MIMICS-2 Study: 1-Year Results US, German and Japanese Experience with the BioMimics 3D Stent

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On behalf of the MIMICS-2 Investigators

Disclosure

Speaker name: Thomas Zeller

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I have the following potential conflicts of interest to report:

- [x] Consulting
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [ ] I do not have any potential conflict of interest

MIMICS Clinical Program

Extending BioMimics 3D Stent evaluation to more than 1,250 subjects in 100+ sites

FIH
N=10
1 site

Feasibility

Mimics RCT

Randomized Controlled Trial*
vs. straight stent

N=50
8 sites
2-Yr follow-up

CE Mark

MIMICS-2

Prospective, Multinational Interventional Study

N=271
43 sites
36-month follow-up

IDE Study (US, Japan, Germany)

MIMICS-3D

Prospective, Multinational Observational Registry

Non-selected patients

N=500+
25 sites
36-month follow-up

European Postmarket Surveillance

MIMICS *et seq*

Investigator-initiated, prospective and retrospective studies

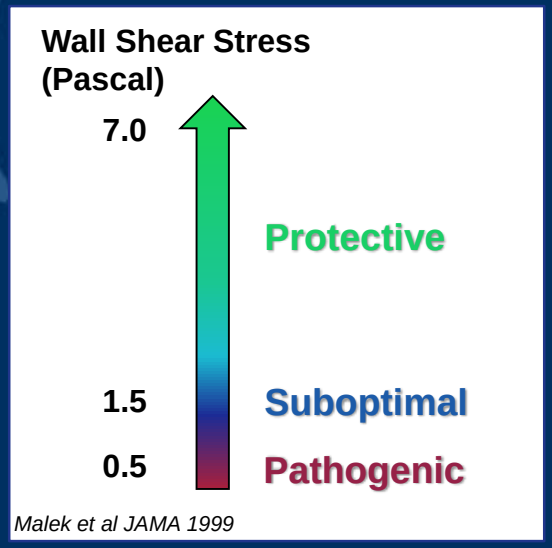
N = c.500
20+ sites

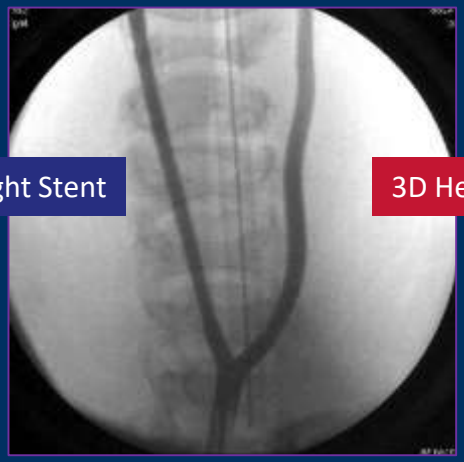
Postmarket Surveillance & Geographic Expansion

** Zeller et al Circ Cardiovasc Interv. 2016*

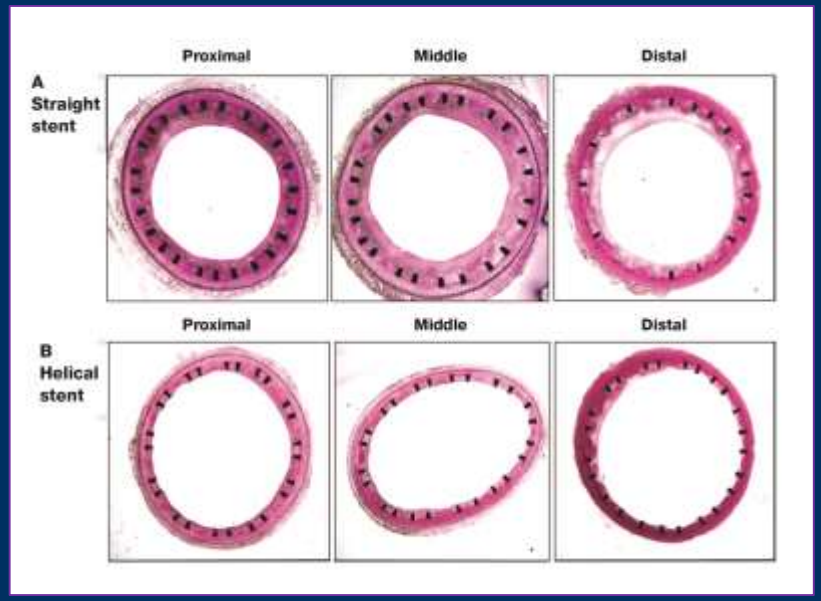
Swirling Flow: Hypothesis for Stent Improvement

Natural Swirling Flow may be compromised by anatomy, disease and straight stents





Porcine common carotid arteries (N=10 animals)



At 30 days:
45% less intimal hyperplasia in the helical stents[1]
($p < 0.005$)

1. Caro et al., 2013

Mimics RCT: Proof of Principle

coreLab BAD KROZINGEN		BioMimics 3D (N=50)	Control stent (N=26)	P value
Lesion Location	Mid-Distal SFA	16%	8%	0.48
	Distal SFA	66%	46%	0.14
	Distal SFA / Prox PA	8%	23%	0.08
TASC II	A	42%	42%	1.00
	B	56%	58%	1.00
	C	2%	0%	1.00
Lesion Length	mm	66 ± 29	63 ± 28	0.66
Stent Length	mm	99 ± 30	88 ± 22	0.08
Occlusion	Total	44%	46%	1.00
Calcification	Moderate to Severe	52%	58%	0.81

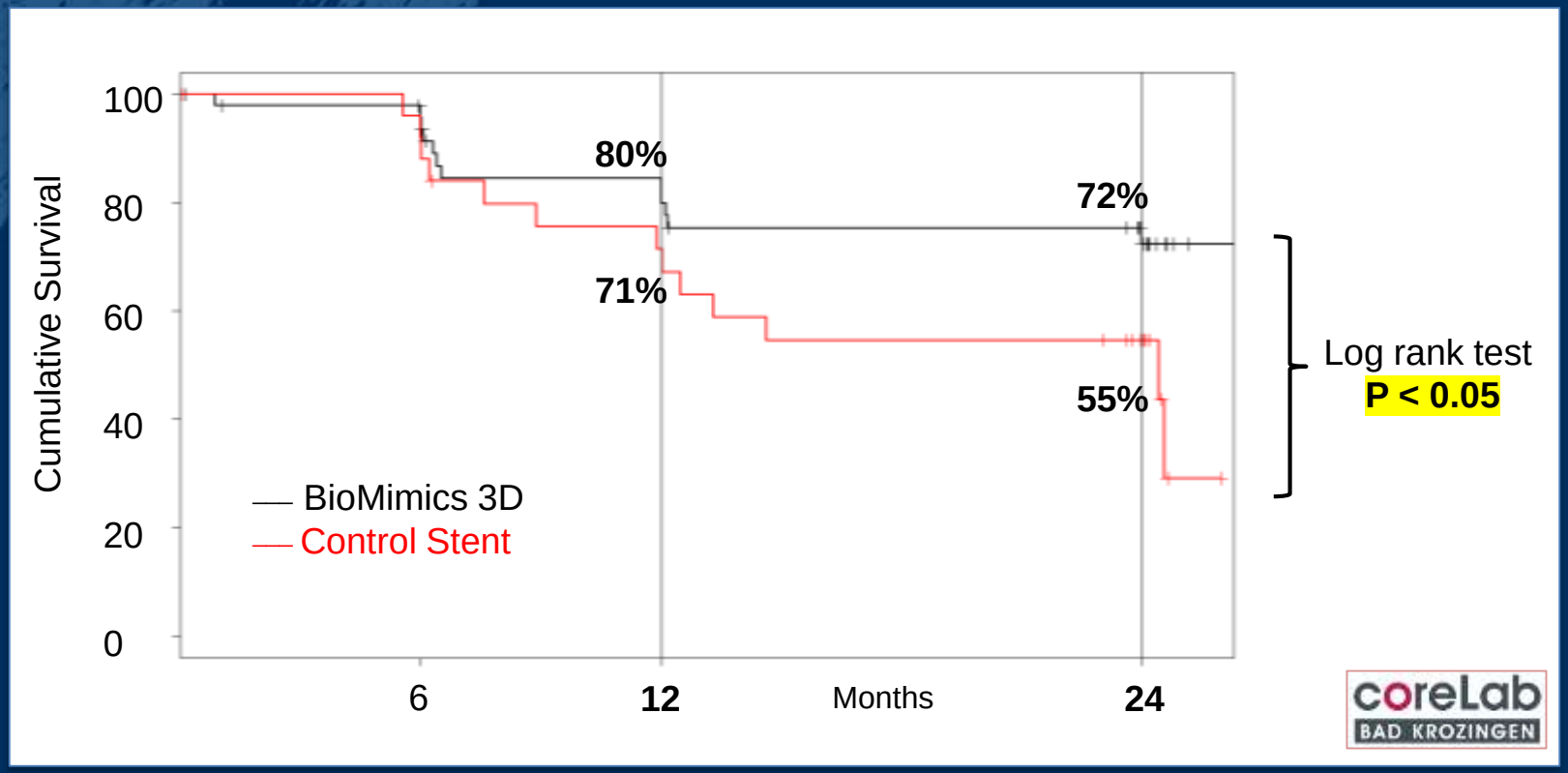
Zeller et al Circ Cardiovasc Interv. 2016

Comparison with Other Studies	**ZILVER PTX**	**IN.PACT**	**LEVANT 2**	**Mimics RCT**
Total Occlusions	30%	25.8%	20.6%	**44%**
Calcium (severe)	37%	8%	17.6%	**42%**

Mimics RCT: Primary Patency

Kaplan Meier Estimate of Survival from Loss of Patency

PSVR >2.0, or >50% diameter stenosis, or adjudicated, clinically-driven TLR



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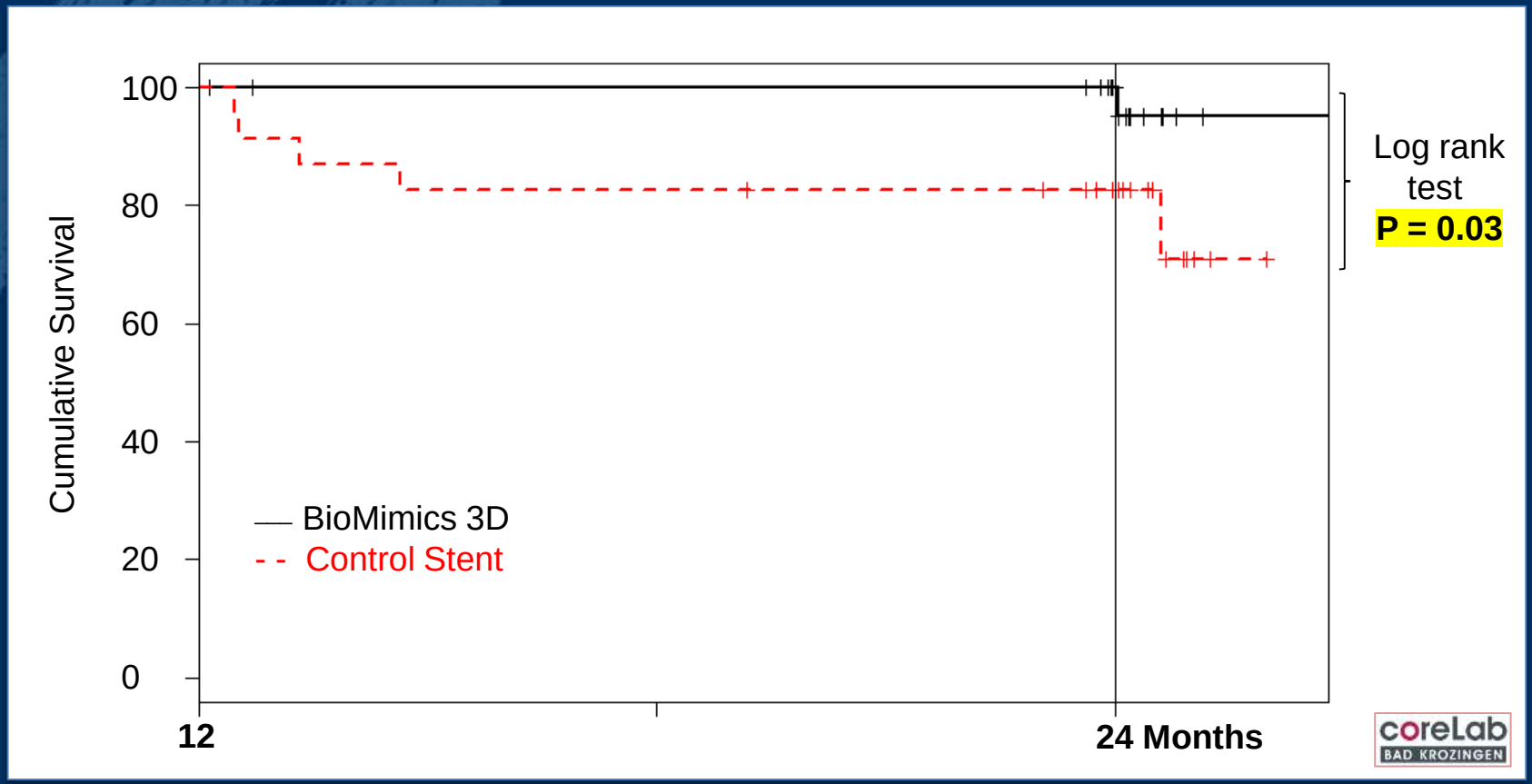
Mimics RCT: Durable Benefit

Kaplan Meier Estimate of Survival from CDTLR (Landmark Analysis)

(Clinically-driven TLR determined through Event Adjudication)



Zeller et al Circ Cardiovasc Interv. 2016

Mimics RCT:

- Better primary patency and reduced need for re-intervention through Year 2 than a straight nitinol stent
- Core lab confirmed 0% stent fracture at 2-year X-ray review

MIMICS-2

1st Presentation of One-Year Results

MIMICS-2 Study:

Evaluation of Safety and Effectiveness of the BioMimics 3D Stent System in the Femoropopliteal Arteries of Patients with Symptomatic Peripheral Arterial Disease

- **Primary Endpoints**
  - **Safety:** composite of death, major amputation or CDTLR through 30 days
  - **Effectiveness:** primary patency at 12-months
- **Follow-up: 3 years**
- **43 investigational sites enrolled 271 subjects**
  - US: 31 sites N = 162
  - Germany: 6 sites N = 78
  - Japan: 6 sites N = 31
- **Study Principal Investigators**
  - Timothy M. Sullivan, MD — Minneapolis, MN, USA
  - Thomas Zeller, MD — Bad Krozingen, Germany
  - Masato Nakamura, MD — Tokyo, Japan
- **Core laboratories: ultrasound; angiography; X-ray**
- **Clinical Event Committee (CEC) adjudication**

MIMICS-2 Study

Baseline Patient Demographics

		N= 271 Subjects
Age	Mean years ± SD (N)	68.4 ± 9.5 (271/271)
Gender	Male / Female	180 (66.4%) / 91 (33.6%)
Risk Factors	Diabetes Mellitus	45.4% (123/271)
	Hypertension	90.0% (244/271)
	Hypercholesterolemia	81.9% (222/271)
	Smoker Current / Former	80.8% (219/271)
Coronary Revascularization	Previous Percutaneous or Surgical	43.2% (117/271)
Previous Peripheral Intervention	None in target vessel	98.2% (266/271)
Rutherford Category	1	0% (0/271)
	2	26.9% (73/271)
	3	67.5% (183/271)
	4	5.2% (14/271)
	5	0.4% (1/271)
Ankle Brachial Index	Mean ± SD (N)	0.70 ± 0.20 (257/271)

MIMICS-2 Study

Baseline Angiography and QVA

Core Laboratory Data		N= 271 Subjects
Reference Vessel Diameter (mm)	Mean ± SD	5.2 ± 0.9 (269/271)
Lesion Type[1]	De novo	100% (271/271)
Lesion Location in Femoropopliteal Artery	Prox	11.5% (31/270)
	Mid	48.1% (130/270)
	Distal	40.4% (109/270)
Diameter Stenosis (%)	Mean ± SD	77.8 ± 18.3 (269/271)
Lesion Length (mm)	Mean ± SD	81.2 ± 38.4 (269/271)
Total Occlusion (%)		30.0 (81/270)
Calcification (%)	None - Mild	54.1 (146/270)
	Moderate - Severe	45.9 (124/270)
Run-off (%) - 1 or more patent tibial artery (<50% stenosis)		98.8 (237/240)

[1] *Investigator-reported*

MIMICS-2 Study

Index Procedure Data

		N= 271 Subjects
BioMimics 3D Stents placed[1]	# Stents / N	305 / 271
	# Subjects with 1 stent	87.5% (237/271)
	# Subjects with 2 stents	12.5% (34/271)
Stented Segment Length[2]	Mean ± SD (mm)	112.3 ± 36.3 (269/271)
Diameter Stenosis[2]	Pre-stent % ± SD	78.8 ± 18.3 (269/271)
	Post-stent % ± SD	12.6 ± 7.5 (269/271)
Dissections[2]	No Dissection	97.8% (263/269)
	Type A-C	2.2% (6/269)
	Type D-F	0% (0/269)
Device Success[1]		100% (271/271)
Technical Success[2]		100% (269/269)

[1] Investigator-reported
[2] Core Lab

Device Success: Successful delivery of System; placement of stent and retrieval of System
Technical Success: Core Lab determined ≤50% residual diameter stenosis (in-stent) at end of index procedure

MIMICS-2 Study

Endpoint: **Safety**

Primary safety endpoint is a composite of CEC-adjudicated Major Adverse Events through 30 days, including death, any major amputation performed on the target limb, or CDTLR

	Performance Goal	Rate (n/N) [95% CI]
Freedom from MAE through 30 days	>88%	**99.6%** (268/269) [97.7%, 100%]
Primary safety endpoint		**Achieved**

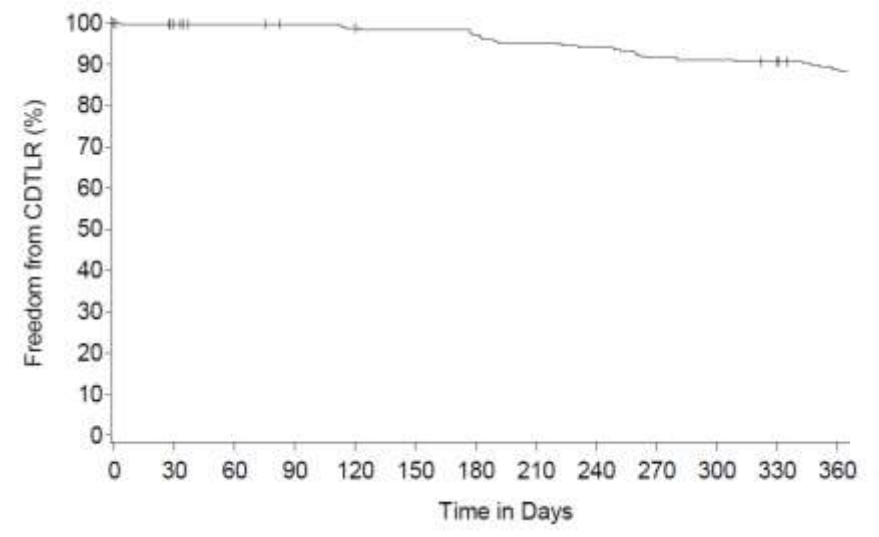
n/N for Intention to Treat subjects: (n) 1 Subject had CDTLR Day 3 due to abrupt closure of treated segment; (N) 2 Subjects were lost to follow-up without reported MAE and without ascertainment of status past lower visit window threshold of 23 days

Confidence interval [CI] calculated by Agresti-Coull method. Lower bound corresponds to lower 97.5% one-sided Agresti-Coull interval

CDTLR: Clinically-driven target lesion revascularization is revascularization of the target lesion with objective evidence of recurrent symptoms associated with an angiographic determination of ≥50% stenosis and new distal ischemic signs (worsening ABI or worsening Rutherford Category associated with the index limb); or ≥70% angiographic diameter stenosis in the absence of objective evidence of recurrent symptoms.

MIMICS-2 IDE Study

Kaplan-Meier Survival Analysis

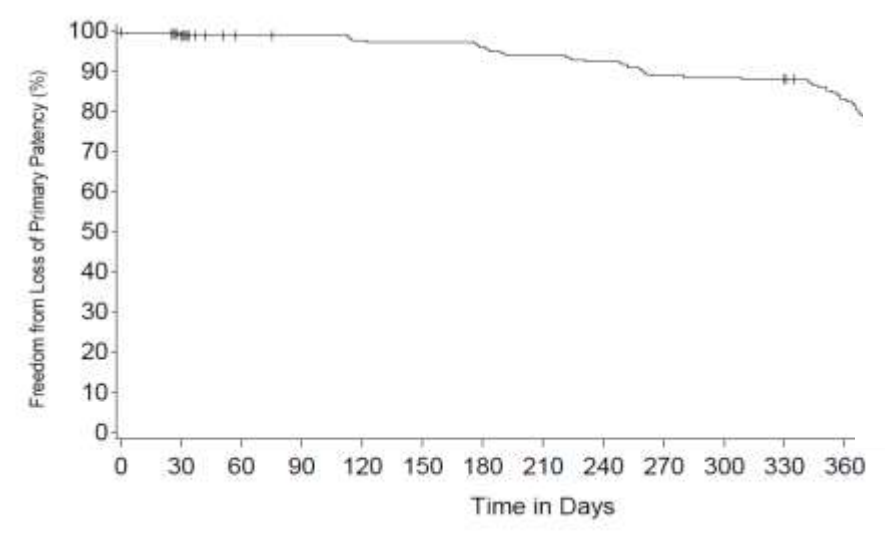


12-Month Freedom from CDTLR: **88.4%**

Time (days)	0-0	1-30	31-60	61-120	121-180	181-240	241-300	301-365
# at risk	271	266	261	257	252	244	236	224
# subjects with events	0	1	0	2	4	8	8	7
# censored	0	4	5	2	1	0	0	5
Event-free % (cumulative)	100%	99.6%	96.6%	98.9%	97.3%	94.2%	91.1%	**88.4%**
SE	0.0%	0.4%	0.4%	0.7%	1.0%	1.4%	1.8%	2.0%

MIMICS-2 IDE Study

Kaplan-Meier Survival Analysis



12-Month Freedom from Loss of Primary Patency: **81.9%**

Time (days)	0-0	1-30	31-60	61-120	121-180	181-240	241-300	301-360	361-365
# at risk	271	258	248	244	240	231	221	202	199
# subjects with events	0	3	0	3	4	9	10	13	3
# censored	0	10	10	1	0	0	0	6	0
Event-free % (cumulative)	100%	98.9%	98.9%	97.7%	96.1%	92.5%	88.5%	83.1%	**81.9%**
SE	0.0%	0.6%	0.6%	0.9%	1.2%	1.7%	2.0%	2.4%	2.4

Conclusions

- MIMICS-2 Primary Safety and Effectiveness Endpoints were met
- Probability of freedom from loss of primary patency at 12 months with BioMimics 3D is similar to those for DES/DCB
  - Natural Swirling Flow is an alternative to antiproliferative drugs
- Core-lab confirmed 0% stent fracture: Mimics RCT and MIMICS-2
- Unique BioMimics 3D stent design provides hemodynamic and biomechanical benefits for primary and complementary stenting

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