First-in-Human Clinical Study with a Novel Drug-Filled Stent: 9-Month Clinical, Angiographic, IVUS, and OCT Outcomes from the RevElution Study

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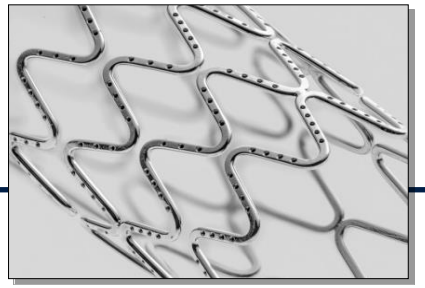
and the RevElution Study Investigators

Disclosure Statement of Financial Interest

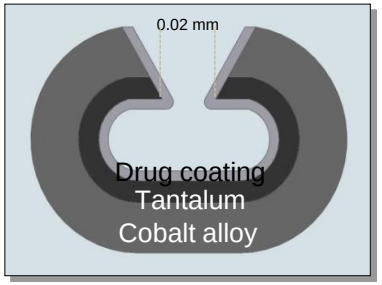
Within the past 12 months, I, Stephen Worthley, or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Grant/Research Support	• -
• Consulting Fees/Honoraria	• St Jude Medical, Medtronic
• Major Stock Shareholder/Equity	• -
• Royalty Income	• -
• Ownership/Founder	• -
• Intellectual Property Rights	• -
• Other Financial Benefit	• -

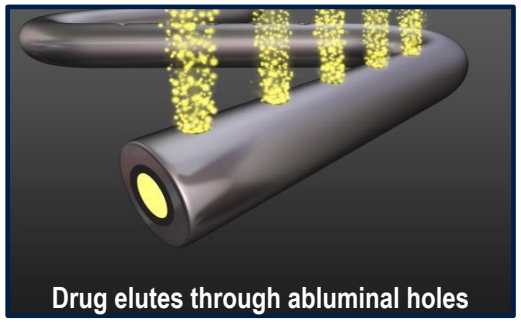
Drug-Filled Stent
Concept

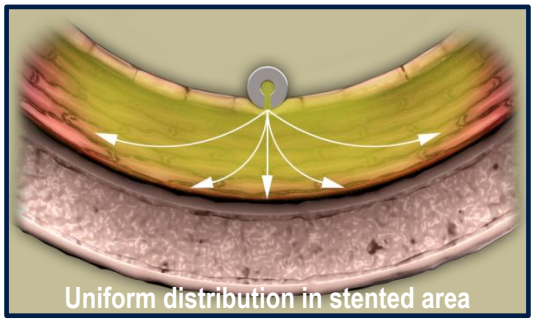


- The drug-filled stent (DFS, Medtronic, Santa Rosa, CA) is a novel polymer-free DES (81µm struts). Zero polymer exposure avoids adverse effects of polymer-induced inflammation and could potentially allow for a shorter DAPT duration
- DFS is made from a tri-layer wire:
  - Outer cobalt alloy layer for strength
  - Middle tantalum layer for radiopacity
  - Core material is removed and becomes an inner lumen that is continuously coated with drug in a solid state



- Drug (sirolimus) is protected and contained inside the stent
- Drug releases through abluminal laser-drilled holes
- Drug elution is controlled through natural diffusion via direct interaction with the vessel wall
- Elution profile is controlled by the number and size of the holes, resulting in a sustained elution similar to durable polymer DES





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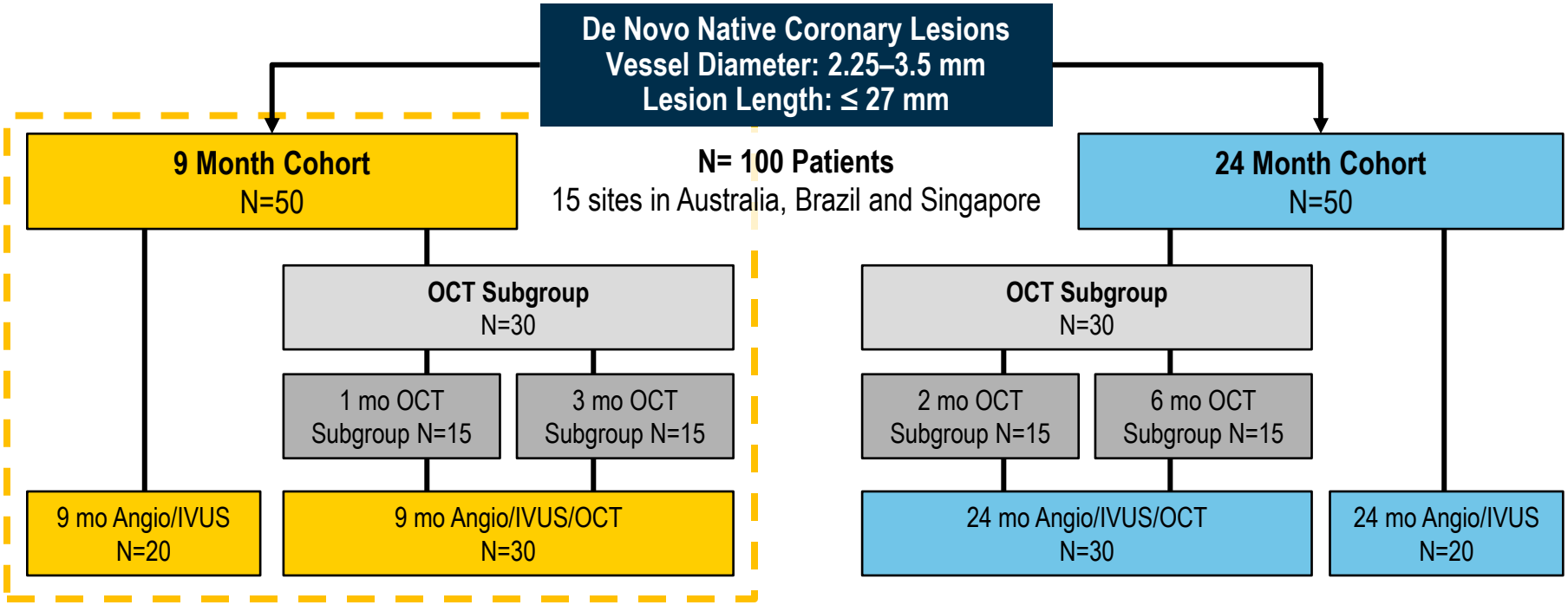
Study Design



PRIMARY ENDPOINT:	**In-stent late lumen loss at 9 months in 9M cohort (50 pts)**
Key 2˚ Endpoints:	Major Adverse Cardiac Events (MACE), Target Lesion Failure (TLF) and components
QCA / IVUS Endpoints:	% diameter stenosis, in-segment late lumen loss, NIH volume and % volume obstruction
Key OCT Endpoints:	Stent strut tissue coverage, neointimal tissue thickness, stent (mal)apposition, % volume obstruction and NIH tissue characterization
Pharmacokinetic Analysis:	12 PK timepoints up to 30 days will be assessed
DAPT Regimen:	ASA indefinitely and clopidogrel ≥ 6 months (12 months in pts not at high risk of bleeding)

NCT02480348

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Baseline Patient Characteristics

%	9 Month Cohort N=50 pts, 56 lesions
Age, years (mean±SD)	66.2 ± 10.1
Male	76.0
Diabetes mellitus	30.0
Insulin treated	10.0
Hypertension	76.0
Hyperlipidemia	84.0
Current smoker	12.0
Family history of CAD	42.6
Prior MI	20.0
Prior PCI	16.0
Prior CABG	10.0
Reason for revascularization	
Unstable angina	18.0
Stable angina	56.0
Positive functional study	30.0
Silent ischemia	6.0

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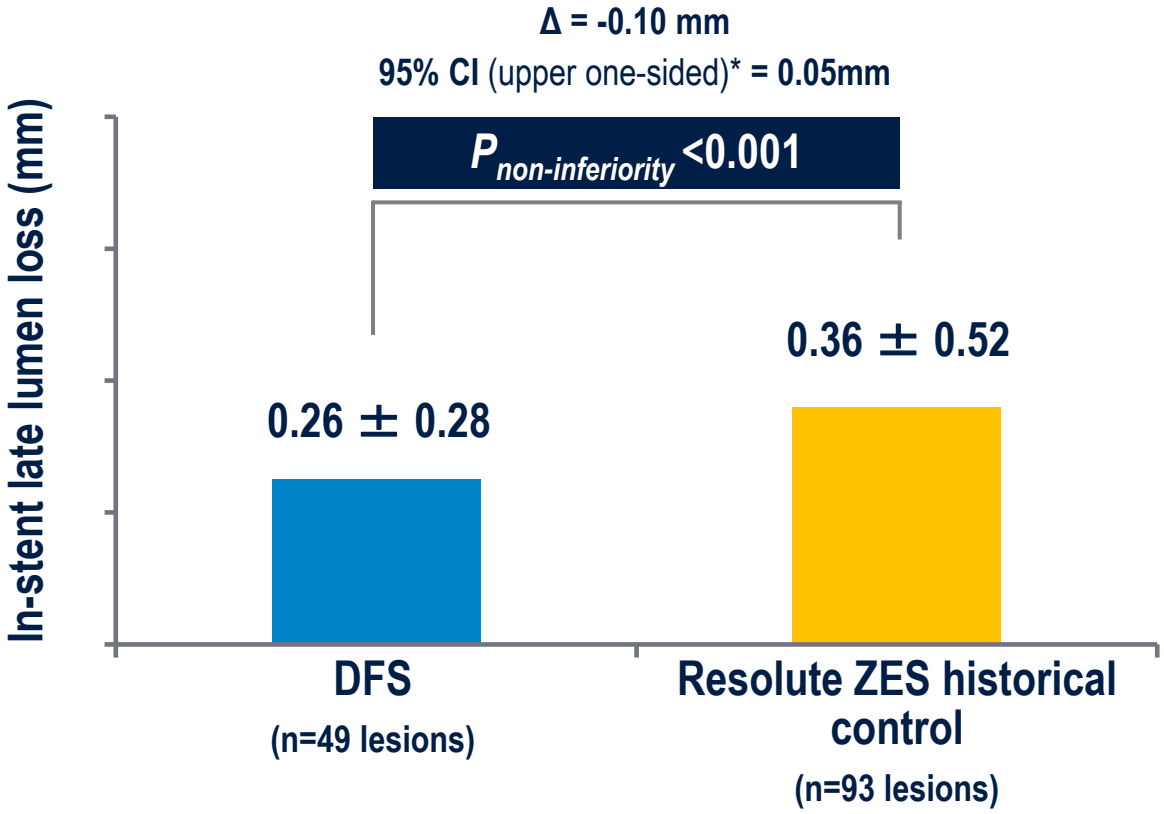
Baseline Angiographic Characteristics

%	9 Month Cohort N=50 pts, 56 lesions
Target vessel location	
LAD	52.0
LCX	32.0
RCA	26.0
ACC/AHA lesion class – B2	50.0
– C	26.8
TIMI 3 flow	98.2
RVD (mm)	2.70 ± 0.43
MLD (mm)	0.97 ± 0.28
% Diameter stenosis	63.8 ± 9.5
Lesion length (mm)	12.85 ± 5.21
Lesions treated per patient	1.1 ± 0.3
Radial approach	86.0
Lesion success[1]	100.0
Device success[2]	100.0
Procedure success[3]	100.0

[1] The attainment of <50% residual stenosis of the target lesion using any percutaneous method.
[2] The attainment of <50% residual stenosis of the target lesion using only the DFS
[3] The attainment of <50% residual stenosis of the target lesion and no in-hospital MACE.

RevElution Trial – Primary Endpoint

Late Loss at 9 Months



Primary endpoint met, demonstrating non-inferiority

*The CI is adjusted to propensity score, based on lesion-length, baseline RVD, age, sex, diabetes, history of MI and worst CCS Angina Class as independent variables.

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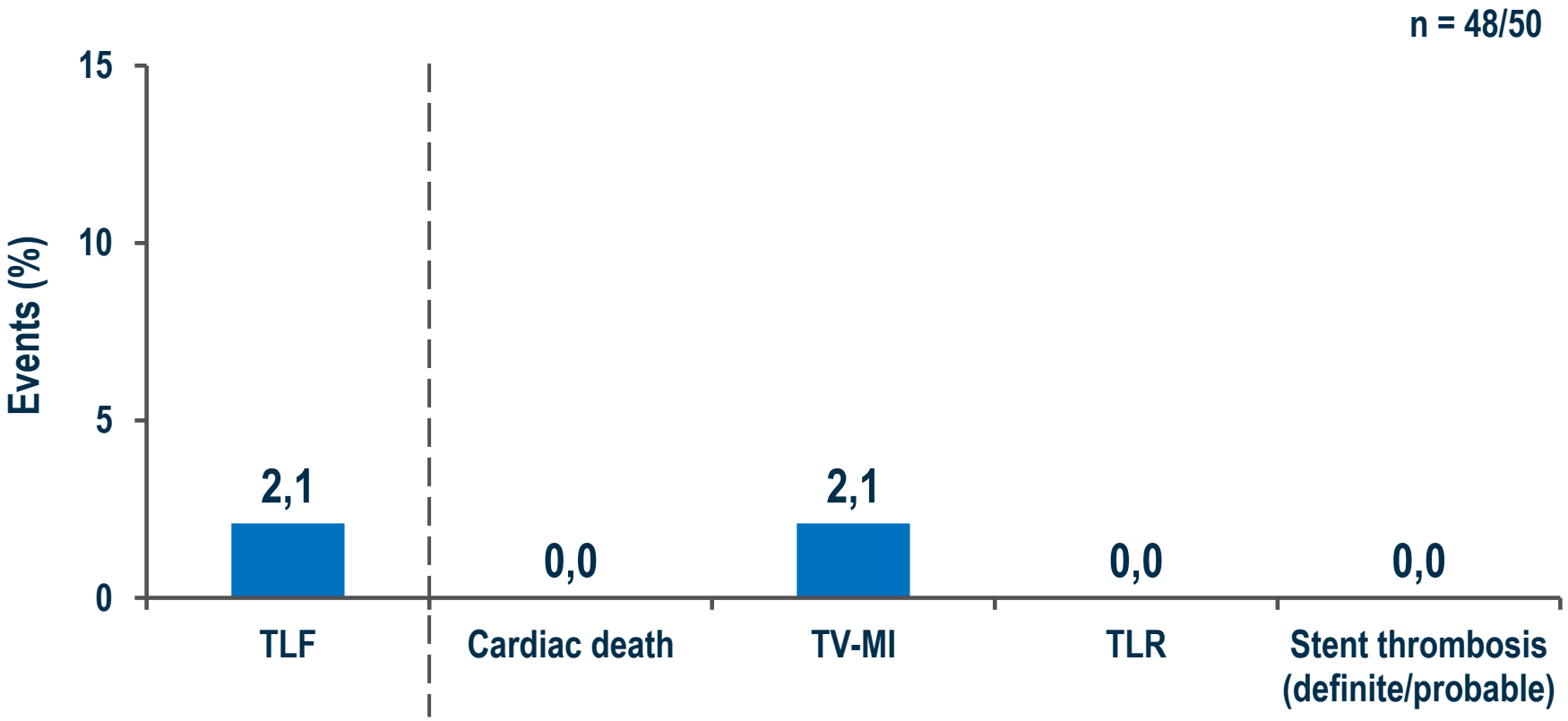
Clinical Results at 9 Months



One patient developed ischemia symptoms while having a CT guided lung biopsy for lung cancer. Based on elevated troponin levels, CEC adjudicated event as a NQMI.

Target lesion failure (TLF) is defined as cardiac death, target vessel MI or ischemia-driven TLR.

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Conclusions

- The Drug-Filled Stent (DFS) is a novel polymer-free DES with sirolimus residing on the inside of the stent and eluted through abluminal holes
- In the first 50 patient cohort, the polymer-free DFS was safe and effective with late lumen loss non-inferior to historical control, with minimal neointima hyperplasia and 0% binary restenosis at 9 months
- DFS implantation resulted in a high degree of early stent strut coverage and 0% late incomplete malapposition, indicative of rapid early healing
- The TLF rate was low (2.1%) at 9 months with no stent thrombosis
- DFS may avoid polymer-associated adverse vascular responses, potentially allowing for shorter duration of DAPT