ReZolve2®
Bioresorbable Coronary Scaffold
Clinical Program Update

Dr. David Muller
St Vincent’s Hospital
Sydney, Australia
Potential conflicts of interest

Speaker's name: Dr. David Muller

☐ I do not have any potential conflict of interest

☑️ I have the following potential conflicts of interest to report:

Institutional grant/research support: REVA Medical, Inc.

Medical Advisory Board: Medtronic, Boston Scientific

Speaker’s honoraria: Abbott Vascular, St Jude Medical
ReZolve²® Sirolimus-Eluting Bioresorbable Coronary Scaffold

Unique Slide & Lock Design

Drug-Eluting (Sirolimus)

Radiopaque
Strong and Resilient Polymer

Desaminotyrosine-derived polycarbonate material that is radiopaque
Novel Approach for Scaffold Performance

**Proprietary Polymer**
- Desaminotyrosine-derived polycarbonate
- Biocompatible for safe resorption
- X-ray visible to aid in scaffold placement
- Broad degradation tunability
- Standard handling (not temp sensitive, no refrig.)

**High Performance Design**
- Traditional inflation (not stepped)
- Strength to treat real world lesions
- Expansion to higher diameters without breaking (3.0 diameter can go up to 3.9 mm during postdilatation)
- Conforms to vessel shape
Resorption Pathway

- **REVA Polymer**
- **Molecular Weight**
- **Mass Loss**
- **I₂DAT, Tyrosol, CO₂**
- **Excretion**

**Generalized Polymer Degradation Curves**

- **H₂O**
- **Hydrolysis**

- **Absorption and excretion by 3-4 years**
- **~85% MW degradation by 12 months**
- **~ 4 Years**

* Pietrzak WS. Craniofacial Surg 1997;2:92-96
**Demonstrated Safety**

*ReZolve2 Scaffold Degradation & Healing*

- Preclinical studies evaluated in 100s of animals over 11 years
- Benign degradation process
- Vasomotion restoration by ~12 - 24 months
- Absorption and excretion within 48 months

**Images:**
- 0-3 Months
- 6-24 Months
- 36-48 Months
- Non-Degraded
- Highly Degraded & Resorbing
- 90+% Resorbed
Release Kinetics of Sirolimus

Elution profile comparable to commercially successful products

80μg of Sirolimus abuminally coated on 3.0 mm x 18 mm scaffold
ReZolve2 Clinical Program
ReZolve2 Sirolimus-Eluting Bioresorbable Coronary Scaffold

Initiated March 2013

- Enrolled 112 Patients
- Primary Endpoint(s):
  - Freedom from ischemia-driven target lesion revascularization at 6 months
  - Quantitative measurements at 9 or 12 months (QCA/IVUS) – Based upon cohort assignment
ReZolve2
Device Specifications

3.0 mm x 18 mm
Study Treatment range: 2.75 mm to 3.3 mm

Post-dilation up to 3.9 mm
6 Fr. profile
80μg Sirolimus

Fully radiopaque
Rapid exchange delivery system
Balloon expandable

No special storage or handling
ReZolve2 Clinical Program
Investigators

• Australia
  – Dr. David Muller
  – Dr. Darren Walters
  – Dr. Robert Whitbourn
  – Dr. Alan Whelan
  – Dr. Eric Yamen
  – Dr. Sharad Shetty

• Brazil
  – Dr. Alexandre Abizaid

• Germany
  – Dr. Norbert Frey
  – Dr. Weber-Albers
  – Dr. Stephen Achenbach
  – Dr. Adnan Kastrati
  – Dr. Holger Nef
  – Dr. Johannes Brachmann
  – Dr. Malte Kelm

• Germany con’t
  – Dr. Volker Schaechinger
  – Dr. Axel Schmermund
  – Dr. Klaus Tiroch

• New Zealand
  – Dr. Mark Webster
  – Dr. Seif El Jack
  – Dr. John Ormiston

• Poland
  – Dr. Janusz Kochman
  – Dr. Roman Wojdyla
  – Dr. Dr. Dariusz Dudek

• Slovenia
  – Dr. Vojko Kanic
ReZolve2 Clinical Program
Inclusion/Exclusion Criteria

• Primary Inclusion Criteria
  – Clinical evidence of myocardial ischemia or positive functional test
  – Visually estimated stenosis >50% and <100%
  – Reference vessel diameter 2.75 mm – 3.3 mm (confirmed by QCA)
  – Lesion length ≤ 14mm

• Primary Exclusion Criteria
  – Myocardial infarction within 24 hours of the procedure
  – Ejection fraction <30%
  – Target vessel is totally occluded (TIMI 0 or 1)
  – Significant stenosis (>50%) proximal or distal to target lesion
  – Highly calcified lesion
Enrollment Process

- **Step 1** Preliminary Lesion Assessment
  - Preliminary angiographic evaluation
  - Visual assessment of reference vessel diameter

- **Step 2** Lesion Pre-dilation

- **Step 3** Final Lesion Assessment
  - Angiographic evaluation
  - QCA verification of reference vessel diameter
  - Confirm patient eligibility: **Enroll Patient**

- **Step 4** Implant Scaffold

- **Step 5** Post – Dilation: At physician discretion

- **Step 6** Final Angio, IVUS &/or OCT evaluation
Case Review

9 Month Protocol Required Follow-up
Patient: 001-001
ReZolve2 Scaffold Case Review
Case Overview

• Demographics & Physical Exam
  – Age = 67
  – Gender = Male
  – Height = 179 cm
  – Weight = 82 kg
  – Heart Rate = 71 bpm
  – Blood Pressure = 124/84

• Patient History
  – No current angina
  – History of Hypertension & Hyperlipidemia
  – No prior PCI
  – Non-Smoker
  – No Diabetes
  – LVEF = 60%

• Summary
  – Positive Functional Study
  – Mid-LAD Lesions
    ▪ Reference Vessel Diameter = 3.1 mm
    ▪ Lesion Length = 11 mm
    ▪ Baseline Stenosis approx. 65%
  – Enrolled on June 23, 2014
    ▪ Implanted REVA ReZolve2 Scaffold
  – 9 Mo. Follow-up on: March 25, 2014
ReZolve2 Scaffold Case Review

BASELINE ANGIOGRAPHY

St Vincent’s Hospital
Sydney, Australia

SCAFFOLD DEPLOYMENT
INITIAL RESULT
(3.0 x 18mm)

POST DILATATION
(3.5 x15mm)
Angiographic Results

Baseline Pre-Stenting

Baseline Post-Stenting

9 Month Follow-up
9 Month IVUS Result

Proximal Scaffold

Scaffold widely patent at 9 months

Mid Scaffold

Distal Scaffold
Case Review

5 Month Unscheduled Follow-up

Patient: 003-001

TLR – Site estimated 90% Stenosis
ReZolve2 Scaffold Case Review
Patient Demographics

• Demographics & Physical Exam
  – Age = 61
  – Gender = Female
  – Height = 150 cm
  – Weight = 51 kg
  – Heart Rate = 63 bpm
  – Blood Pressure = 133/60

• Patient History
  – No current angina
  – History of Hypertension & Hyperlipidemia
  – No prior PCI
  – Prior Smoker
  – No Diabetes
  – LVEF = 69%

• Case Summary
  – Positive Functional Study
  – Mid-RCA Lesions
  – Est. 80% diameter stenosis
  – Enrolled on August 16, 2013
  – Unscheduled follow-up 5 months post procedure on: January 22, 2014 due to recurrent angina
Baseline Assessment

- RCA Lesion
- Est. % Dia. Stenosis = 80%
- Est. RVD = 2.86mm
- Lesion Length = 14 mm
  - Appears to be shorter
- TIMI Score = III

Pre-dilation

- NC Quantum 2.75 x 12mm
- Inflation: 14 atm for 20 sec
- % dia. stenosis result = 20%
- TIMI = III
- No dissection
ReZolve2 Scaffold Case Review
Baseline Day 0 Images

- **QCA Assessment**
  - Distal Reference = 3.1mm
  - Proximal Reference = 3.1mm
  - ARVD = 3.1mm
  - Target Inflation Dia. = 3.3mm
  - Target Inflation Pres. = 12 atm

- **Actual Deployment Data**
  - Lot # = BR13372
  - Serial # = 4124
  - Inflation Pressure = 12 atm
  - % dia. stenosis result = 0%
  - No dissection

**Final Result**
ReZolve2 Scaffold Case Review
Baseline OCT Imaging

Proximal Scaffold

Mid Scaffold

Distal Scaffold
• FUP Angiographic Assessment
  - High degree of diffuse restenosis throughout length of scaffold
ReZolve2 Scaffold Case Review
5 Month Follow-up Imaging

• Case Analysis
  – Scaffold was placed more distal than intended.
  – May have contributed to restenosis of scaffold

Baseline Reference Marks
Proximal Edge of Scaffold
Reference Branch
Max Lesion
Reference Branch

Post Implant Image
## Preliminary Baseline Characteristics (n=112)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Age (average years)</td>
<td>61</td>
</tr>
<tr>
<td>Male</td>
<td>72%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>23%</td>
</tr>
<tr>
<td>Current/Former Smoker</td>
<td>68%</td>
</tr>
<tr>
<td>Hypertension (requiring medication)</td>
<td>82%</td>
</tr>
<tr>
<td>Hyperlipidemia (requiring medication)</td>
<td>75%</td>
</tr>
<tr>
<td>Prior PCI</td>
<td>60%</td>
</tr>
<tr>
<td>Prior CABG</td>
<td>0%</td>
</tr>
<tr>
<td>Prior MI</td>
<td>41%</td>
</tr>
<tr>
<td>LVEF</td>
<td>60%</td>
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</tbody>
</table>
### ReZolve2 Clinical Program

#### Target Lesion Location (n=111)

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAD</td>
<td>30.6%</td>
<td>34</td>
</tr>
<tr>
<td>LCX</td>
<td>30.6%</td>
<td>34</td>
</tr>
<tr>
<td>RCA</td>
<td>38.7%</td>
<td>43</td>
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</table>

#### ACC/AHA Lesion Class (n=110)

<table>
<thead>
<tr>
<th>Class</th>
<th>Percentage</th>
<th>Count</th>
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<tbody>
<tr>
<td>Type A</td>
<td>11.8%</td>
<td>13</td>
</tr>
<tr>
<td>Type B1</td>
<td>41.8%</td>
<td>46</td>
</tr>
<tr>
<td>Type B2</td>
<td>41.8%</td>
<td>46</td>
</tr>
<tr>
<td>Type C</td>
<td>4.6%</td>
<td>5</td>
</tr>
</tbody>
</table>

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**Core Lab Analysis**  
Alexandra Lansky, MD  
*Director, Yale Heart and Vascular Clinical Research*  
Yale Cardiovascular Research Group
**Baseline Angiographic Characteristics (n=110)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Pre-Procedure RVD (mm)</td>
<td>2.90 ± 0.25</td>
</tr>
<tr>
<td>Pre-Procedure MLD (mm)</td>
<td>0.94 ± 0.29</td>
</tr>
<tr>
<td>Pre-Procedure %DS</td>
<td>67 ± 10</td>
</tr>
<tr>
<td>Mean Lesion Length (mm)</td>
<td>11.10 ± 3.07</td>
</tr>
</tbody>
</table>

**Final Post-Procedure**

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<table>
<thead>
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<tbody>
<tr>
<td>Final RVD (mm)</td>
<td>2.94 ± 0.26 (n=109)</td>
</tr>
<tr>
<td>Final In-stent MLD (mm)</td>
<td>2.80 ± 0.24 (n=105)</td>
</tr>
<tr>
<td>Final In-stent %DS</td>
<td>5 ± 8 (n=104)</td>
</tr>
<tr>
<td>Acute Recoil (%)</td>
<td>-1 ± 8 (n=73)</td>
</tr>
</tbody>
</table>

**Core Lab Analysis**
Alexandra Lansky, MD
Director, Yale Heart and Vascular Clinical Research
Yale Cardiovascular Research Group
# ReZolve2 Clinical Program

<table>
<thead>
<tr>
<th>Acute Procedural Outcomes</th>
<th></th>
<th>n=</th>
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<tbody>
<tr>
<td><strong>Technical Success</strong> (1)</td>
<td>96%</td>
<td>n=112</td>
</tr>
<tr>
<td><strong>Acute Procedural Success</strong> (2)</td>
<td>98%</td>
<td>n=107</td>
</tr>
<tr>
<td><strong>Clinical Procedural Success</strong> (3)</td>
<td>97%</td>
<td>n=105</td>
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</table>

(1) Defined as successful delivery and deployment of the device. Devices not delivered primarily due to profile.
(2) Defined as technical success with residual stenosis <50% with no immediate (in-hospital) MACE.
(3) Defined as acute procedure success without the occurrence of MACE through 30 days.
ReZolve2 Clinical Program
Interim Results

<table>
<thead>
<tr>
<th>Period</th>
<th>MACE Events</th>
<th>n</th>
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<tbody>
<tr>
<td>In-Hospital</td>
<td>2 MACE Events</td>
<td>n=107</td>
</tr>
<tr>
<td></td>
<td>1 TLR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 post-procedure MI</td>
<td></td>
</tr>
<tr>
<td>30-Day Results</td>
<td>1 MACE Event</td>
<td>n=106</td>
</tr>
<tr>
<td></td>
<td>1 TLR</td>
<td></td>
</tr>
<tr>
<td>90-Day Results</td>
<td>0 MACE Events</td>
<td>n=105</td>
</tr>
<tr>
<td>6-Month Results</td>
<td>3 MACE Events</td>
<td>n=67¹</td>
</tr>
<tr>
<td></td>
<td>2 TLRs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 patient death</td>
<td></td>
</tr>
</tbody>
</table>

(1) Follow up is currently ongoing. Data represents reported events through April 30, 2014.
ReZolve2 Clinical Program
Findings

• Successful acute demonstration of ReZolve2 platform
  – Demonstration of ease-of-use features: single step inflation, radiopacity, clinically relevant sizing and standard storage conditions
  – Demonstration of acute performance: 96% delivery success and <1.0% acute recoil
  – 9 & 12 month follow-up ongoing

• Areas needed further improvement defined
  – Reduction in overall device profile and strut thickness
  – Improvement in mounted scaffold surface smoothness

Learnings incorporated into Fantom Program
Thank you