Agenda Item 1

Featured Start-Up – gel-e Life Sciences
**TOPIC:** Featured Start-Up – gel-e Life Sciences (information item)

**COMMITTEE:** Economic Development and Technology Commercialization

**DATE OF COMMITTEE MEETING:** September 8, 2016

**SUMMARY:** The featured start-up, gel-e Life Sciences, has developed an advanced wound care platform based on technology from the University of Maryland, College Park. By making molecular modifications to natural biopolymers, gel-e’s patented approach works rapidly to stop bleeding in a clean and safe manner. The product works independent of the body’s natural clotting ability and the material comes off easily after the wound heals.

The company’s first product, Vascular gel-e, has been approved by the FDA for vascular access procedures and other solutions in development include chronic wound dressings, surgical gels, and even over-the-counter products. Gel-e Life Sciences has received support and funding from numerous USM and State programs, including the Fischell Institute, TAP, MIPS, and TEDCO. The company expects to serve multiple large markets in excess of $7 billion, where more effective, less expensive and safer wound treatments are needed.

**ALTERNATIVE(S):** This item is for information purposes.

**FISCAL IMPACT:** This item is for information purposes.

**CHANCELLOR’S RECOMMENDATION:** This item is for information purposes.

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<thead>
<tr>
<th>COMMITTEE RECOMMENDATION:</th>
<th>DATE:</th>
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<tbody>
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<thead>
<tr>
<th>BOARD ACTION:</th>
<th>DATE:</th>
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SUBMITTED BY: Thomas Sadowski / Suresh Balakrishnan (301) 445-2783
Committee on Economic Development and Technology Commercialization

Featured Start-Up- gel-e Life Sciences

September 8, 2016
Safe harbor statement

Except for the historical information contained herein, the matters discussed in this presentation contain forward-looking statements. The accuracy of these statements is subject to significant risks and uncertainties. Actual results could differ materially from those contained in the forward-looking statements. The Company’s actual and projected performance is based upon various sources of market information available to the Company at the time this document was prepared. No representations or warranties can be made with respect to the accuracy of the source information or the validity of the Company’s projections derived from the source information.
Nurturing disruptive life sciences innovations

Robert E. Fischell Institute for Biomedical Devices

Maryland Technology Advancement Program

Conception of gel-e Technology Platform

1st of Six Peer Reviewed Publications

1st of Five Issued US Patents

1st FDA Approval

$400k TEDCO, MIPS Maryland Awards

$200k MD Biotechnology Center

$900k SBIR

$200k MIPS

$200k LSIF

$50k US Air Force/UMD School of Medicine

~$2M in Grants & Awards
gel-e: The next generation of advanced hemostats

**gel-e** is:
- extremely quick to stop bleeds
- inexpensive to manufacture
- made from safe ingredients
- requires no clinical prep time
- available in many formulations
- better than the standard-of-care
**gel-e** is made from safe ingredients

Native Chitosan → hm-Chitosan → gel-e

Natural Fatty Acids

gel-e quickly stops bleeds using an inert, self-assembling biopolymer... now approved by the FDA
gel-e’s highly versatile product platform

- **films**: chronic wounds
- **bandages**: nuisance bleeds/first-aid/vascular access
- **gels**: surgical applications
- **foams**: trauma/military applications

- nosebleeds
- internal surgery
- trauma
- sports injury
- chronic wounds
- neurosurgery
- minor cuts/scrapes
- outpatient procedures
- diabetic ulcers
- minor cuts/scrapes
- outpatient procedures
gel-e applies to ANY situation where you need to control bleeding

- **Military/trauma**
- **Vascular access** *(already DA approved)*
- **Internal surgical**
- **Chronic wounds**
- **First-aid**
**gel-e** offers a significant improvement vs the standard-of-care

<table>
<thead>
<tr>
<th></th>
<th>Cellulose(^1)</th>
<th>Fibrin(^2)</th>
<th>gel-e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clotting Time</td>
<td>~300 sec</td>
<td>15-30 sec</td>
<td>&lt;5 sec</td>
</tr>
<tr>
<td>Cost-of-</td>
<td>$0.10</td>
<td>~$88.00(^1)</td>
<td>$0.03</td>
</tr>
<tr>
<td>materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prep Time</td>
<td>None</td>
<td>~30 min</td>
<td>None</td>
</tr>
<tr>
<td>Anti-Microbial</td>
<td>No</td>
<td>No</td>
<td>Yes(^3)</td>
</tr>
<tr>
<td>Scar Reducing</td>
<td>No</td>
<td>No</td>
<td>Yes(^4)</td>
</tr>
</tbody>
</table>

\(^1\)Active ingredient in the current standard of care for external and some internal surgical hemostats

\(^2\)Active ingredient in the current standard of care for internal surgical hemostats; cost estimate does not include estimate for commercial manufacturing


**gel-e's disruptive potential**

- **Most effective**: Extremely effective, safe and low-cost

  - Chitosan/Kaolin

- **Least effective**: Cellulose/Gauze

  - Peptides
  - Fibrin
  - Synthetic Fibrin

**Product Costs**

- $10
- $50
- $100
- $300
- $500
gel-e product development roadmap

R&D
- 2016: $369
- 2017: $735
- 2018: $2,740
- 2019: $2,180
- 2020: $1,669

G&A
- 2016: $282
- 2017: $560
- 2018: $1,067
- 2019: $1,659
- 2020: $2,087

S&M
- 2016: $15
- 2017: $75
- 2018: $135
- 2019: $159
- 2020: $488

Cap Ex
- 2016: $142
- 2017: $53
- 2018: $0
- 2019: $200
- 2020: $0

Total Op Ex
- 2016: $808
- 2017: ($1,423)
- 2018: $3,942
- 2019: $4,198
- 2020: $4,244

Running Cash
- 2016: ($385)
- 2017: ($2,131)
- 2018: ($4,800)
- 2019: ($2,872)
- 2020: $7,419

Spend Budget in thousands

2016 2017 2018 2019 2020

Vascular gel-e
- Partnership to commercialize vascular gel-e
- FDA Approved

Nuisance gel-e
- 510k submission
- Market Approval

Chronic wound gel-e
- 510k submission
- Market Approval

Trauma gel-e
- DoD grant
- De novo 510k submission
- Market Approval

Surgical gel-e
- Preclinical studies for surgical gel-e
- CE Mark Submission
- Market Approval

Commercial Launch

Partnership to commercialize vascular gel-e
Partnership to commercialize chronic wound gel-e
Partnership to commercialize chronic wound gel-e
Partnership to commercialize chronic wound gel-e
Partnership to commercialize chronic wound gel-e
gel-e strategic growth plan

$2-3M Series A

- 2 new FDA submissions
- Partner commercializes Vascular gel-e™
- Establish cGMP Manufacturing
- Pre-clinical testing of surgical hemostat
- Expand Team

Grants & Awards

- 1st FDA Approval
- 5 Issued Patents
- 6 Peer-Reviewed Publications

~$8M Series B or Corporate Partnership

- Regulatory submission of Surgical gel-e™
- Partner commercializes Nuisance & Chronic Wound gel-e
- Organic growth or Exit

Investor Incentives
- 50% matching grant from NSF on first $1M invested
**gel-e** key milestones drive value

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>6 Peer-Reviewed Publications</td>
</tr>
<tr>
<td></td>
<td>5 Issued Patents</td>
</tr>
<tr>
<td></td>
<td>1st FDA Approval [Vascular gel-e]</td>
</tr>
<tr>
<td>2014</td>
<td>1st FDA Approval [Vascular gel-e]</td>
</tr>
<tr>
<td></td>
<td>5 Issued Patents</td>
</tr>
<tr>
<td>2015</td>
<td>1st FDA Approval [Vascular gel-e]</td>
</tr>
<tr>
<td></td>
<td>5 Issued Patents</td>
</tr>
<tr>
<td>2016</td>
<td>Partnership to Commercialize Vascular gel-e</td>
</tr>
<tr>
<td></td>
<td>2nd &amp; 3rd FDA Approvals [Nuisance &amp; Chronic wound gel-e]*</td>
</tr>
<tr>
<td>2017</td>
<td>Partnerships to Commercialize Nuisance &amp; Chronic Wound gel-e</td>
</tr>
<tr>
<td>2018</td>
<td>Regulatory Approval of Surgical gel-e</td>
</tr>
<tr>
<td>2019</td>
<td>$200M</td>
</tr>
<tr>
<td>2020</td>
<td>$300M</td>
</tr>
<tr>
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<td>$450M</td>
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**Return on Investment:** 4x-25x

**gel-e valuation (approx est.)** $25M+

**Partner Sales** $150M

**Revenue**

- **2011**: $2M
- **2014**: $17M
- **2015**: $5M
- **2016**: $18M
- **2017**: EBIT+ $38M

**Close-up**

- Arch Therapeutics
  - Market cap @ $86M‡ Pre-Revenue
- Closure
  - Market cap @ ~$160M Sales = $1.5M† Sold to Ethicon @ $497M 10x Sales
- Medafor
  - Sold to CR Bard @ $280M 18x Sales
- Omrix
  - Sold to Ethicon @ $438M 6x sales

*Assumes Q3-2016 Financing
‡ August 4, 2016
† Sales & lowest Q’ly market cap in 1997
gel-e management team & advisors

**Larry Tiffany**
Chairman of the Board
- CEO/Founder, TGM Medicine
- CEO, DioGenix
- CBO, Ore Pharma
- GM, Gene Logic Genomics/Dx
- President, GeneTrax
- SVP WW BD, Gene Logic

**Matthew Dowling, PhD**
Founder/CSO
- gel-e Inventor
- Lead Founder
- Fischell Fellow
- PI on >$1.7M in Grants

**Rich Vincent**
CFO
- CFO, DioGenix
- CFO, Sorrento Therapeutics
- CFO, Meritage
- CFO, Elevation Pharma
- CFO, Verus

**Alexander Arrow, MD**
Independent Director
- CEO, Zelegent
- COO, Biolase
- CMO, Circuit Rx
- CFO, Arstasis
- Head Med Tech Equity, Lazard

**David King, MD, LTC**
Harvard Medical
- Trauma Surgeon
- US Army Lieutenant Col.
- Thought-leader in treatment of non-compressible hemorrhage

**Mayur Narayan, MD, MBA**
U of Texas Southwestern
- Trauma Surgeon
- Gold Doctor Awardee
- Medical Director of Center of Injury Prevention and Policy

**Joel Buzy, MD, FACEP**
Shady Grove Adventist ER
- Medical Director, Tactical and EMT Medicine Montgomery County, MD
- Partner, Medical Emergency Professionals
- Medical Director, ESPN X Games
A Next Generation Hemostatic/Wound Care Platform

Reducing the Cost of Treatment with Stable, Easy to Use Hemostats

A Novel Solution to a Multi-Billion Dollar Need
Appendix
### Patent Summary

**Appendix: gel-e has strong patent protection**

<table>
<thead>
<tr>
<th>U.S. Patent #</th>
<th>Patent Title</th>
<th>Patent Synopsis</th>
<th>Issue Date</th>
<th>Expiration Date</th>
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<tbody>
<tr>
<td>9,066,885</td>
<td>Advanced functional biocompatible polymeric matrix containing nano-</td>
<td>HM-CHITOSAN FILMS for Wound Treatment</td>
<td>06-30-2015</td>
<td>10-05-2028</td>
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<tr>
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<td>compartments</td>
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<tr>
<td>8,932,560</td>
<td>Advanced functional biocompatible polymeric matrix used as a</td>
<td>HM-CHITOSAN SPONGES and SPRAYS for Hemorrhage Control</td>
<td>01-13-2015</td>
<td>07-11-2030</td>
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<td></td>
<td>hemostatic agent and system for damaged tissues and cells</td>
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<td>8,668,899</td>
<td>Advanced functional biocompatible foam used as a hemostatic agent</td>
<td>HM-CHITOSAN FOAMS for Treatment of Non-Compressible Hemorrhage</td>
<td>03-11-2014</td>
<td>06-20-2030</td>
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<tr>
<td></td>
<td>for compressible and non-compressible acute wounds</td>
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<td>8,664,199</td>
<td>Method and system for reversal of interactions between hydrophobically modified biopolymers and vesicles or cell membranes</td>
<td>CYCLODEXTRIN Powders and Sprays for CLOT REVERSAL</td>
<td>03-04-2014</td>
<td>12-04-2030</td>
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<td>8,858,883</td>
<td>Method and system for capture and use of intact vesicles on</td>
<td>Electrodeposited HM-CHITOSAN FILMS for Wound Care and Hemorrhage Control</td>
<td>10-14-2014</td>
<td>12-02-2030</td>
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<td>electrodeposited hydrophobically modified biopolymer films</td>
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## Appendix: Published in 6 peer-reviewed journals

<table>
<thead>
<tr>
<th>Publication</th>
<th>Volume &amp; Pages</th>
<th>Article Title</th>
<th>Authors</th>
<th>NCBI Ref#</th>
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<tr>
<td>Biomaterials</td>
<td>Vol 32, pgs 3351-3357</td>
<td>A self-assembling hydrophobically-modified chitosan capable of reversible hemostatic action</td>
<td>MB Dowling, R Kumar, MA Keibler, JR Hess, GV Bochicchio, SR Raghavan</td>
<td>PMID: 21296412</td>
</tr>
<tr>
<td>ACS Biomaterials Science &amp;</td>
<td>Vol 1, 440-447</td>
<td>Sprayable foams based on an amphiphilic biopolymer for control of hemorrhage without compression</td>
<td>MB Dowling, IC MacIntire, JC White, M Narayan, MJ Duggan, DR King, SR Raghavan</td>
<td>--</td>
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<tr>
<td>Engineering</td>
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