$25,000+</u> multiplex PCR instrument	<u>\$500</u> mobile reader
<b>Test Cost</b>	<u>\$260</u> cartridges plus <u>\$100</u> culture	<u>\$200</u> cartridge

# Why now

## Sepsis is a leading cause of deaths and up to 93% of COVID deaths are sepsis



Sources : WHO, IHME Global Burden of Disease ,  
Harvard/Brigham, CDC, Coalition for Sepsis Survival

### Sepsis is the most expensive US healthcare condition

- \$24 B medical cost/yr
- \$1.6 B litigation payments/yr
- 1,700,000 cases/yr
- 270,000 deaths/yr
- Sepsis shock mortality 50-85%
- 60% re-hospitalization within 12 months
- High incidence of permanent organ damage, cognitive impairment, physical disability

# Patents

## Guanine amplifies pathogen signals by attaching millions of electrochemical oligonucleotide detection tags (*Synthetic DNA*)

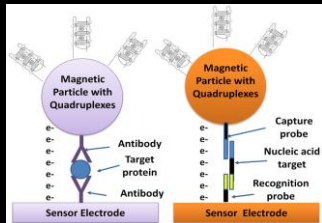
**Detection sequence**  
electroactive G, A, T or C

**Capture sequence**  
70 mers for high selectivity and rapid hybridization

5' Biotin-TTA **CGGGGGGGGGGGGGGGGGGGGG** TTATTTTT  
CGGCCCTTGA GTTTCCTCTG ACGGTCACTA TTTGACCTCC TTCCACCCCT ACTGCAGTTC AGTAGTACCG

**US 11,105,801**  
Expiry 2039

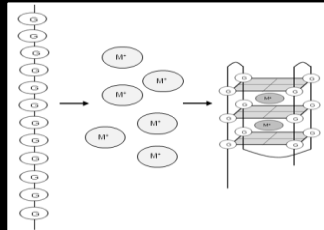
Approved: US Pending: EP, CA



Electrode sandwich assays with millions of electrochemical oligonucleotide tags

**US 11,175,285**  
Expiry 2038

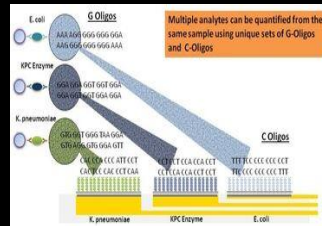
Approved: US, CA



Pre-fab quadruplex oligos have higher signal than single-stranded oligos

**US 9,624,532**  
Expiry 2035

Approved: US, CA, DE, FR, GB



Microparticle sandwich assays with millions of electrochemical oligonucleotide tags

# Products

## Guanine's sepsis test operates with a potentiostat reader and cartridge

- Mobility of a glucose meter
- Simplicity of a pregnancy test
- Accuracy of PCR

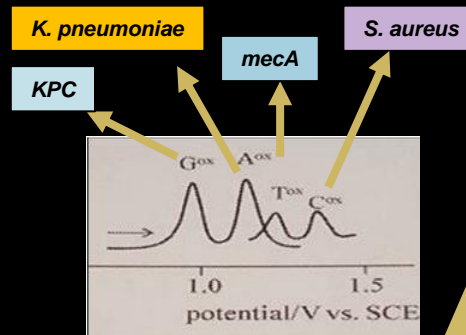
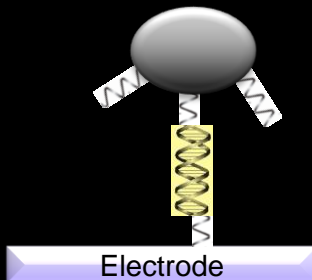
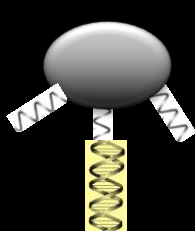


Pathogens are filtered from lysed blood cells

Lysed pathogen RNA and resistance targets are captured with magnetic microparticles bound with oligonucleotide tags

Microparticle-target complexes are magnetically separated and form sandwiches on electrodes

Voltammetry generates oxidation signals from 4 different oligonucleotide tags (G,A,T,C) on 6 electrodes



# Revenue Model

Guanine's single-use test cartridge will generate repeat revenue

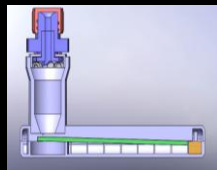


**Reader**

**\$500**

Low price reader will facilitate high market penetration

Projected Cost:  
\$390 → \$250



**Cartridge**

**\$200**

High margin multiple pathogen single-use test cartridge

Projected Cost:  
\$55 → \$30



**Revenue/reader**

**\$35,000/yr**

High annual revenue from as few as 1 test per day per reader



# Traction



## Sepsis test

- Competed first target with \$225k CDC SBIR funding
- Submitted NSF grant application \$275K Phase I for 4 sepsis targets on electrode
- Upcoming \$2 million grant submission to NY State Biodefense Fund for Viral sepsis/COVID sepsis



## Product

- Sensor prototyped and cartridge designed at RPI
- Instrument specified using off the shelf components from Analog Devices
- Bill of materials and costing undertaken
- Prototyping and manufacturing partners identified



## Collaborators

- Pursuing collaboration with multiple hospitals in NY State

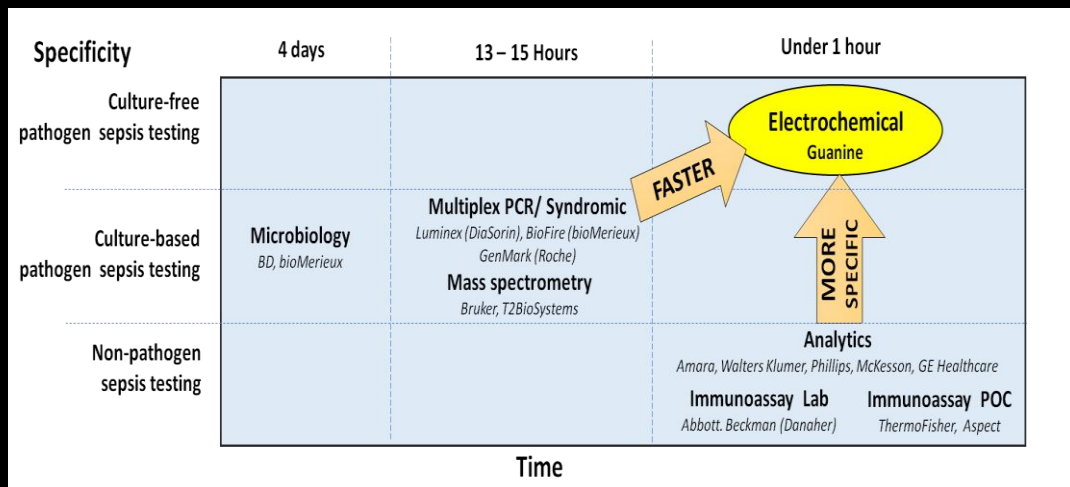


## New Tests

- Submitted NSF grant application with RPI to detect HABs in water system
- Upcoming grant submission to LymeX for portable Lyme disease test
- Upcoming grant applications to NIH for pathogen detection in other body samples

# Competition

	Guanine	Luminex Verigene	BioFire Film Array	GenMark Plex
Detection	Electrochemical Oligonucleotide tag	Optical	Optical	Electrochemical Ferrocene tag
Amplification and Multiplexing	Multiple Microparticle Conjugates <i>attach millions of tags</i>	Multiplex PCR <i>replicate millions of copies</i>	Multiplex PCR <i>replicate millions of copies</i>	Multiplex PCR <i>replicate millions of copies</i>
Turn Around Time	45 min	14 hrs <i>with culture</i>	13 hrs <i>with culture</i>	17 hours <i>with culture</i>
Instrument Price	\$500	\$22,000	\$35,400	>\$25,000
Instrument Size	2 lbs, 3”H	63 lbs, 18” H	57 lbs, 38”H	88 lbs, 24” H



# Sepsis Market

Guanine's rapid sepsis pathogen test will cannibalize current approaches using culture media, reagents and instruments

TAM

**\$1.2B**

SAM

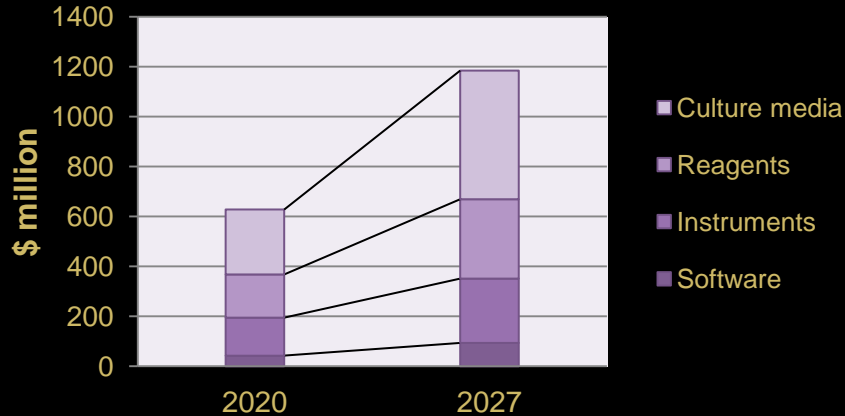
**\$800M**

SOM

**\$220M**

Sepsis Diagnostics Revenue

9.5% CAGR



# Go To Market

**Guanine will market to doctors and nurses who are actively seeking a faster sepsis test to save lives and reduce costs**

## Target Champions

- Identify champions
- Free trials
- Hands-on training
- Business cases

## Expand Usage

- Seek champion's input for additional features
- Prepare testimonials and reference accounts
- Expand product use *within champion's hospital (ER, ICU, OR), affiliated hospitals, and associated networks*

## Leverage Success

- Solicit distributors with early adopter hospitals
- Pursue international distributors
- Focused advertising, social media, and conferences
- Informing healthcare insurance companies of sepsis cost reduction

# Team



**Neil Gordon, B.Eng, MBA**  
**PRESIDENT**

- 35 years in management and commercialization
- Inventor of oligonucleotide detection platform
- Previously spun-out NASA biodetection company
- One of first nanotechnology business consultants



**Garry Palmateer, MS**  
**VP ASSAYS**

- 40 years experience in microbiology
- Developed and used dozens of assays
- Oversaw Walkerton E.coli outbreak for Ontario Gov't
- Co-invented NASA spin-off instrument with Neil



**Raj Bawa, PhD, MD (22)**  
**VP BUSINESS DEV.**

- 30 years in biotech R&D and patents
- Upcoming medical degree to enable sepsis insight
- Editor of cutting edge nanomedicine books



**Ara Altounian B.Eng, MBA**  
**VP OPERATIONS**

- 40 years in administration and marketing
- Co-developed software tools with Neil



**Confidential, PhD**  
**VP ENG & MFG**

- 25 years experience in product design and manufacturing
- Experience with cartridge design and manufacturing processes
- Designed Guanine's biosensor

# Ask

## Guanine is seeking \$7.5 million to launch the sepsis pathogen test and license the platform

- *Functional instrument and 24 target cartridge by month 7*
- *Product sales by month 16*
- *Licensing sales by month 13 (for additional sales)*

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>ASSAYS</b>																
Sepsis						◆										
New (GI, Meningitis)																
<b>PRODUCTS</b>																
Reader												◆				
Cartridge												◆				
Certification															◆	
<b>REVENUE</b>																
Sepsis																◆
Licensing													◆			
Grants						◆										

# Proforma

Revenue will commence in year 2  
and profits in year 3

\$000	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Direct Sales	0	1,841	13,221	25,198	41,963
Distributor Sales	0	434	5,039	16,437	46,703
Licensing Revenue	0	250	5,350	10,700	21,900
<b>Revenue</b>	<b>0</b>	<b>2,525</b>	<b>23,609</b>	<b>52,334</b>	<b>110,567</b>
COGS	0	683	4,992	10,181	13,963
<b>Gross Margin</b>	<b>0</b>	<b>1,842</b>	<b>18,617</b>	<b>42,154</b>	<b>96,604</b>
Development	2,214	2,411	2,642	4,182	7,019
Sales & Marketing	388	751	3,742	9,613	16,419
General & Admin.	1,247	1,304	2,630	5,945	8,918
<b>EBIDT</b>	<b>-3,848</b>	<b>-2,624</b>	<b>9,547</b>	<b>22,413</b>	<b>64,248</b>

# Thank you

Neil Gordon, President  
**Guanine Inc.**  
7 University Place, Suite B210  
Rensselaer, NY 12144

[neil.gordon@guanineinc.com](mailto:neil.gordon@guanineinc.com)  
514-813-7936

[www.guanineinc.com](http://www.guanineinc.com)