The Abbott Vascular BVS Program
A Fully Bioresorbable Vascular Scaffold

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

SE 2928803 Rev E

Bioresorbable Scaffold – Rationale and Goals

Rationale: Vessel scaffolding is only needed transiently*

Goal: Revascularize the vessel like a metallic DES, then resorb naturally into the body.

Potential benefits:

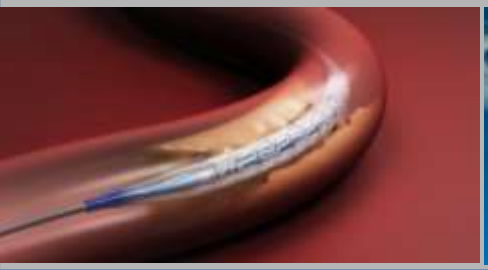
- Restoration of natural physiologic vasomotor function in some patients
- Elimination of chronic sources of vessel irritation and sources for chronic inflammation
- Possibly avoid current challenges with leaving a metal implant behind
- Potentially reduce the need for prolonged DAPT
- No permanent implant to complicate future interventions and re-interventions, particularly in younger patients
- Non-invasive imaging with MSCT or MRA without 'blooming artifact'

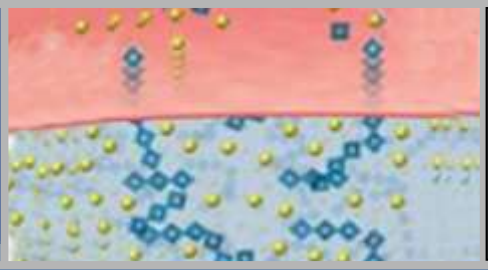
*Serruys PW, et al., *Circulation* 1988; **77:** 361. Serial study suggesting vessels stabilize 3-4 months following PTCA.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Abbott Vascular Everolimus-Eluting Bioresorbable Vascular Scaffold Components

ML VISION Delivery System	Bioresorbable Scaffold	Bioresorbable Coating	Everolimus
• Seven generations of MULTI-LINK success • World-class deliverability	• Polylactide (PLLA) • Naturally resorbed, fully metabolized	• Polylactide (PDLLA) coating • Fully biodegradable	• Similar dose density and release rate to XIENCE V

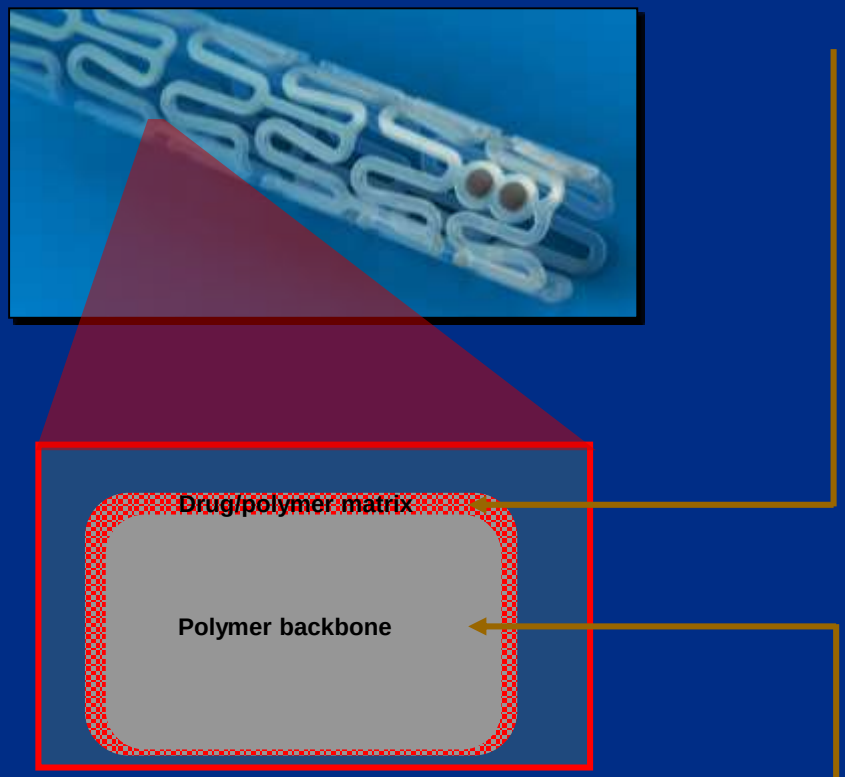





All illustrations are artists' renditions

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Bioresorbable Polymer



Everolimus/PDLLA Matrix Coating

- Thin coating layer
- Amorphous (non-crystalline)
- 1:1 ratio of Everolimus/PLA matrix
- Conformal Coating, 2-4 μm thick
- Controlled drug release

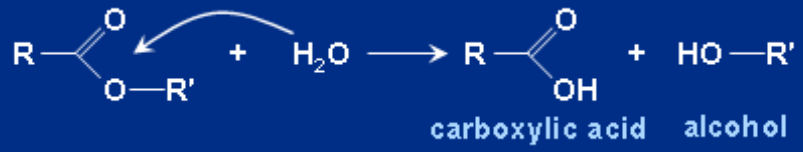
PLLA Scaffold

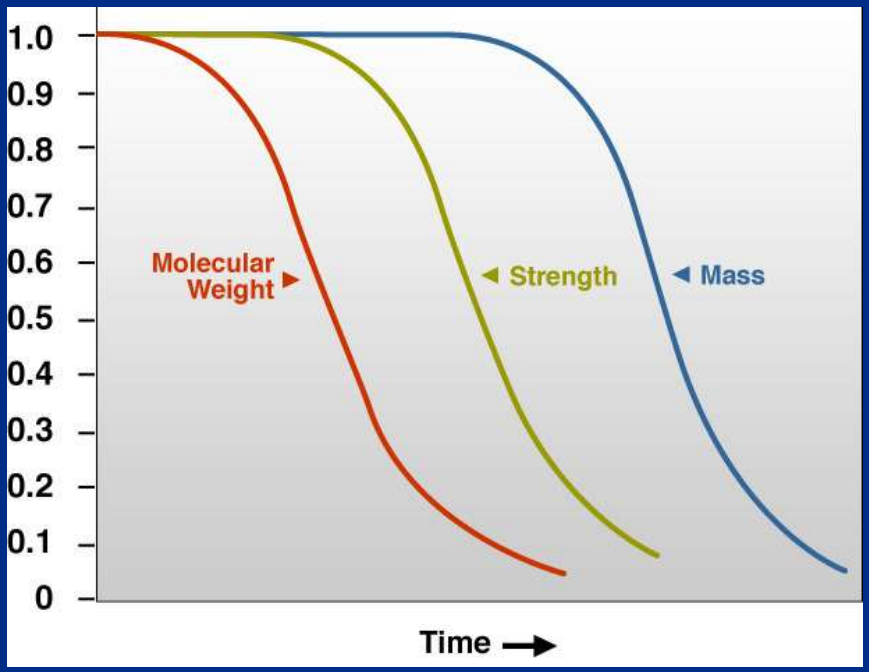
- Highly crystalline
- Provides device integrity
- Processed for increased radial strength

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Polylactide Degradation by Hydrolysis

- Primary mode of degradation is by hydrolysis of ester bonds
- Water preferentially penetrates amorphous regions of the polymer matrix
- Hydrolysis initially results in a loss of molecular weight, but not radial strength, as the strength comes from crystalline domains
- Once crystalline domains are hydrolyzed, there is mass loss

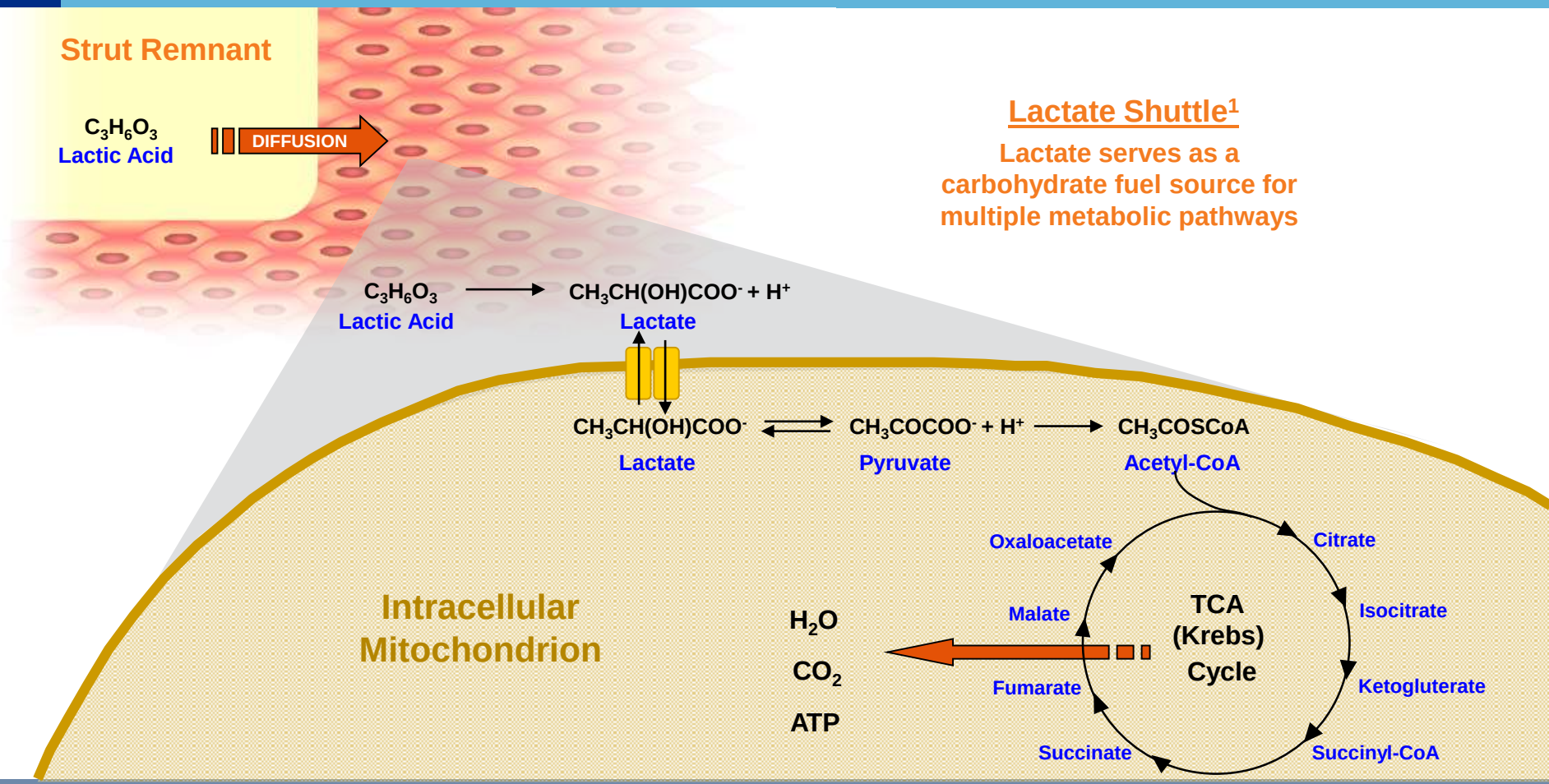




[1]Pietrzak WS, et al. J. Craniofaxial Surg, 1997; 2: 92-96.
Middleton JC, Tipton AJ, Biomaterials, 21 (2000) 2335-2346.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Polylactide Degradation & Lactate Metabolism



1. Philp, A., et.al. *J. Exp. Biol*. 2005; 208: 4561-4575.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Porcine Coronary Artery: Representative Photomicrographs (2x)

BVS Cohort A

CYPHER

Photos taken by and on file at Abbott Vascular.

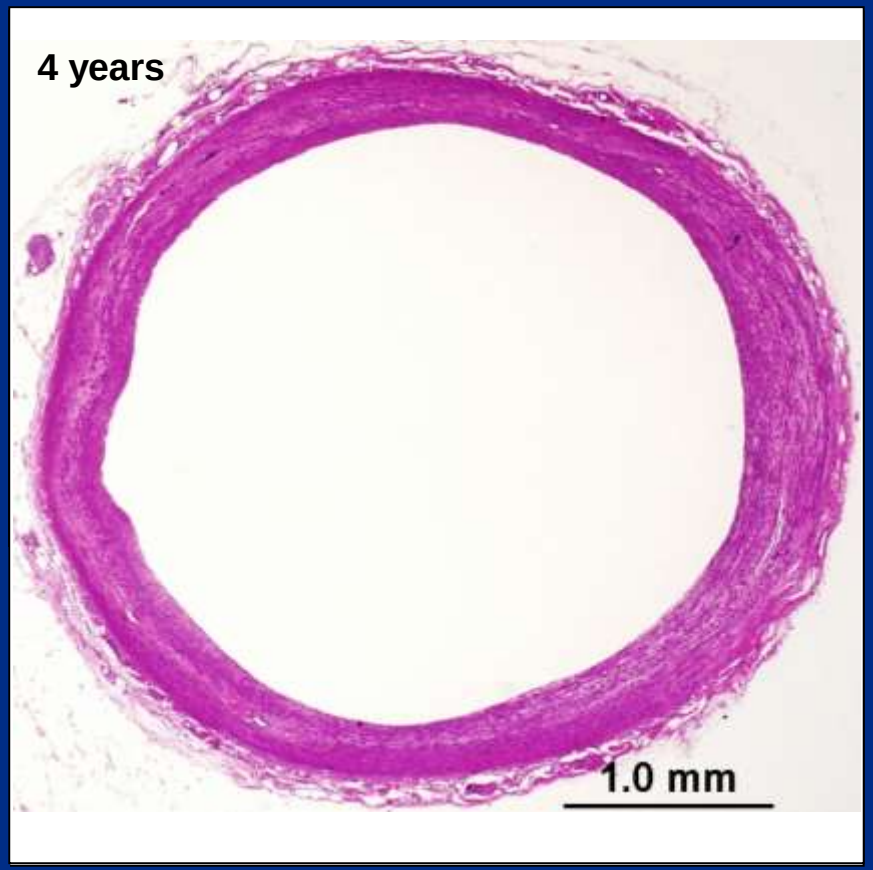
Tests performed by and data on file at Abbott Vascular.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Vascular Response to BVS at 2, 3 & 4 years: Arterial Integration and Accommodation

- Mass loss data suggests 100% of material mass has been lost at 2 years
- The shape of struts is still apparent at 2 years, although the device is fully resorbed
- No inflammation around the pre-existing strut regions
- 3 years: struts fully replaced by tissue
- 4 years: sites of pre-existing struts are indiscernible

Representative porcine coronary arteries, 2x objective

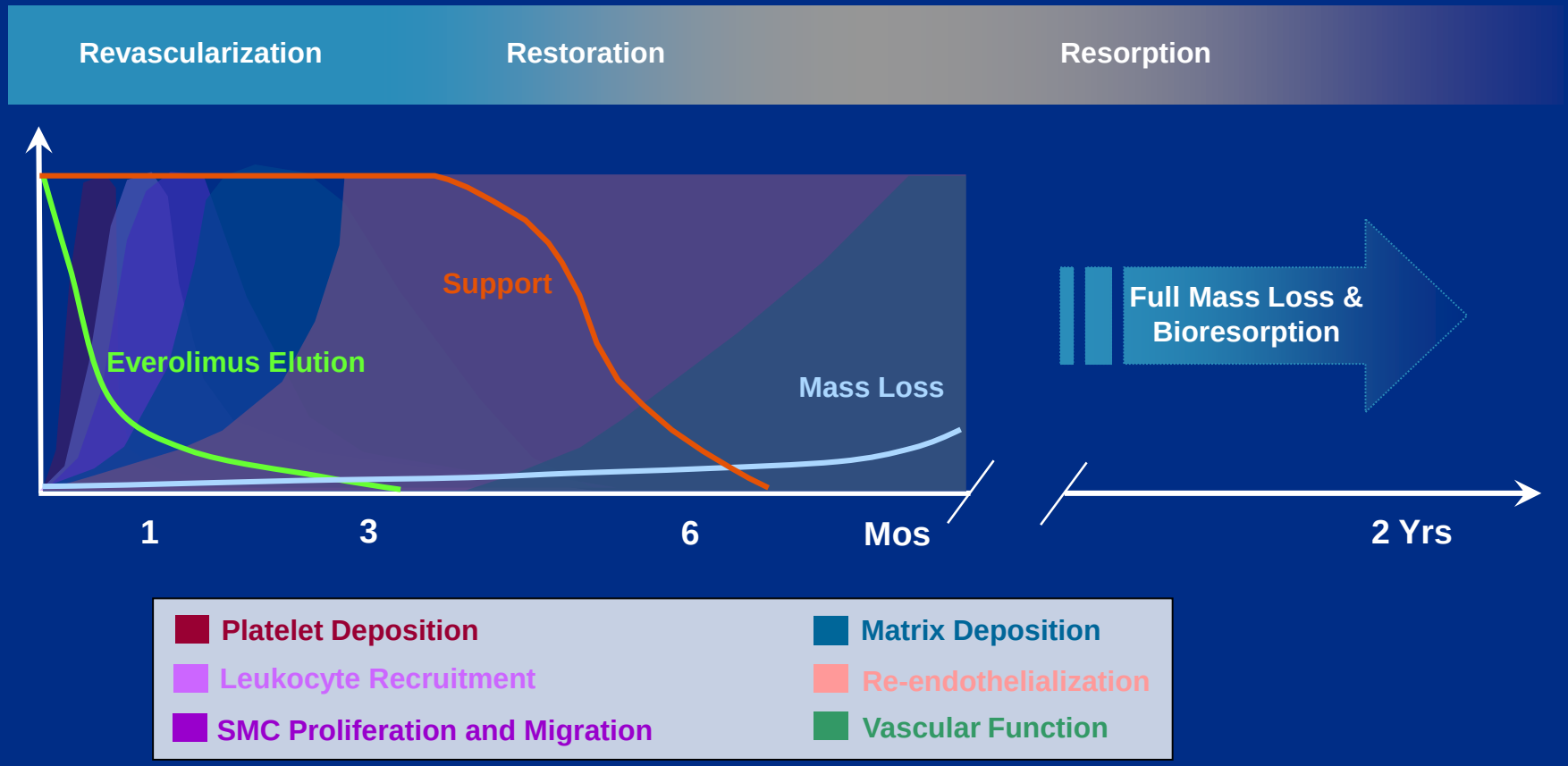


Photos taken by and on file at Abbott Vascular.

Tests performed by and data on file at Abbott Vascular.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

What is Required of a Fully Bioresorbable Scaffold to Fulfill the Desire for 'Vascular Restoration Therapy'?



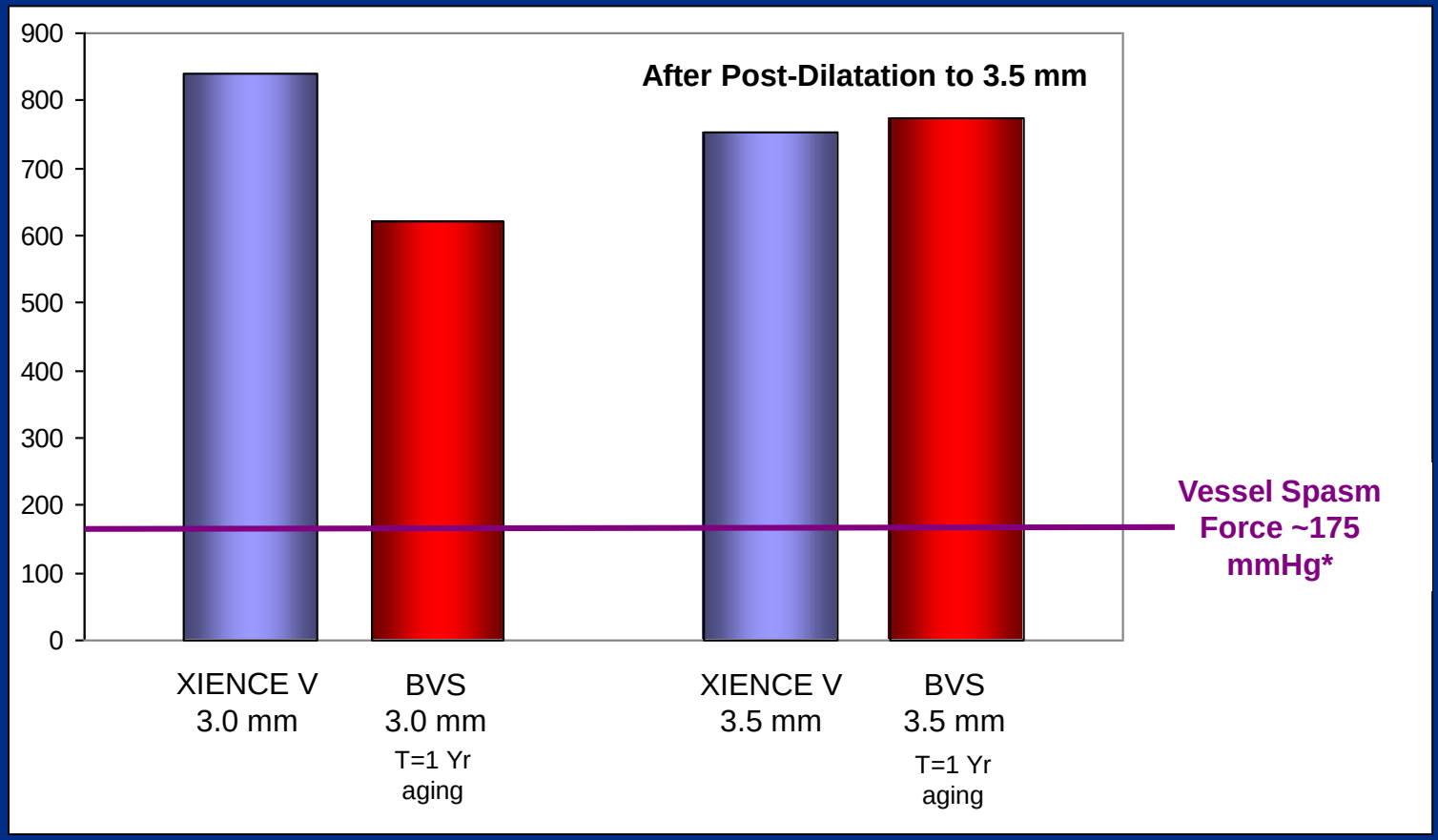
Forrester JS, et al., *J. Am. Coll. Cardiol.* 1991; **17:** 758.
Oberhauser JP, et al., *EuroIntervention Suppl.* 2009; **5:** F15-F22.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

What is Required of a Fully Bioresorbable Scaffold to Fulfill the Desire for 'Vascular Restoration Therapy'?

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Radial Strength



Radial strength comparable to metal stent at T=0

*Agrawal, *et al., Biomaterials* 1992

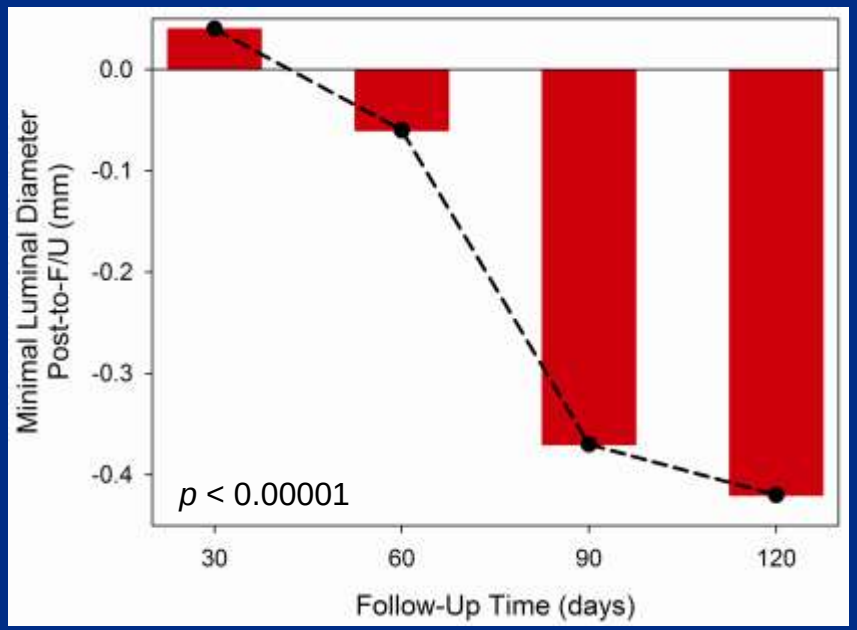
Tests performed by and data on file at Abbott Vascular.

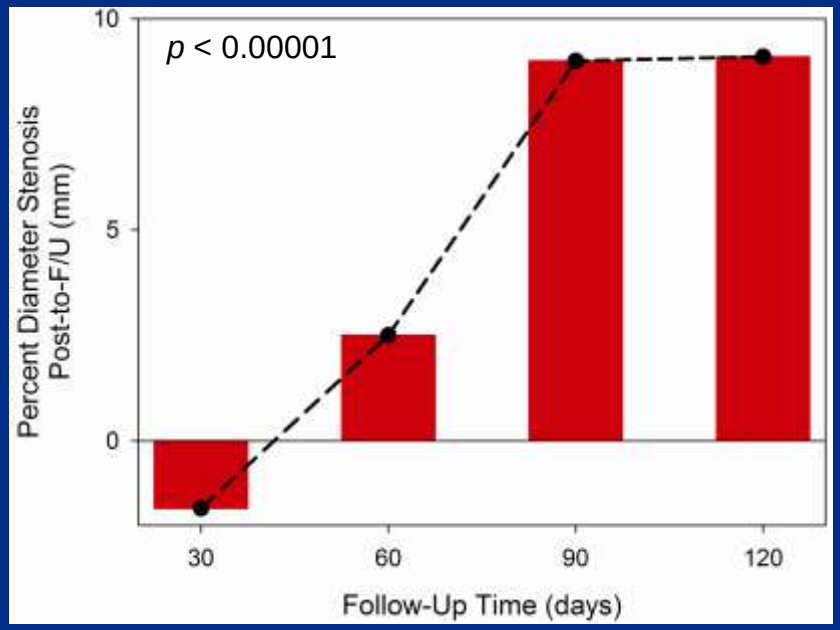
Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

What is the Minimum Duration of Radial Support?

Quantitative angiographic study in 342 consecutive patients at 1, 2, 3, and 4 months

n = 342 patients (*n* = 93 at 30-day F/U; *n* = 79 at 60-day F/U; *n* = 82 at 90-day F/U; *n* = 88 at 120-day F/U)



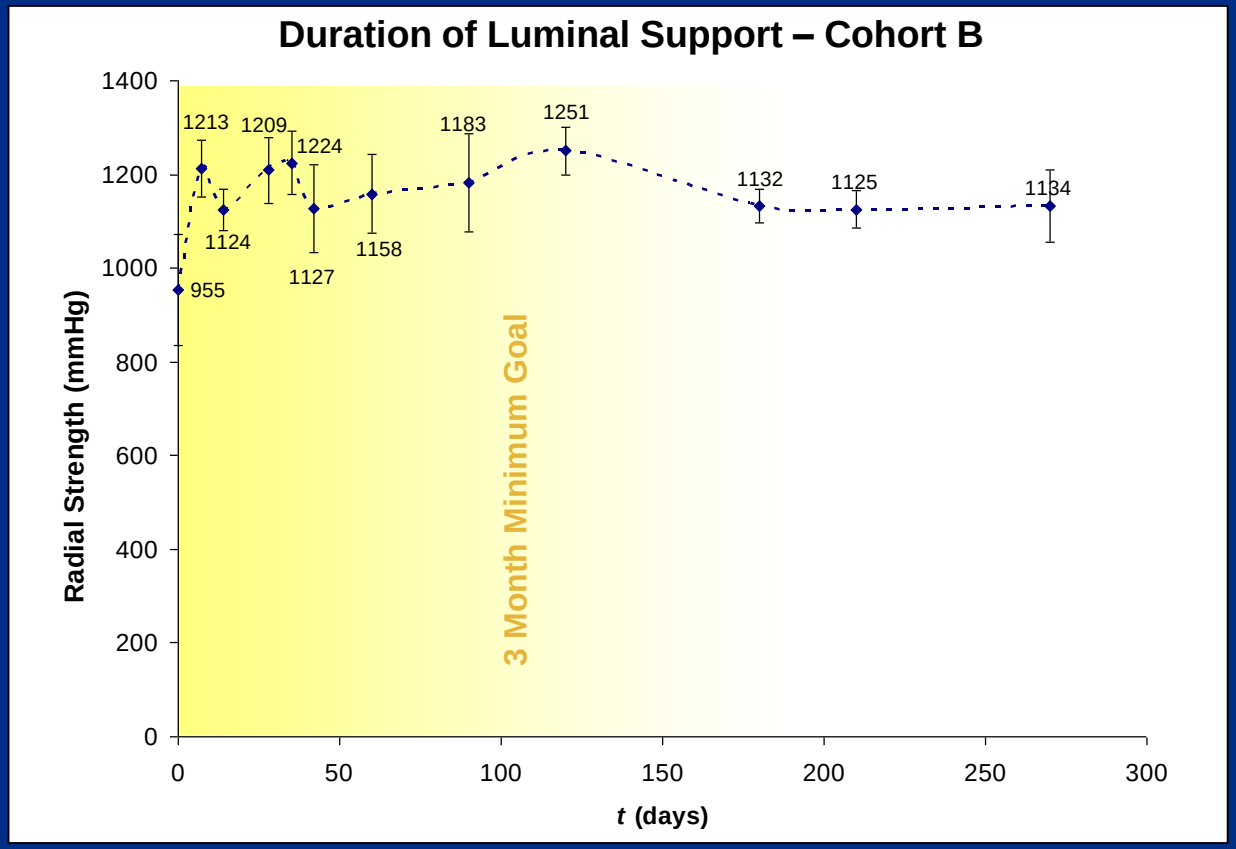


The lumen appears to stabilize **approximately three months** after PTCA.

Serruys PW, et al., *Circulation* 1988; **77:** 361.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Radial Strength Over Time

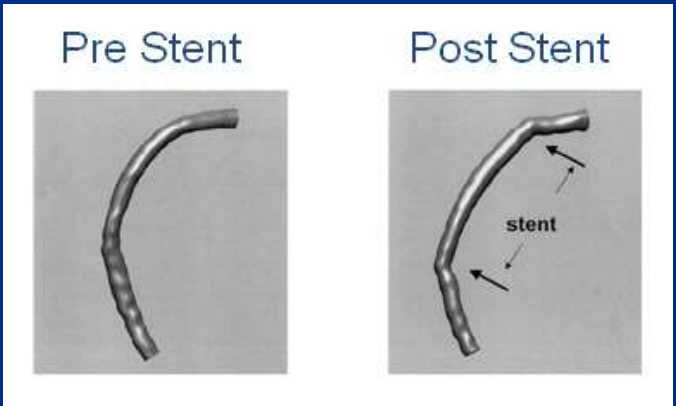


Tests performed by and data on file at Abbott Vascular – in-vitro degradation testing (soaked at 37° C PBS).

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Importance of Respecting Natural Vessel Curvature

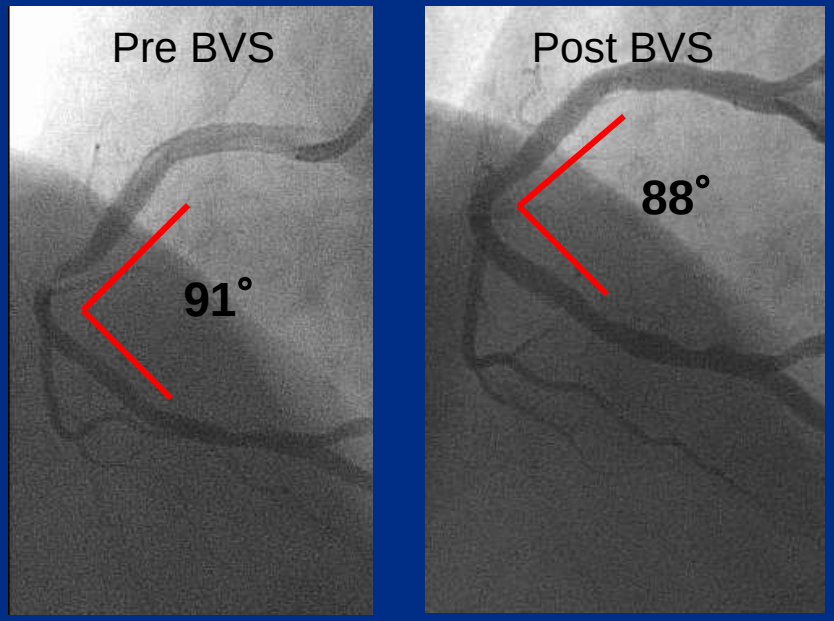
Stiff Metal Stents



Long-term flow disturbances and chronic irritation can contribute to adverse events

Wentzel, J. et al. *J Biomech.* 2000;33:1287-1295.
Gyöngyösi, M. et al. *J Am Coll Cardiol.* 2000;35:1580-1589.

BVS (Cohort B case)



Serruys, P. , TCT 2009

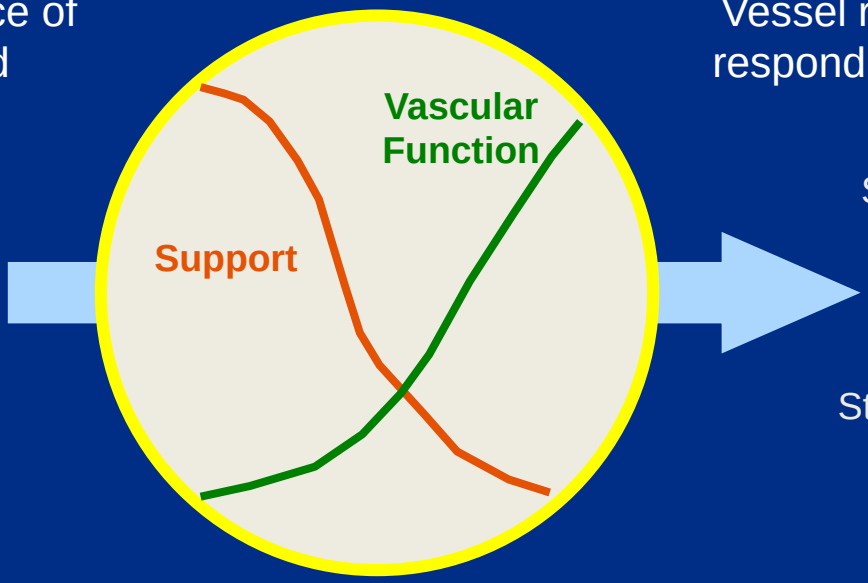
BVS appears to maintain natural vessel curvature at implantation; long-term, scaffold is fully resorbed

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Potential for Mechanical Conditioning

Design Goals:

Gradual disappearance of supportive scaffold



Vessel recovers the ability to respond to physiologic stimuli

Shear stress & pulsatility

Tissue adaptation

Structure and functionality

Mechanical conditioning may lead to improved cellular organization and vascular function

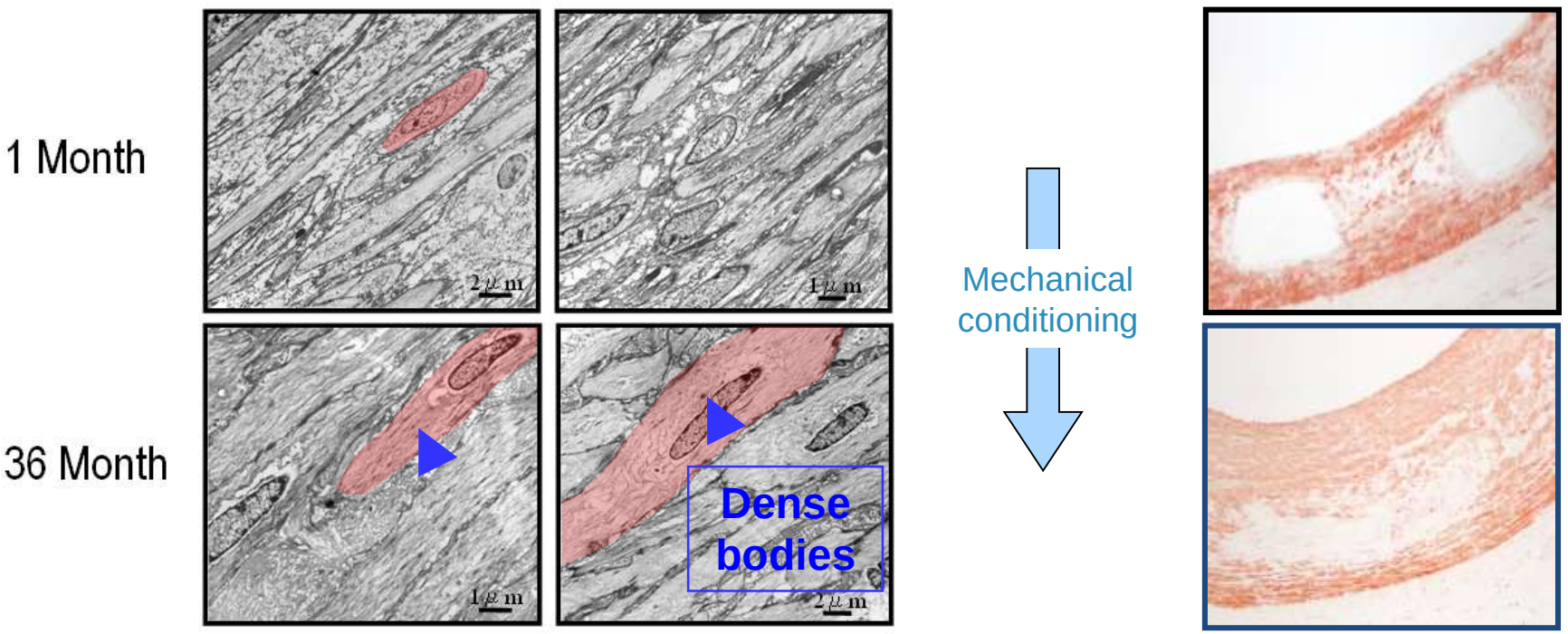
'Vascular Restoration Therapy'

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Mechanical Conditioning in Pre-Clinical Model (Porcine)

Transmission Electron Microscopy (TEM)

Smooth Muscle α-Actin



At 36 months, SMCs are well organized and have undergone transformation to a functional, contractile phenotype

Tests were performed by and data are on file at Abbott Vascular.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB

First In Man Clinical Trial

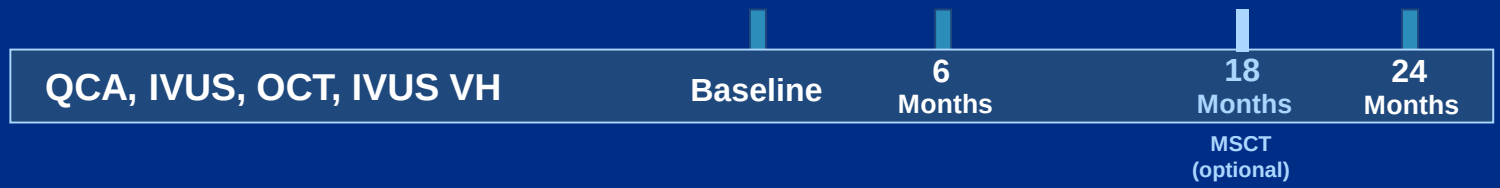
Cohort A: 30 patients enrolled March – July 2006

Cohort B: 101 patients enrolled March – November 2009

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A

- N = 30; 6 sites* (Europe, New Zealand)
- Clinical follow-up schedule:
  - 30 days, 6 months, 12 months, annually to 5 years
- Imaging schedule:

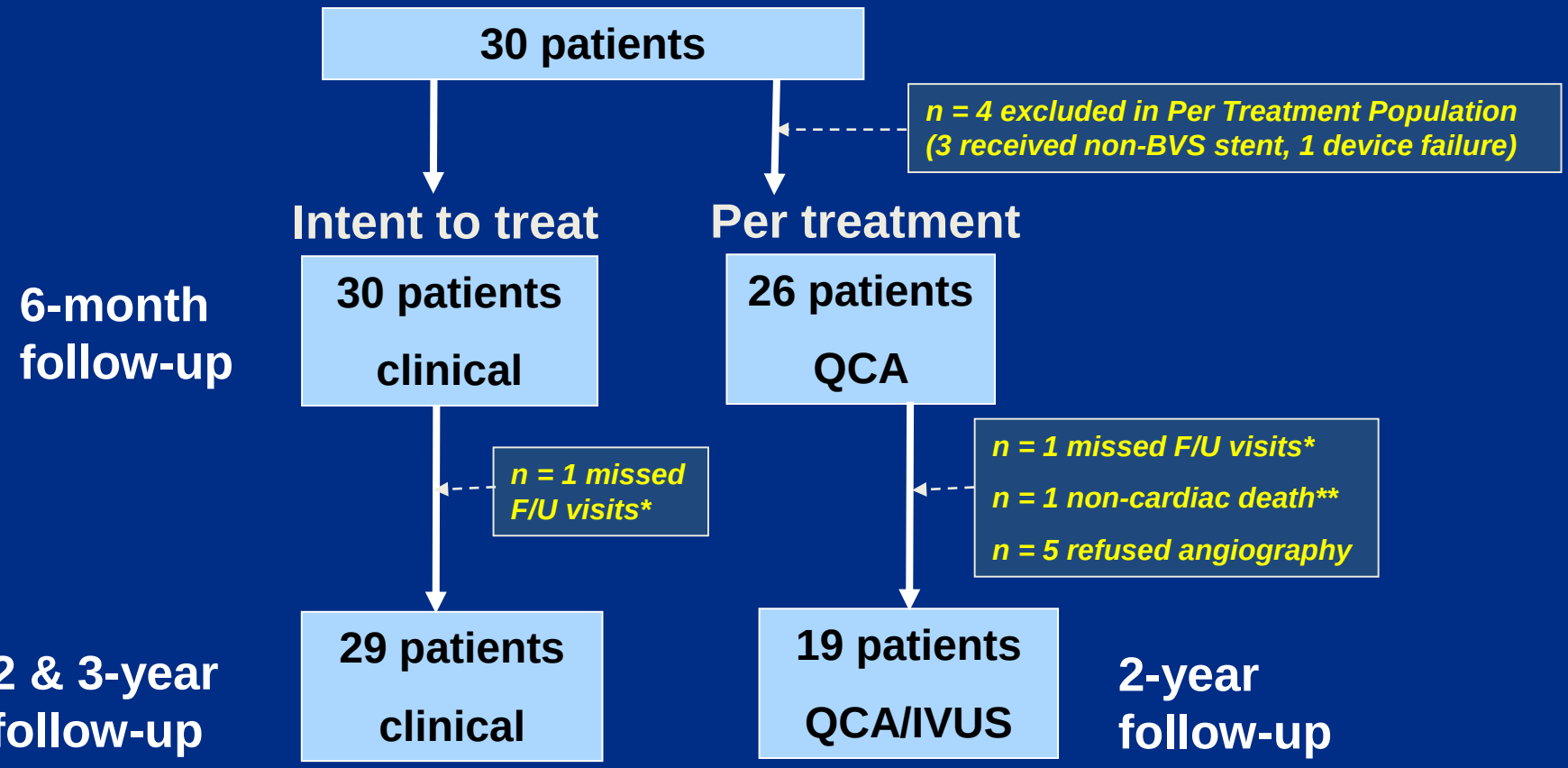


*Patients were enrolled in only 4 of 6 sites

Derived from Serruys, PW., AHA 2009.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A
Clinical Study Overall Population



*One patient missed the 9, 12, 18 month and 2 year visits
**Two patients died of non-cardiac causes at 706 and 888 days
Serruys, PW., AHA 2009.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A
Clinical Results –Intent to treat

Hierarchical	6 Months 30 Patients	12 Months 29 Patients*	24 Months 29 Patients*	**36 Months** **29 Patients***
Ischemia Driven MACE	**1 (3.3%)****	**1 (3.4%)****	**1 (3.4%)****	**1 (3.4%)****
Cardiac Death	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
MI				
Q-Wave MI	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Non Q-Wave MI	**1 (3.3%)****	**1 (3.4%)****	**1 (3.4%)****	**1 (3.4%)****
Ischemia Driven TLR				
by PCI	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
by CABG	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**

No new MACE between 6 and 36 months
No thrombosis up to 3 years **(only one patient on clopidogrel)**

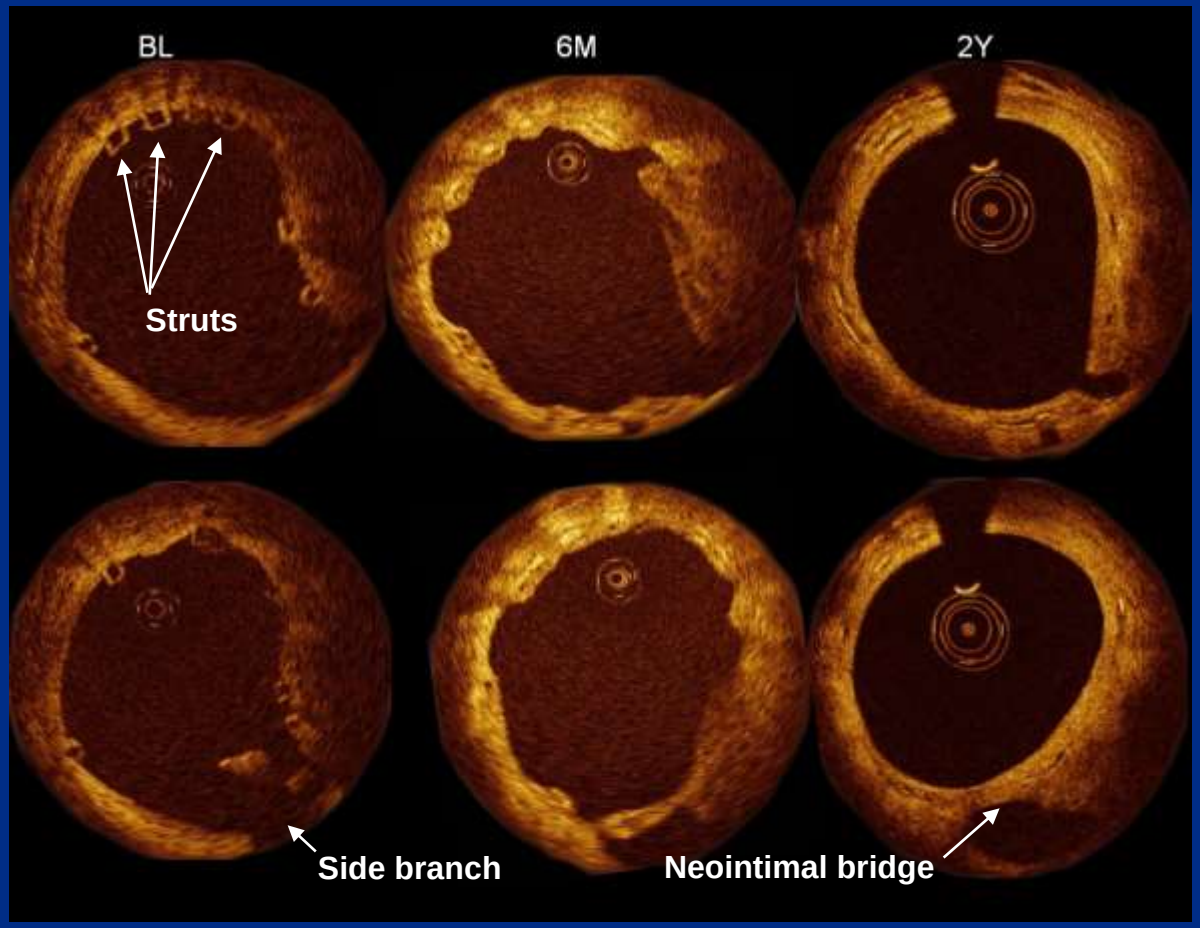
***One patient withdrew consent and missed the 9, 12, 18 month and 2 and 3 year visits but the vital status of the patient and absence of cardiac event is known through the referring physician.**

****This patient also underwent a TLR, not qualified as ID-TLR (DS = 42%) followed by post-procedural troponin qualified as non-Q MI and died from his Hodgkin's disease at 888 days post-procedure.**

Serruys, PW., AHA 2009.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A
OCT Images – Baseline, 6 months and 2 years



Serruys, PW., ESC 2008.

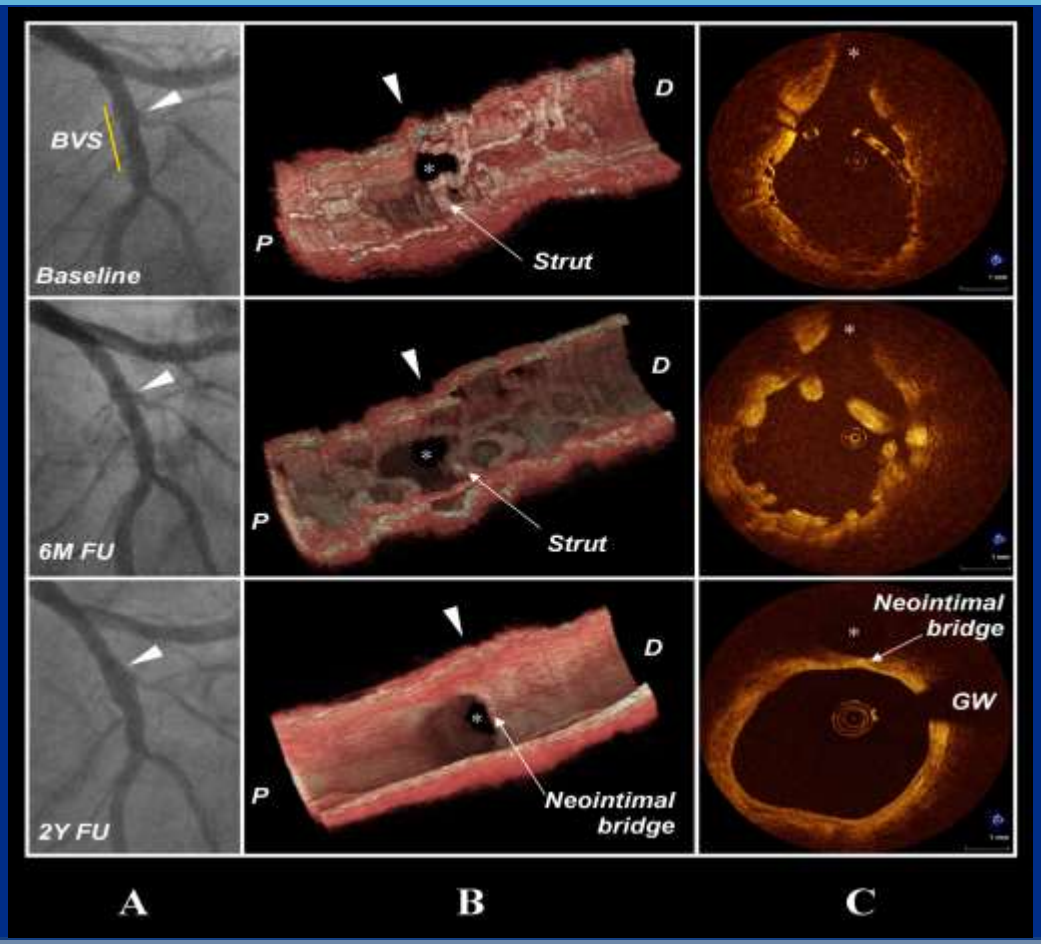
Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A
Side Branch Preservation by Angio, OFDI and OCT

Baseline
M2 1.0 mm/s

6 Month Follow Up
M3 1.0 mm/s

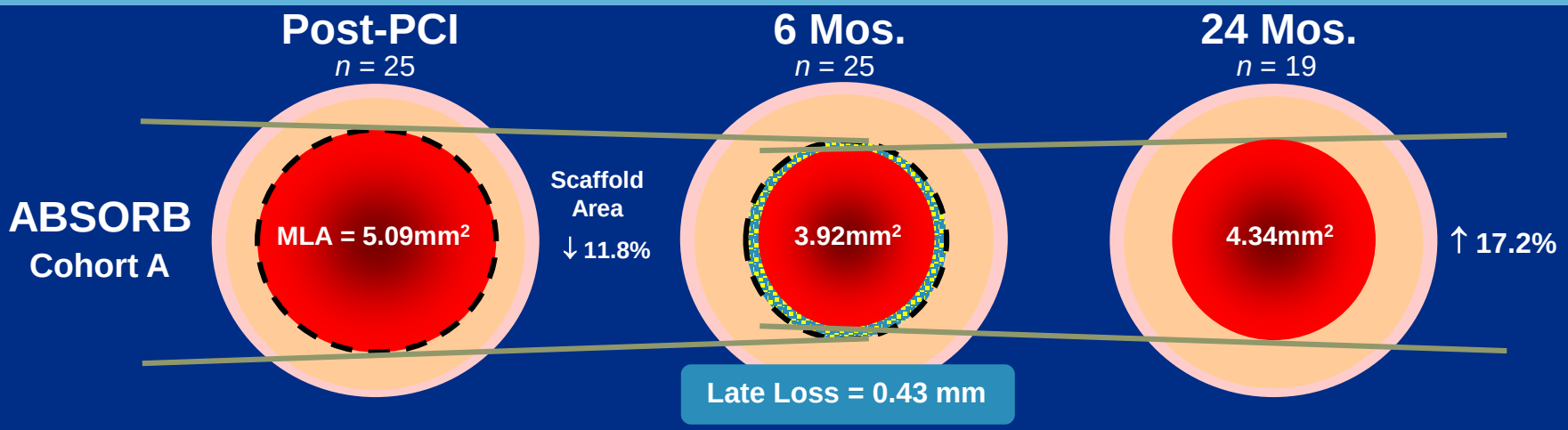
2 Year Follow Up
C7 20 mm/s



Serruys, PW., CCT 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A
Temporal Lumen Dimensional Changes, Per Treatment



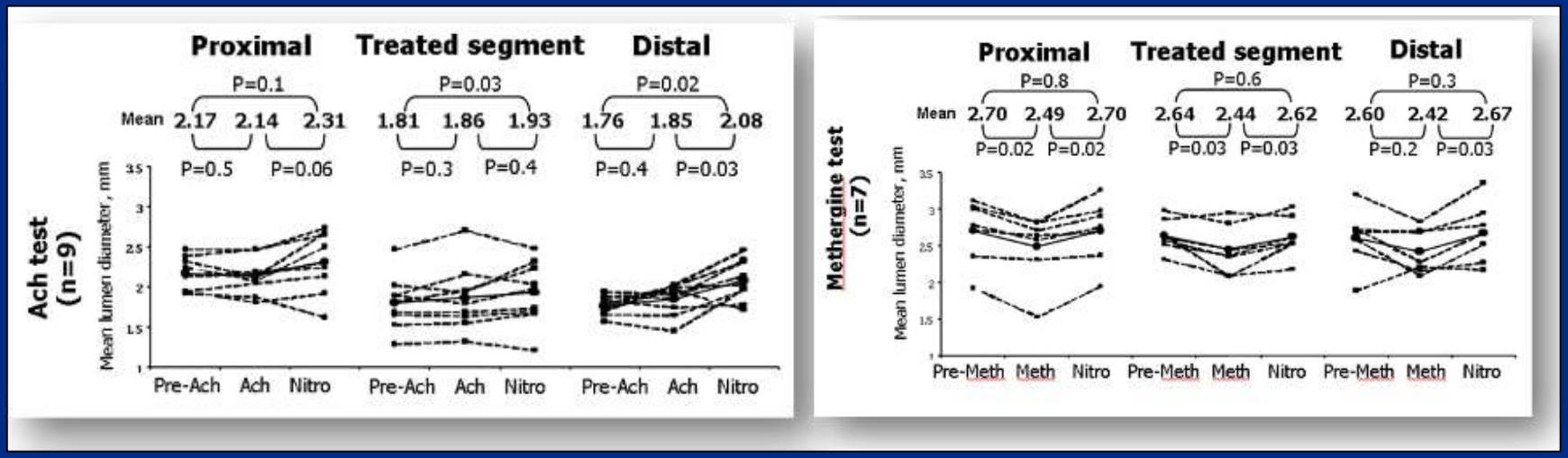
Late lumen loss at 6 months mainly due to reduction in scaffold area

Very late lumen enlargement noted from 6 months to 2 years

Serruys, PW, et al. *Lancet* 2009; **373**: 897-910.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort A
Vasomotor Function Testing at 2 Years

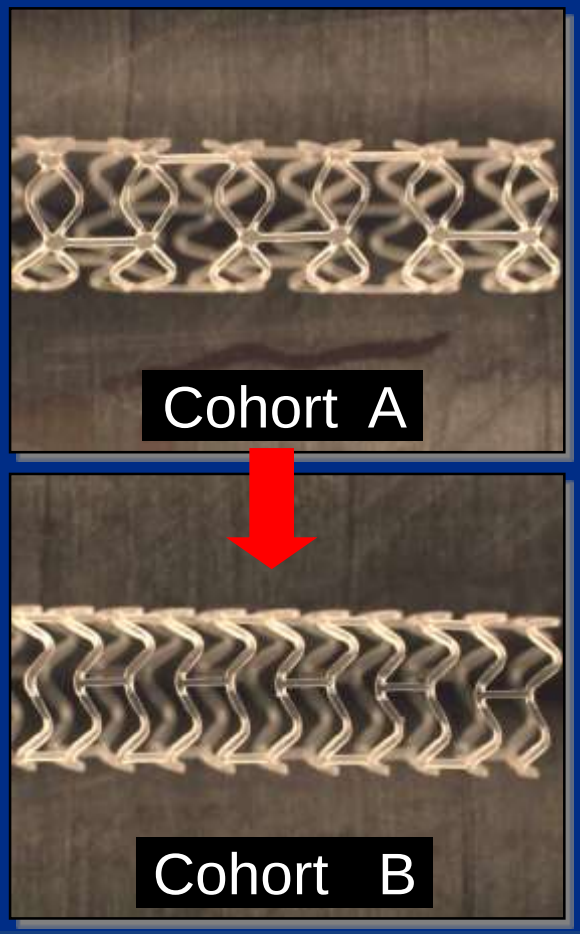


The reappearance of vasomotion in the proximal, distal, as well as treated segments in response to methergin or acetylcholine suggests that vessel vasoreactivity has been restored and that a physiological response to vasoactive stimulus might occur anew.

Serruys, PW, et al. *Lancet* 2009; **373**: 897-910.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

BVS Device Optimization Objectives



- More uniform strut distribution
- More even support of arterial wall
- Lower late scaffold area loss
  - Maintain radial strength for at least 3 months
- Storage at room temperature
- Improved device retention
- Unchanged:
  - Material, coating and backbone
  - Strut thickness
  - Drug release profile
  - Total degradation Time

Photos taken by and on file at Abbott Vascular.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B Clinical Study Design

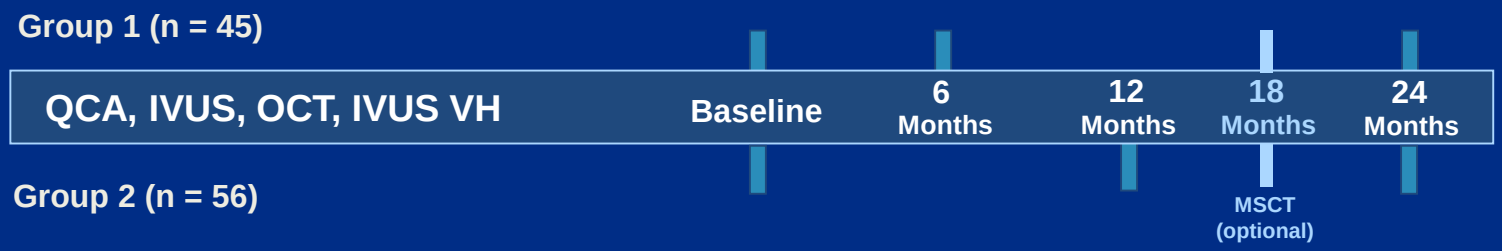
- Sponsor: Abbott Vascular
- Primary Investigators:
  - PW Serruys MD, PhD
  - J Ormiston MD
- DSMB: J Tijssen PhD, M Wiemer MD, P Urban MD
- CEC: C Hanet MD, R Tölg MD, V Umans MD
- Angiographic and IVUS Corelab: Cardialysis (Rotterdam, NL)

- Prospective, open label, FIM
- 3.0 x 18mm devices to treat lesion ≤ 14mm in length
- 12 sites Europe, Australia, New Zealand
- 101 patients enrolled between 19 March and 6 November 2009
- Group 1: 45 patients with imaging FUP at 180 days and 2 years
- Group 2: 56 patients with imaging FUP at 1 year and 2 years

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

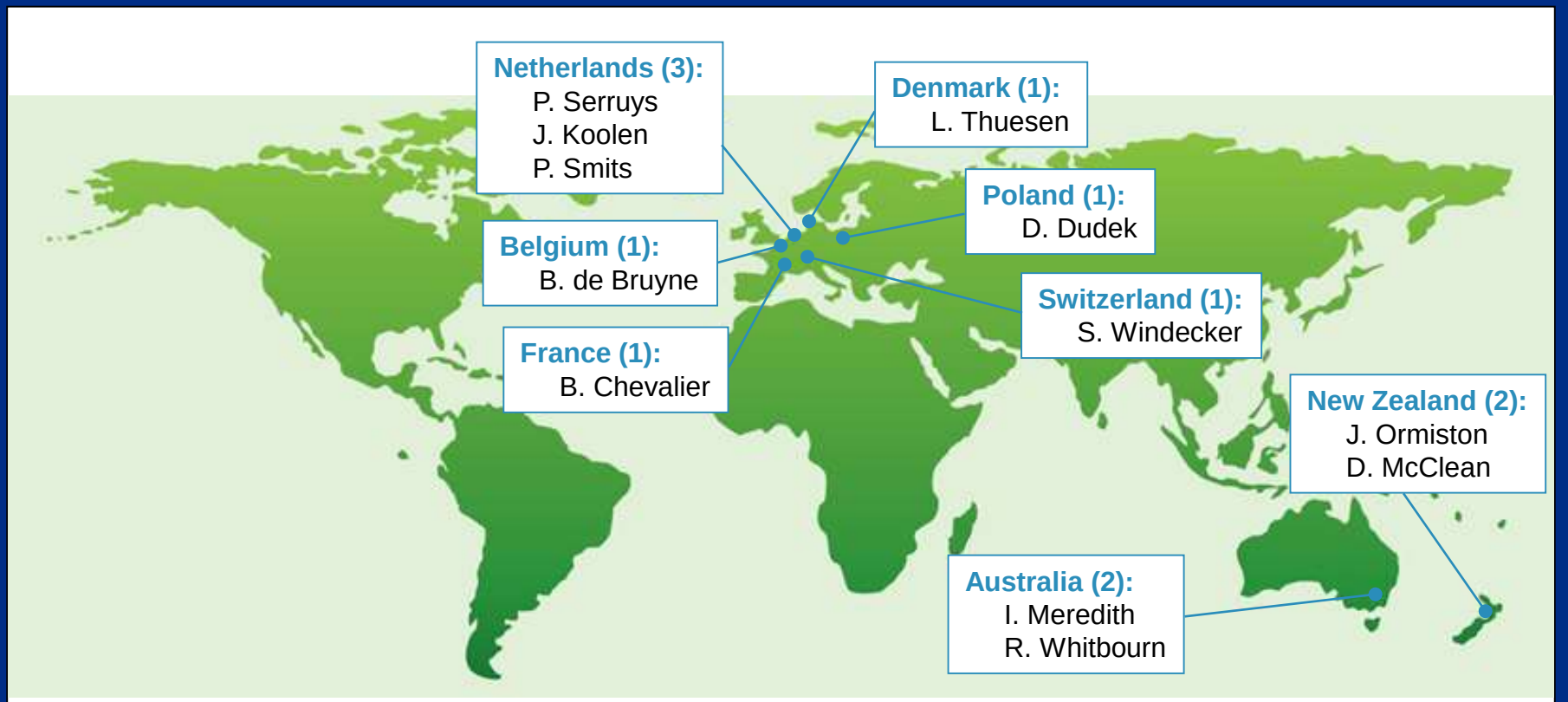
ABSORB Cohort B

- N = 101; 12 sites (Europe, Australia, New Zealand)
- Clinical follow-up schedule:
  - 30 days, 6 months, 12 months, annually to 5 years
- Imaging schedule:



Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

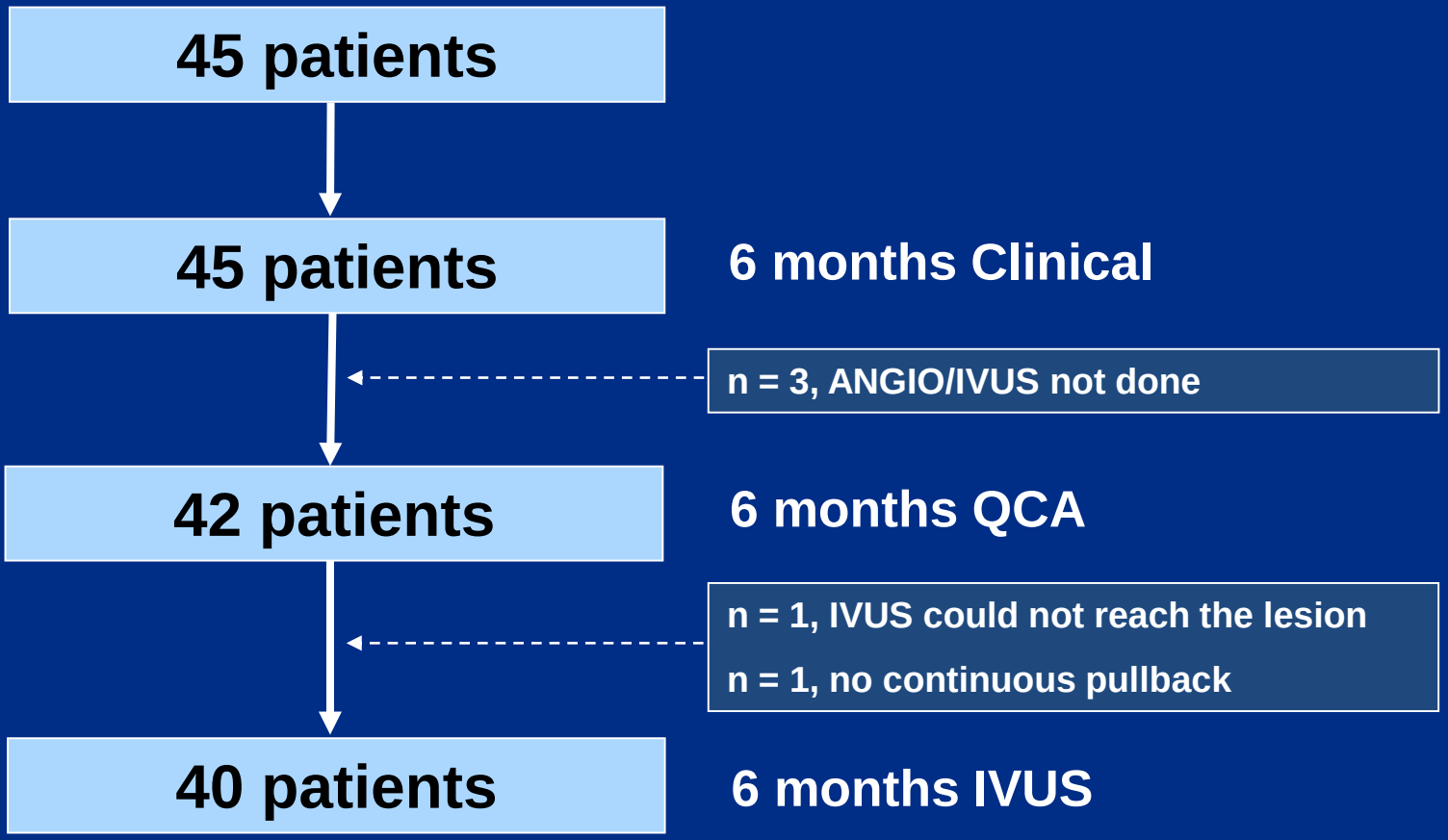
ABSORB Cohort B Clinical Sites



12 Clinical Investigative Sites (Europe, New Zealand, Australia)

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
Clinical/QCA/IVUS Patient Inclusion (Group 1)



Serruys, PW., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
Baseline Demographics (Group 1)

	n = 45
Male (%)	73
Mean age (years)	65
Previous MI (%)	36
Prior Cardiac Intervention on Target Vessel (%)	9
Diabetes mellitus (%)	13
Hypercholesterolemia req. med. (%)	93
Hypertension req. med. (%)	60
Current smoker (%)	11

DeBruyne, B., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
Baseline Lesion Characteristics/Acute Success

Group 1	N = 45 $N_{Lesions}$ = 45
Location of lesion (%)	
LAD	38
RCA	36
LCX	24
Ramus	2
Lesion classification (%)	
A	2
B1	45
B2	50
C	2
Clinical Device success (%)	**100**
Clinical Procedure success (%)	**98**

Clinical Device Success = Successful delivery & deployment of the BVS at intended target lesion & successful withdrawal of the BVS delivery system w/ attainment of final residual stenosis of less than 50% of the target lesion by QCA (by visual estimation if QCA unavailable). Standard pre-dilation catheters & post-dilatation catheters (if applicable) may be used. Bailout patients will be included as device success only if the above criteria for clinical device are met.

Clinical Procedure Success = Same as definition above and/or using any adjunctive device without occurrence of ischemia driven major adverse cardiac event (MACE) during the hospital stay w/ a maximum of first seven days post index procedure.

DeBruyne, B., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
Clinical Results - Intent to treat (Group 1)

Non-Hierarchical	30 Days N = 45	6 Months N = 45	9 Months N = 45
Cardiac Death (%)	**0**	**0**	**0**
Myocardial Infarction n (%)	**1 (2.2)**	**1 (2.2)**	**1 (2.2)**
Q-wave MI	**0**	**0**	**0**
Non Q-wave MI	**1 (2.2)**	**1 (2.2)**	**1 (2.2)**
Ischemia Driven TLR n (%)	**0**	**1 (2.2)**	**1 (2.2)**
PCI	**0**	**1 (2.2)**	**1 (2.2)**
CABG	**0**	**0**	**0**
Hierarchical MACE n (%)	**1 (2.2)**	**2 (4.4)**	**2 (4.4)**
Hierarchical TLF n (%)	**1 (2.2)**	**2 (4.4)**	**2 (4.4)**

No thrombosis by ARC or Protocol

MACE: cardiac death, MI, ischemia-driven TLR
TLF: cardiac death, MI, ischemmia-driven TLR, ischemia-driven TVR

Ormiston, J., TCT 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B Angiographic Results (Group 1)

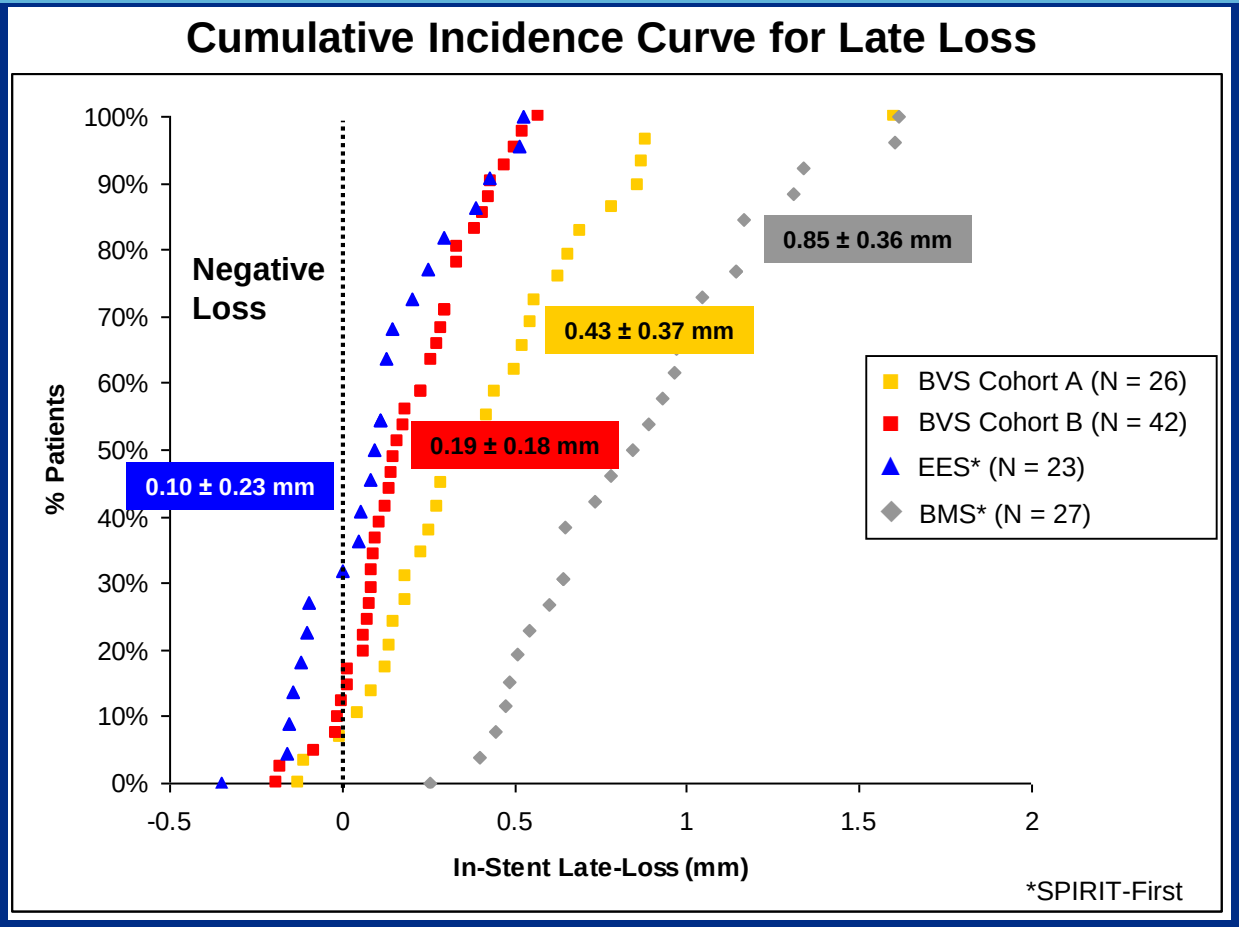
	45 Lesions
Pre-Procedure*	
Lesion Length (mm)	**10.24**
RVD (mm)	**2.65**
MLD (mm)	**1.06**
DS (%)	**60**
In-Scaffold Acute Gain* (mm)	**1.26**
Post-Procedure	
In-Scaffold MLD (mm)	**2.32**
In-Scaffold DS (%)	**15**
6 Months Follow-Up**	
In-Scaffold MLD (mm)	**2.13**
In-Scaffold DS (%)	**19**
In-Scaffold Late Loss (mm)	**0.19**
In-Scaffold ABR (%)	**0**

*N = 44 Lesions
**N = 42 Lesions

DeBruyne, B., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
6-Month QCA – Intent to Treat (Group 1)



DeBruyne, B., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
IVUS Results (Group 1)

	Post-Procedure N = 40 $N_{Lesions}$ = 40	6 Months N = 40 $N_{Lesions}$ = 40
Vessel Volume (mm^3)	291	275
Scaffold Volume (mm^3)	133	122
Plaque behind the scaffold Volume (mm^3)	158	153
Vessel (EEM) Area (mm^2)	14.35	14.46
Lumen Area (mm^2)	6.60	6.36
Minimal Lumen Area (mm^2)	5.50	5.15
Plaque Area (mm^2)	7.75	8.11

Serruys, PW., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
IVUS Results – Paired Analysis (Group 1)

	Intent-to-treat (n=37)			
	Post PCI	**6 Months**	**% Difference**	**P value**
Mean Vessel Area (mm^2)	14.2	14.5	2.4	0.06
Mean Scaffold Area (mm^2)	6.58	6.44	-2.0	<0.02
Minimum Scaffold Area (mm^2)	5.51	5.24	-4.6	0.001
Neointimal Hyperplasia Area (mm^2)	-	0.08	NA	-
Minimum Lumen Area (mm^2)	5.49	5.17	-5.4	<0.001
% Lumen Area stenosis	17	19	15	0.24

Serruys, PW., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

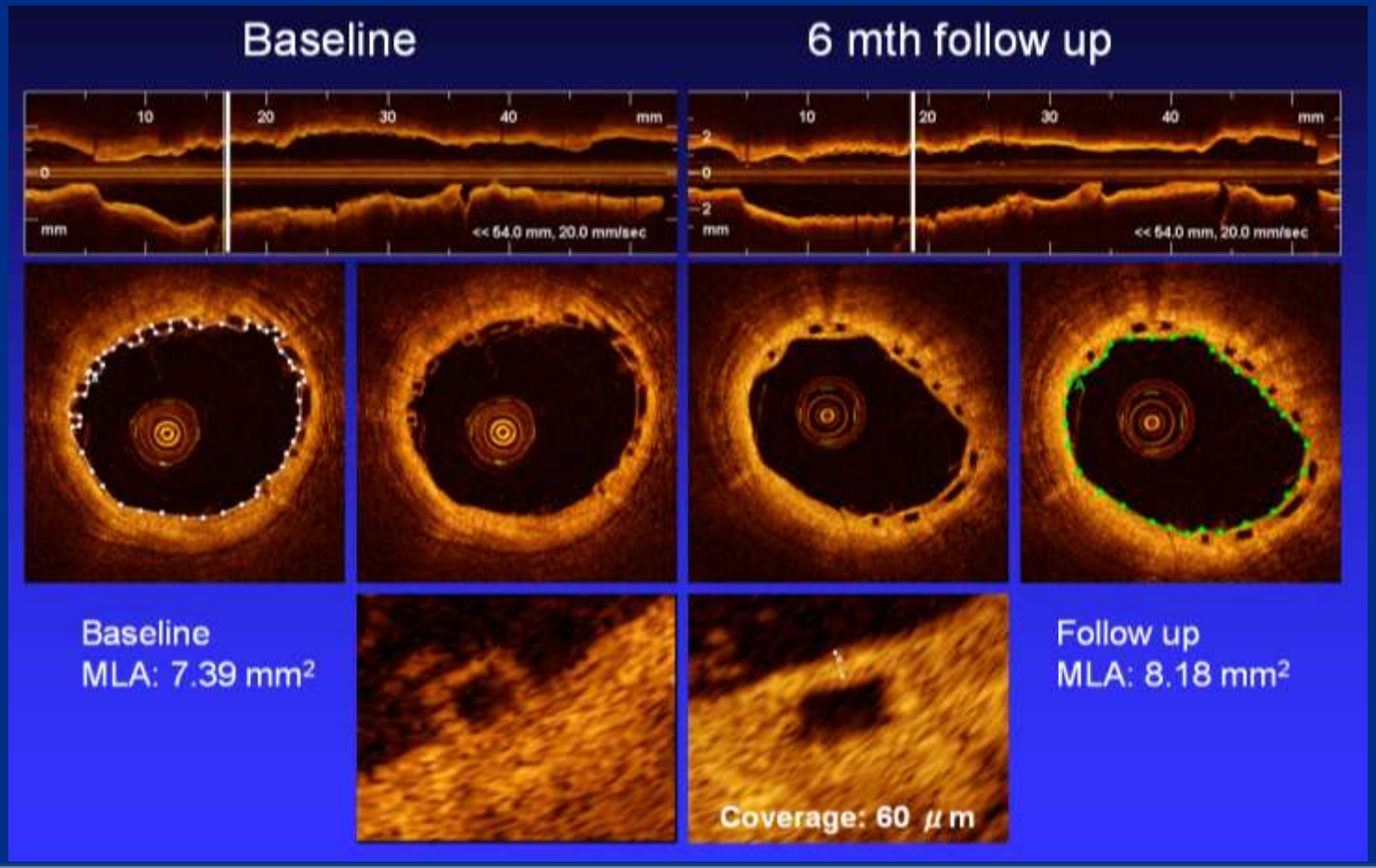
ABSORB Cohort B
OCT Results – Paired Analysis (Group 1)

	Intent-to-treat (n=25)			
	Post PCI	**6 Months**	**% Difference**	**P value**
Mean Scaffold Area (mm^2)	7.53	7.74	2.67%	0.1
Minimum Scaffold Area (mm^2)	6.31	6.20	-1.99%	0.63
Mean Neointimal Area (mm^2)	NA	1.25	-	-
Mean Flow Area (mm^2)	6.79	6.14	-10%	<0.001
% Area Stenosis	19	24	12	0.03
% Uncovered Struts	-	3.23	-	-
Incomplete Strut Apposition Area (mm^2)	0.19 (n=12)	0.31 (n=3)		

Serruys, PW., PCR 2010.

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

ABSORB Cohort B
Representative OCT Images (Group 1)



Serruys, PW., CCT 2010.

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ABSORB Extend

- **N = up to 1,000 patients at up to 100 sites (Europe, Australia, New Zealand, Latin America, Asia)**
- **Device sizes:**
  - 2.5 x 18 mm
  - 2.5 x 28 mm
  - 3.0 x 18 mm
  - 3.0 x 28 mm

  (overlap of two 18 mm long devices also permitted)
- **Lesion length treatable: ≤ 28 mm**
- **Clinical follow up:**
  - ID-MACE, ID-TVF, ID-TLR, ID-TVR, 'stent' thrombosis
  - 30 days, 6 months, and annually 1-3 years
- **Angiography, IVUS and OCT follow up:**
  - Subgroup of patients at selected investigational sites who receive planned overlapping BVS scaffolds to treat long lesions

Pipeline product. Currently in development at Abbott Vascular. Not available for sale.

Summary

- Results from ABSORB Cohort A continue to be encouraging, with only one MACE and no thrombosis through 3 years of follow up
- ABSORB Cohort B has demonstrated a low incidence of adverse events, no thrombosis, and metallic DES-like angiographic late loss at 6 months follow up
- ABSORB EXTEND is aimed at building a body of scientific data to support this revolutionary technology
- If fully bioresorbable technology permits restoration of natural vascular integrity and function, it may provide unique physiologic benefits to patients
- In the future, 'Vascular Restoration Therapy' could provide greater durability of results following PCI, a concept that must be tested in future trials

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