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Problem
Solution
Commercialization
An endemic problem affecting 90% of US dairy herds

- Chronic, contagious and fatal
- Causes diarrhea, emaciation & loss of milk yield
- Hard to detect, slow to develop & spreads readily

Cost to US dairy industry

$500m per year*

* Estimates from Council for Agricultural Science and Technology
Advantages of a Live Attenuated Vaccine

- Stronger & longer immunity
- Eliminates shedding & disease spread
- Eliminates side effects impacting value
- Prevents infection
Next 24 months…
Two major efficacy studies
Commercialization Process

<table>
<thead>
<tr>
<th>Product Development &amp; Regulatory Approval</th>
<th>Product Testing &amp; Validation</th>
<th>Manufacturing &amp; Scale Up</th>
<th>Initial Sales/Marketing</th>
<th>USDA-APHIS Approval</th>
<th>Market Entry &amp; Commercial Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Vaccine Efficacy Studies</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Year 2</td>
<td>Vaccine Safety Studies</td>
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<tr>
<td>Year 3</td>
<td>Production Validation</td>
<td></td>
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<tr>
<td>Year 4 &amp; 5</td>
<td></td>
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Addressable Market

- **Dairy cattle**: $280-360m
- **Other ruminant animals**
  - Beef Cattle: $100-150m
  - Goats: $30-50m
  - Sheep: $150-200m
  - Camels: $50-100m

Estimates based on OIE total herd sizes and JD disease prevalence data.
**Business Model**

Product Development & Manufacturing  
Contract Manufacturer  
Distributor(s)  
Veterinarians  
Farmers

**The Farmer’s Alternatives**

<table>
<thead>
<tr>
<th>Test/Cull &amp; On-Farm Management</th>
<th>Vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>5%</td>
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</table>

**Current Johne’s Disease Vaccine Competitors**

<table>
<thead>
<tr>
<th>Competitor Vaccine</th>
<th>Pan Genome Systems Vaccine</th>
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</thead>
<tbody>
<tr>
<td>Prevents infection</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Eliminates shedding</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>No granulomas</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Doesn’t interfere with TB test</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Available in U.S.</td>
<td>Yes **  Yes **</td>
</tr>
</tbody>
</table>

* Does reduce  
** But restricted or illegal in some states

**Intellectual Property**

Vaccine candidates against Johne’s Disease  
Issued June 2014

Global gene regulators as vaccine candidates against paratuberculosis  
Pending

RNA biomarkers for early diagnosis of mycobacterial infections  
Pending
Key Management Team

Dr. Adel Talaat, MVSc, Ph.D
Founder & CEO

• International expert
• 20+ years research
• Microbiology/Immunology & veterinarian
• Multiple patents & publications

Jon Sandbrook
President

• Global experience
• Management consulting
• Animal health, disease control, diagnostics

Board of Directors

Dr. Michael T. Collins, DVM, Ph.D, DACVM
Ex Pres. of Intl. Assn. of Paratuberculosis

Dr. Bill Checovich, Ph.D
20+ years in early stage biotech

Paul Radspinner, MBA
20+ years in Pharma Ops, Mkig & Biz Dev

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