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## The development of bioresorbable composite polymeric scaffolds with high mechanical strength

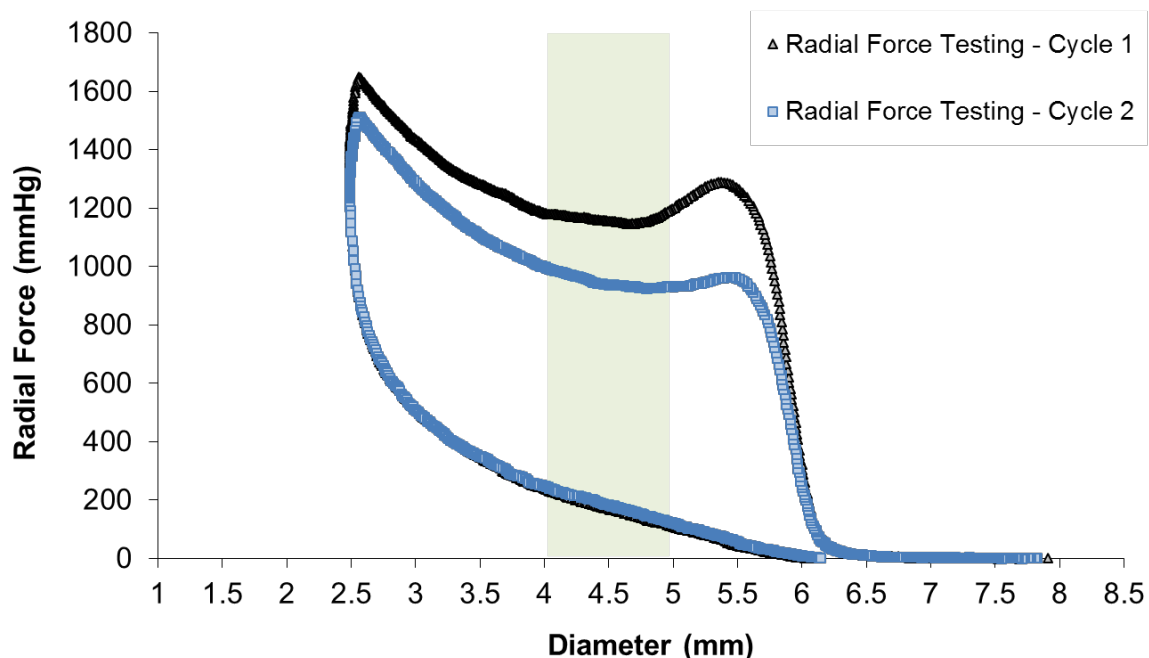
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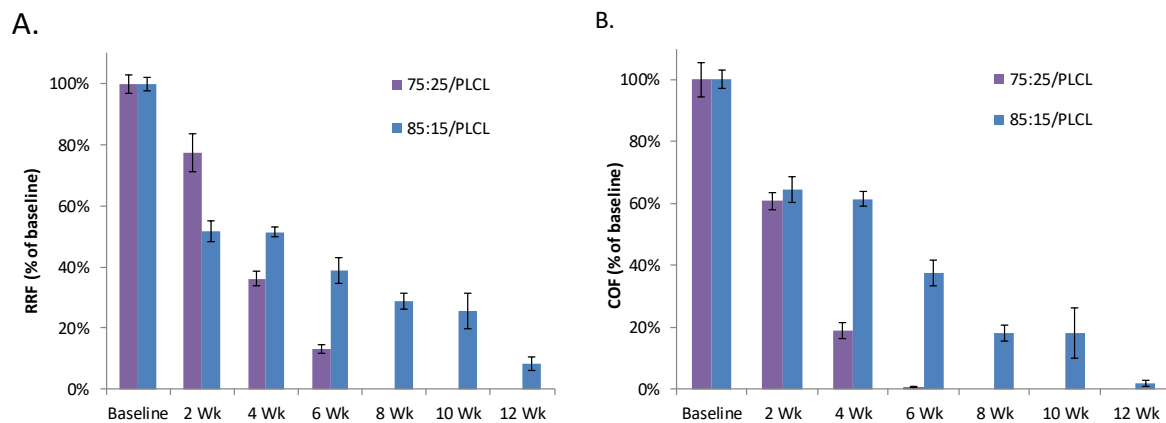
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### Supporting Information: Supplementary Figures and Tables

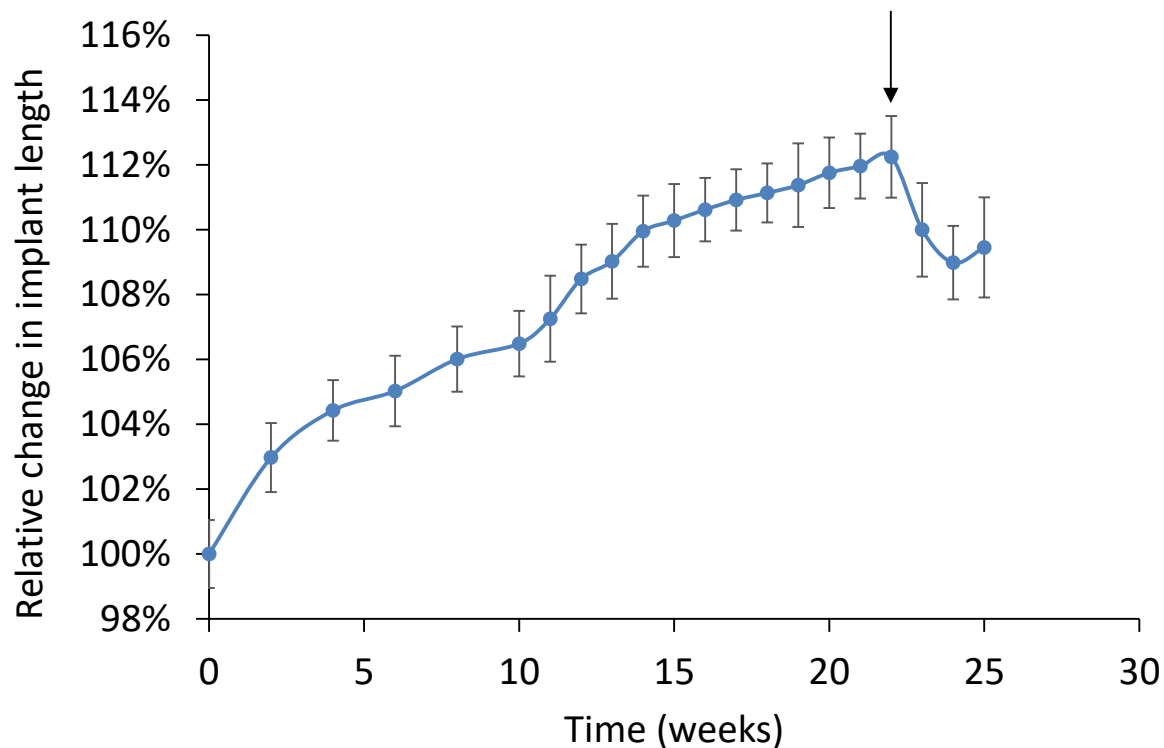


Supplemental Figure 1. Example radial force curve of the elastomer coated braid. The data is of the first two cycles. The shaded region indicates target vessel diameter range for implantation.

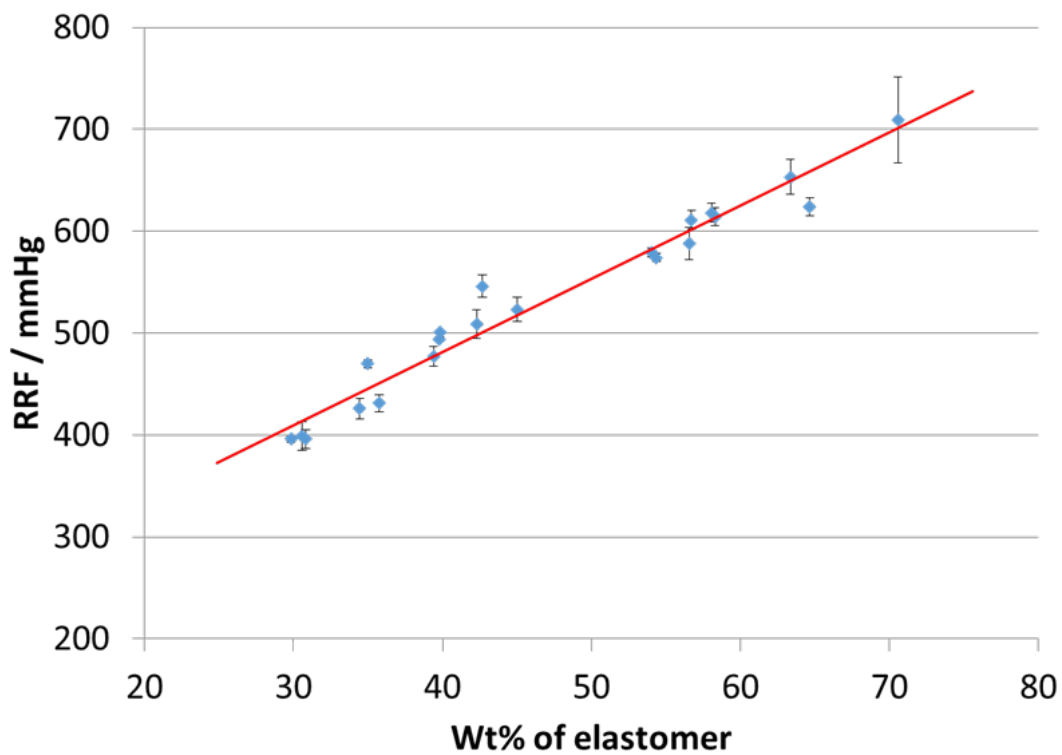




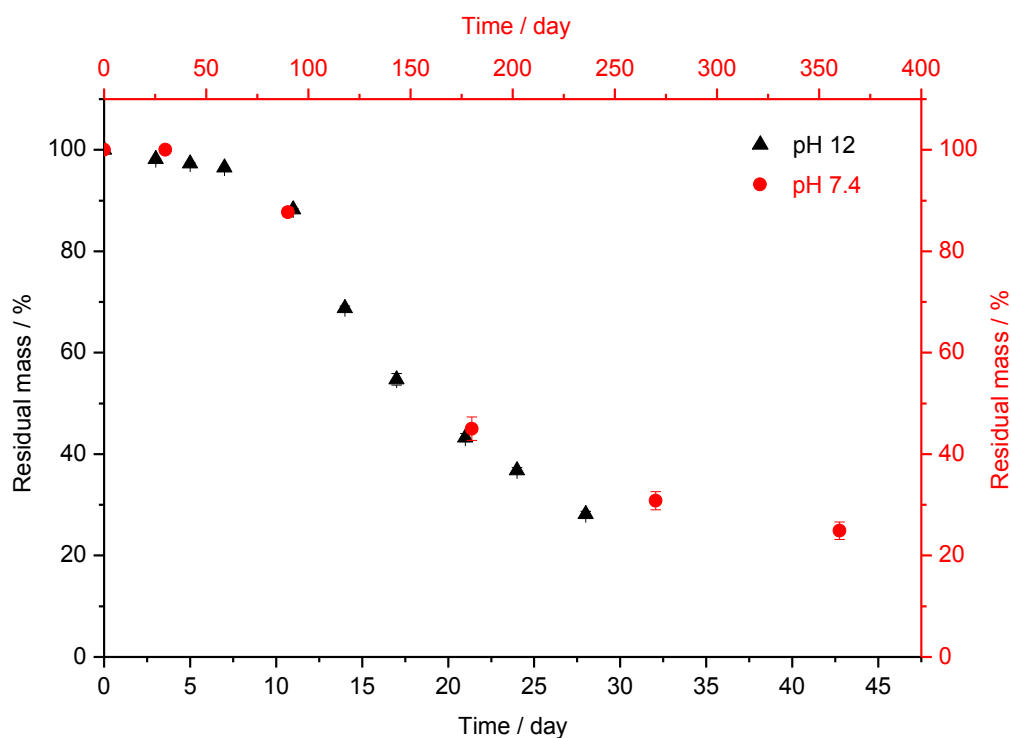
Supplemental Figure 3. Retention of mechanical properties of 75:25/PLCL and 85:15/PLCL implant designs. (A) Radial resistive force as a percentage of baseline over time. (B) Chronic outward force as a percentage of baseline over time. Each data point represents the mean and standard deviation of an n=5 samples.



Supplemental Figure 4. Cyclic bend fatigue testing on 85:15/PLCL implants. Each data point represents the mean and standard deviation of an n=3 samples. The arrow indicates the point at which mechanical integrity is loss.



Supplemental Figure 5. Effect of coating weight on implant mechanical properties. Data shown represents the mean and standard deviation on an n=3 samples.



Supplemental Figure 6. *In vitro* degradation testing of implants. Data shows comparison of resorption under physiological conditions (pH = 7.4) and accelerated conditions (pH=12). Data shown represents the mean and standard deviation on an n=3 samples.

Supplemental Table 1. Impact of PGCL molecular weight and cross-link density on material properties of elastomer films

PGCL Molecular Weight	PGCL:HDI Ratio (wt:wt)	$E$ (MPa)	$\sigma_{\max}$ (MPa)	$\epsilon_b$ (%)
20,000	12:1	5.7	5.4	350
20,000	12:4	43.2	7.5	320
100,000	20:1	4.2	7.3	820
100,000	20:2	3.9	9.0	860
100,000	20:3	6.0	6.7	700
100,000	20:4	10.1	9.6	810

$E$  = Young's Modulus,  $\sigma_{\max}$  = Maximum tensile strength,  $\epsilon_b$  = Break strain  
 All measurements carried out at room temperature in air

Supplemental Table 2. Details of implantation procedure results and comparison of histological scores between 10:90/PGCL, 75:25/PGCL, and 75:25/PLCL implants in swine.

Parameter	Timepoint	Group		
		10:90/PGCL	75:25/PGCL	75:25/PLCL
Balloon-to-artery ratio	1 mo	1.20 ± 0.04	1.21 ± 0.02	1.12 ± 0.03
	3 mo	1.25 ± 0.04	1.23 ± 0.02	1.12 ± 0.04
	6 mo	N/A	1.19 ± 0.02	1.11 ± .03
Stent-to-artery ratio	1 mo	0.98 ± 0.06	1.01 ± 0.09	1.02 ± 0.09
	3 mo	1.04 ± 0.11	1.01 ± 0.07	1.01 ± 0.05
	6 mo	N/A	1.04 ± 0.10	1.00 ± 0.04
Injury score	1 mo	0.4 ± 0.4	0.3 ± 0.4	0.3 ± 0.1
	3 mo	1.5 ± 0.5	2.3 ± 0.4	0.6 ± 0.7
	6 mo	N/A	0.7 ± 0.1	1.0 ± 1.1
Inflammation score	1 mo	3.7 ± 0.7	3.1 ± 1.0	0.7 ± 0.3
	3 mo	3.1 ± 0.2	3.7 ± 0.5	2.0 ± 1.0
	6 mo	N/A	3.0 ± 0.0	2.8 ± 0.3
Fibrin score	1 mo	1.3 ± 0.9	1.1 ± 0.6	0.0 ± 0.0
	3 mo	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	6 mo	N/A	N/A	0.0 ± 0.0



Supplemental Table 3. Details of implantation procedure results and comparison of histological scores between 75:25/PLCL and 85:15/PLCL implants in sheep.

Parameter	Timepoint	Group	
		75:25/PLCL	85:15/PLCL
Balloon-to-artery ratio	1 mo	1.15 ± 0.07	1.13 ± 0.04
	3 mo	1.16 ± 0.05	1.13 ± 0.03
	6 mo	1.16 ± 0.05	1.17 ± 0.07
	12 mo	1.17 ± 0.05	1.14 ± 0.08
	18 mo	N/A	1.17 ± 0.07
Stent-to-artery ratio	1 mo	1.05 ± 0.06	1.01 ± 0.05
	3 mo	1.11 ± 0.20	1.02 ± 0.09
	6 mo	1.02 ± 0.04	1.02 ± 0.03
	12 mo	1.05 ± 0.06	1.04 ± 0.08
	18 mo	N/A	1.09 ± 0.12
Injury score	1 mo	0.1 ± 0.1	0.1 ± 0.1
	3 mo	0.1 ± 0.1	0.1 ± 0.1
	6 mo	0.1 ± 0.1	0.1 ± 0.1
	12 mo	0.3 ± 0.3	0.6 ± 0.3
	18 mo	N/A	0.5 ± 0.2
Inflammation score	1 mo	1.1 ± 0.2	0.6 ± 0.6
	3 mo	2.4 ± 0.4	1.2 ± 0.3
	6 mo	1.5 ± 0.6	1.5 ± 0.2
	12 mo	1.8 ± 0.7	2.4 ± 0.3
	18 mo	N/A	2.1 ± 0.7
Fibrin score	1 mo	0.0 ± 0.0	0.0 ± 0.0
	3 mo	0.0 ± 0.0	0.0 ± 0.0
	6 mo	0.0 ± 0.0	0.0 ± 0.0
	12 mo	0.0 ± 0.0	0.0 ± 0.0
	18 mo	N/A	0.0 ± 0.0

Supplemental Table 4. Summary of polymer characterization information.

Implant designation	Base braid		Elastomer coating		
	Composition	Inherent Viscosity	Prepolymer composition	Prepolymer molecular weight (Mn)	Prepolymer/HDI ratio (wt/wt)
10:90/PGCL	10:90 PLGA	1.53	50:50 PGCL	49600	10:1
75:25/PGCL	75:25 PLGA	1.91	50:50 PGCL	49600	10:1
75:25/PLCL	75:25 PLGA	1.91	40:60 PLCL	54100	10:1
85:15/PLCL	85:15 PLGA	1.80	40:60 PLCL	54100	10:1

Note: No residual solvents or residual HDI were detected using gas chromatography. The residual ethylene oxide levels after sterilization was less than 100 ppm.

Supplemental Table 5. Semi-quantitative scoring scheme for histological analysis.

Attribute	Score	Description of assigned weight
Injury score	0	IEL intact, endothelium typically denuded, media may be compressed but not lacerated
	1	IEL lacerated, media typically compressed but not lacerated
	2	IEL lacerated, media visibly lacerated, EEL intact but may be compromised
	3	EEL lacerated, typically large lacerations of media extending through Eel, coil wires sometimes residing in adventitia
Inflammation score	0	<25% struts with fewer than 10 inflammatory cells
	1	Up to 25% struts with greater than 10 inflammatory cells
	2	25-50% struts with greater than 10 inflammatory cells
	3	>50% struts with greater than 10 inflammatory cells
	4	2 or more loops (or 4 or more struts) with associated granulomatous inflammatory reaction
Fibrin Score	0	No fibrin is appreciated (or only small strands)
	1	At least 25% of struts involving confluent fibrin that surrounds up to 25% of the strut circumference
	2	At least 50% of struts involving confluent fibrin that surrounds >25% of strut circumference
	3	ALL struts with confluent fibrin surrounding >50% of strut circumference OR (2) Confluent fibrin involving >25% of strut circumference with involvement >50% of struts AND extension between struts or bridging.

IEL – Internal elastic lamina; EEL- External elastic lamina