Novel Cardiac Device Bridges Critical Treatment Gap

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Too many broken hearts
The problem

**HEART FAILURE:** 5 million (US population), 23 million worldwide
1 million new cases every year----500K die every year

<table>
<thead>
<tr>
<th>Progress</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medications, stents, bypass, pacemakers</td>
<td></td>
<td>THERAPEUTIC GAP</td>
<td>Transplant/ artificial heart pumps</td>
<td></td>
</tr>
</tbody>
</table>

**Our interest**

Stage 3: Comfortable only at rest, too well for transplant but too ill to carry on

Stage 4: Unable to carry out any activity due to symptoms and breathless at rest, half die in six months and less than one in ten survives to a year....
Our solution

Bonde Artificial Heart Laboratory
Our solution

Simple as a pacemaker insertion
No surgery
No clot, can periodically clean clots/debris
No power lines: no source for infection
Better quality of life and functionality
Improved survival
Patient preference
Reduced costs
- Reduced ER visits
- Reduced hospitalizations
Our Technology

• Secure IP (>12 patents filed/pending/submitted)

• Wider applications---as a circulatory device

• Existing CPT codes to bill for procedure

• Funding/5 yrs: $ 2 million (NIH, AHA, and endowment)
Yale: Artificial Heart Program

Clots—strokes---infection---tethered to a powerline
## Competitors

<table>
<thead>
<tr>
<th></th>
<th>Thoratec</th>
<th>Heartware</th>
<th>CoRISMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clot problem</td>
<td>1 in 10</td>
<td>1 in 15</td>
<td>Eliminated</td>
</tr>
<tr>
<td>Stroke</td>
<td>1 in 20</td>
<td>1 in 30</td>
<td>Eliminated</td>
</tr>
<tr>
<td>Infection of power line</td>
<td>1 in 30</td>
<td>1 in 30</td>
<td>No Power lines</td>
</tr>
<tr>
<td>Swim/Shower/bath</td>
<td>NO</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Cost</td>
<td>$150K per device</td>
<td>$125K per device</td>
<td>20K per device</td>
</tr>
<tr>
<td>Market share</td>
<td>60%</td>
<td>40%</td>
<td>--</td>
</tr>
<tr>
<td>Value in 2016</td>
<td>$3.4 billion, bought by Abbott</td>
<td>$2.7 billion, bought by Medtronic</td>
<td>--</td>
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</tbody>
</table>
Current status of technology

<table>
<thead>
<tr>
<th>Component</th>
<th>Patent</th>
<th>Bench top</th>
<th>Durability</th>
<th>Animal testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless power</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Controller</td>
<td></td>
<td></td>
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<tr>
<td>Pump</td>
<td></td>
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<tr>
<td>Maintenance of pump</td>
<td></td>
<td></td>
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</tbody>
</table>
## Market Potential

<table>
<thead>
<tr>
<th>Total Patients</th>
<th>5,000,000 annually</th>
</tr>
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<tbody>
<tr>
<td>Target Patients</td>
<td>30% Total Patients</td>
</tr>
<tr>
<td>Target Penetration</td>
<td>35% of Target Patients</td>
</tr>
<tr>
<td>Target Population</td>
<td>525,000 Patients</td>
</tr>
<tr>
<td>Estimated Unit Pricing</td>
<td>$20,000 per unit</td>
</tr>
<tr>
<td>Est. Initial Revenue**</td>
<td>$10.5 billion annually</td>
</tr>
</tbody>
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**US only: additional upside opportunity in Europe and Asia**
Integration/Durability: $500,000
Hemolysis testing: $500,000
Non GLP animal testing: $1 million
GLP animal testing: $1.5 million

Total cost to regulatory filing: $15 million
Product in market: 2023
Team: diverse expertise

Surgeons
Physicians/cardiologists
Electrical Engineers
Mechanical engineers
Biomedical engineers
Hydraulic engineers
Computer science engineering
Cardiac physiologist
Radiologist, interventional
Stent manufacturing experts
Veterinarians
Regulatory experts

Over the last 5 years: 32 team members
Bonde Lab: leading innovation

Featured in *The Economist* and *NBC news*

Most coveted awards from American Society for artificial Internal Organs, NIH, AHA for innovation
Lets mend those broken hearts and give life a chance...

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