

# 3-year clinical outcome following treatment with thin, very thin or ultrathin strut drug-eluting stents in *small* coronary vessels in BIO-RESORT

Clemens von Birgelen, MD PhD

Thoraxcentrum Twente, Medisch Spectrum Twente, Enschede, the Netherlands,  
On behalf of the BIO-RESORT investigators



- **Background:** Small coronary vessel PCI has an increased risk but is often done in clinical practice. Study data are scarce. Newer DES, such as ultrathin strut Orsiro and very thin strut Synergy, have substantially **thinner struts** than earlier DES. Thin stent struts may be particularly advantageous in small vessels, due to the **greater relative impact of strut size on lumen obstruction**.
- **Aim:** To assess in all-comers with small coronary target lesions the 3-year clinical outcome after treatment with **ultrathin strut** sirolimus-eluting **Orsiro** or **very thin strut** everolimus-eluting **Synergy** versus **thin strut** zotarolimus-eluting **Resolute Integrity** stents

Orsiro CoCr-SES	Synergy PtCr-EES	Resolute Integrity CoCr-ZES
		
Thickness ( $\mu\text{m}$ ) of <i>uncoated</i> strut		
60**	74*	91

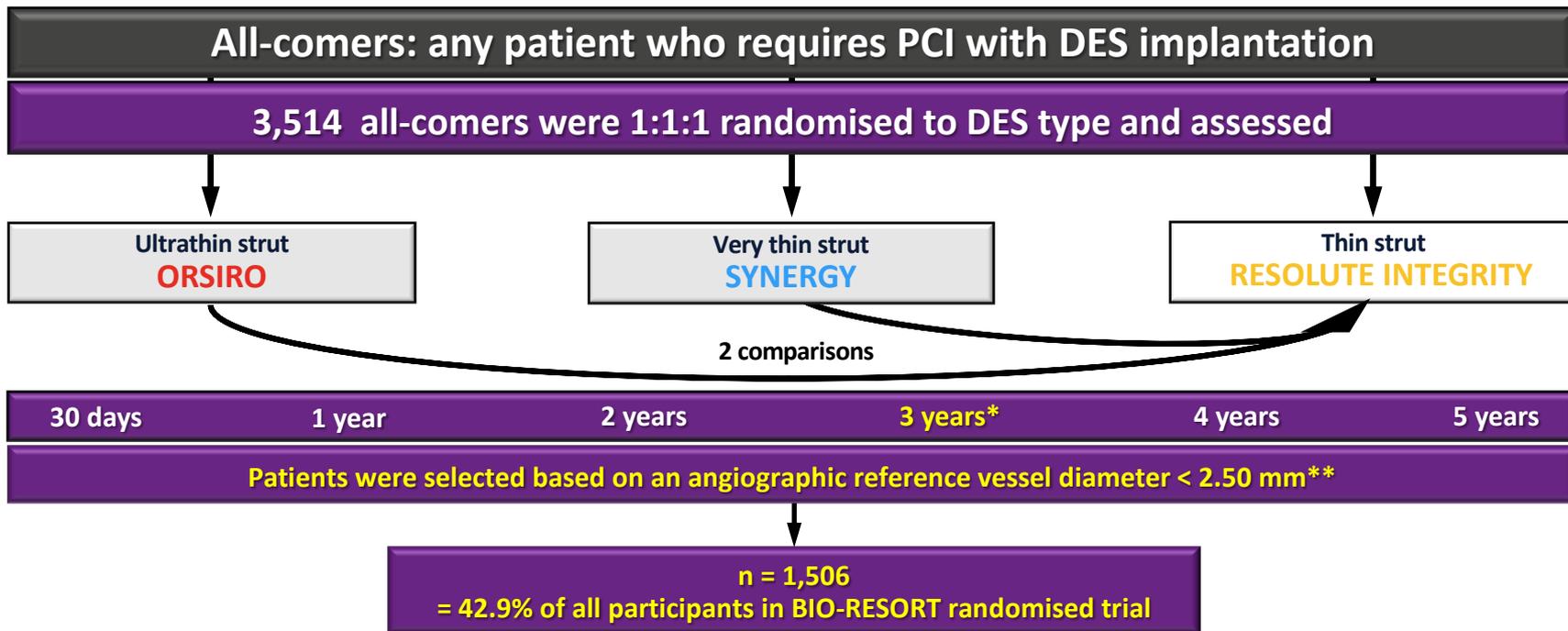
# Study Stents



	ORSIRO	SYNERGY	RESOLUTE INTEGRITY
Coating characteristics	Biodegradable Circumferential Asymmetrical	Biodegradable Abluminal	Durable Circumferential Symmetrical
Bare strut thickness, $\mu\text{m}$	60 ( $\geq 3.5$ mm stents: 80)	74 (3.0 – 3.5 mm: 79, 4.0 mm stent: 81)	91
Coating thickness, $\mu\text{m}$	7.4 / 3.5 (ab-/luminal)	4	5.6
Coated strut thickness, $\mu\text{m}$ (of smallest stent)	71	78	102
Metal	Cobalt-chromium	Platinum-chromium	Cobalt-chromium
Polymer	PLLA (poly [L-lactide] acid) (BIOlute <sup>®</sup> ), on thin amorphous silicon carbide (proBIO <sup>®</sup> )	PLGA (poly [lactic- co-glycolic acid] polymer) coating	BioLinx <sup>®</sup> , a blend of hydrophobic C10, hydrophilic C19, and poly-vinyl pyrrolidone
Drug	Sirolimus	Everolimus	Zotarolimus
Drug release time, mo.	3.3	3	6
Degradation time, mo.	24	4	---



# Design: BIO-RESORT Small Vessel Analysis



Investigator-initiated, multicenter, assessor and patient-blinded, three-arm, randomized, non-inferiority trial ·  
Visits to outpatient clinic, questionnaire or telephone follow-up · No routine angiographic follow-up ·  
Independent monitoring and clinical event adjudication (CEC) · Supervision by DSMB

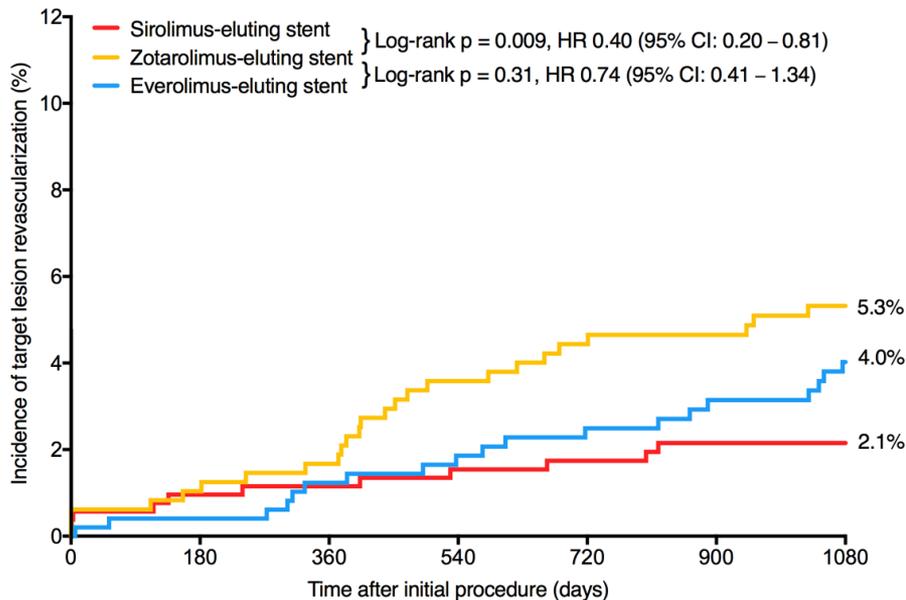
BIO-RESORT Study Sites: Thoraxcentrum Twente, Medisch Spectrum Twente, Enschede · Rijnstate Hospital, Arnhem · Haga Hospital, The Hague ·  
Albert Schweitzer Hospital, Dordrecht; all in the Netherlands · Enrollment from December 21, 2012 to August 24, 2015 · PI: C. von Birgelen, MD PhD  
3-year follow-up rate: 96.4%

\* 3-Year BIO-RESORT Trial: Buiten RA, Ploumen EH, Zocca P, et al. JACC Cardiovasc Interv. – *In press*. \*\* Based on quantitative coronary analysis (QCA) by experienced core lab analysts.

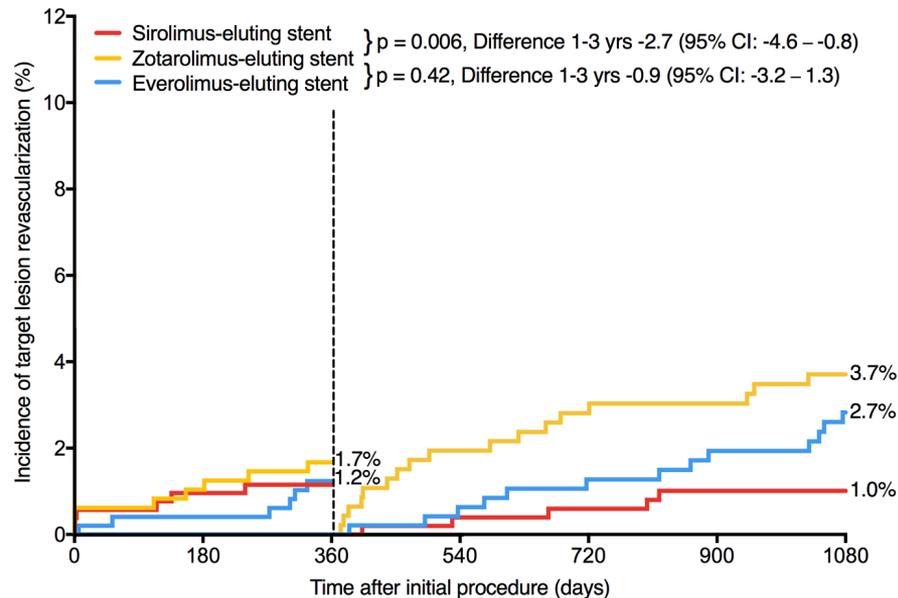


# Main Findings

## Target Lesion Revascularisation, until 3-years



## Target Lesion Revascularisation, 1-year landmark



Sirolimus-eluting stent: Orsiro; Zotarolimus-eluting stent: Resolute Integrity; Everolimus-eluting stent: Synergy

**PCI with *ultrathin strut Orsiro* stents resulted in fewer target lesion revascularisations than PCI with *thin strut Resolute Integrity*. Landmark analysis revealed that this significant between-DES difference emerged between 1- and 3-year follow-up.**

The definite stent thrombosis rate was in Orsiro 0.4%, Synergy 0.8% and Resolute Integrity 1.1% ( $p=0.21$  and  $p=0.72$ , respectively). There was no between-stent difference in TLF or safety endpoints (e.g., cardiac death and target vessel-related myocardial infarction).

# Essentials to Remember

## Why?

Stenting small vessel lesions increases adverse event risk, but data on PCI with contemporary *very thin* and *ultrathin* strut DES are scarce.

## What?

3-year clinical outcome in 1,506 all-comer patients treated with *thin*, *very thin* or *ultrathin* strut DES in at least one small target vessel lesion.

## How?

Prespecified analysis of data from the randomised BIO-RESORT trial.

## What are the results?

Patients treated with the *ultrathin* strut Orsiro experienced fewer repeat target lesion revascularisations than patients treated with thin strut Resolute Integrity (2.1% vs. 5.3%).

## Why is this important?

Our findings suggest a relation between the use of the *ultrathin* strut Orsiro stent and a lower repeat target lesion revascularisation risk in all-comers with small vessel lesions.

## Main Message / Quotes

**Our findings may be clinically relevant, as they suggest a relation between the use of ultrathin strut Orsiro stents and a lower repeat revascularization risk in all-comer patients who undergo stenting in at least one small vessel.**

**Due to a greater relative impact of stent strut size on lumen obstruction, the substantially thinner struts of this new-generation drug-eluting stent may be particularly advantageous in small vessel lesions.**