

Supporting Information

PCL-b-PLLA diblock copolymers with high performance to replace polyoxymethylene for tissue ligation clips

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Table S1. The characterizations of P(CL-r-LLA) and PCL-b-PLLA copolymers.

Samples	Copolymer Type	CL:LLA (mol:mol)		M_n (Da) ^{b)}	\bar{D} ^{b)}	$[\eta]$ (dL·g ⁻¹) ^{c)}
		Feed	Product ^{a)}			
RP10	P(CL-r-LLA)	10:90	10:90	36840	2.45	1.96
RP15	P(CL-r-LLA)	15:85	13:87	35611	1.99	1.75
RP20	P(CL-r-LLA)	20:80	22:78	36979	2.20	1.87
BP10	PCL-b-PLLA	10:90	11:89	37007	2.88	2.94
BP15	PCL-b-PLLA	15:85	15:85	38873	2.03	2.55
BP20	PCL-b-PLLA	20:80	20:80	29195	2.59	2.37

^{a)} Determined by ¹H-NMR using CDCl₃ as solvent; ^{b)} Determined by GPC using THF as eluent; M_n values are apparent molecular weights; ^{c)} Determined by Ubbelohde viscometry using CHCl₃ as solvent.

Table S2. Thermal properties of P(CL-r-LLA) and PCL-b-PLLA copolymers.

Samples	T _g (°C)	T _{cc} (°C)	ΔH _{cc} (J·g ⁻¹)	T _m (°C)	ΔH _m (J·g ⁻¹)	T _{5%loss} (°C)	T _{95%loss} (°C)
RP10	53.2	-	-	150.1	0.9	282.8	348.2
RP15	49.3	-	-	146.8	0.4	304.5	388.3
RP20	32.6	-	-	-	-	284.1	391.0
BP10	59.7	130.2	25.4	52.5, 167.4	1.8, 24.5	280.2	335.0
BP15	61.4	110.7	29.1	55.1, 177.5	3.0, 32.5	294.3	398.7
BP20	59.7	101.5	31.6	54.3, 166.9	4.7, 30.8	297.5	385.5

Table S3. Mechanical properties of P(CL-r-LLA) and PCL-b-PLLA copolymers.

Samples	Yield Strength (MPa)	Young's Modulus (MPa)	Breaking Strength (MPa)	Breaking Elongation (%)
RP10	31.0±1.8	1058±142	37.0±1.2	179±13
RP15	21.6±1.0	662±57	32.0±2.6	230±20
RP20	15.3±0.6	377±34	31.4±1.4	256±10
BP10	49.6±1.6	1959±62	37.4±2.3	70±16
BP15	39.0±1.4	1424±96	38.7±1.4	142±7
BP20	29.8±1.0	1244±88	27.3±1.7	168±16

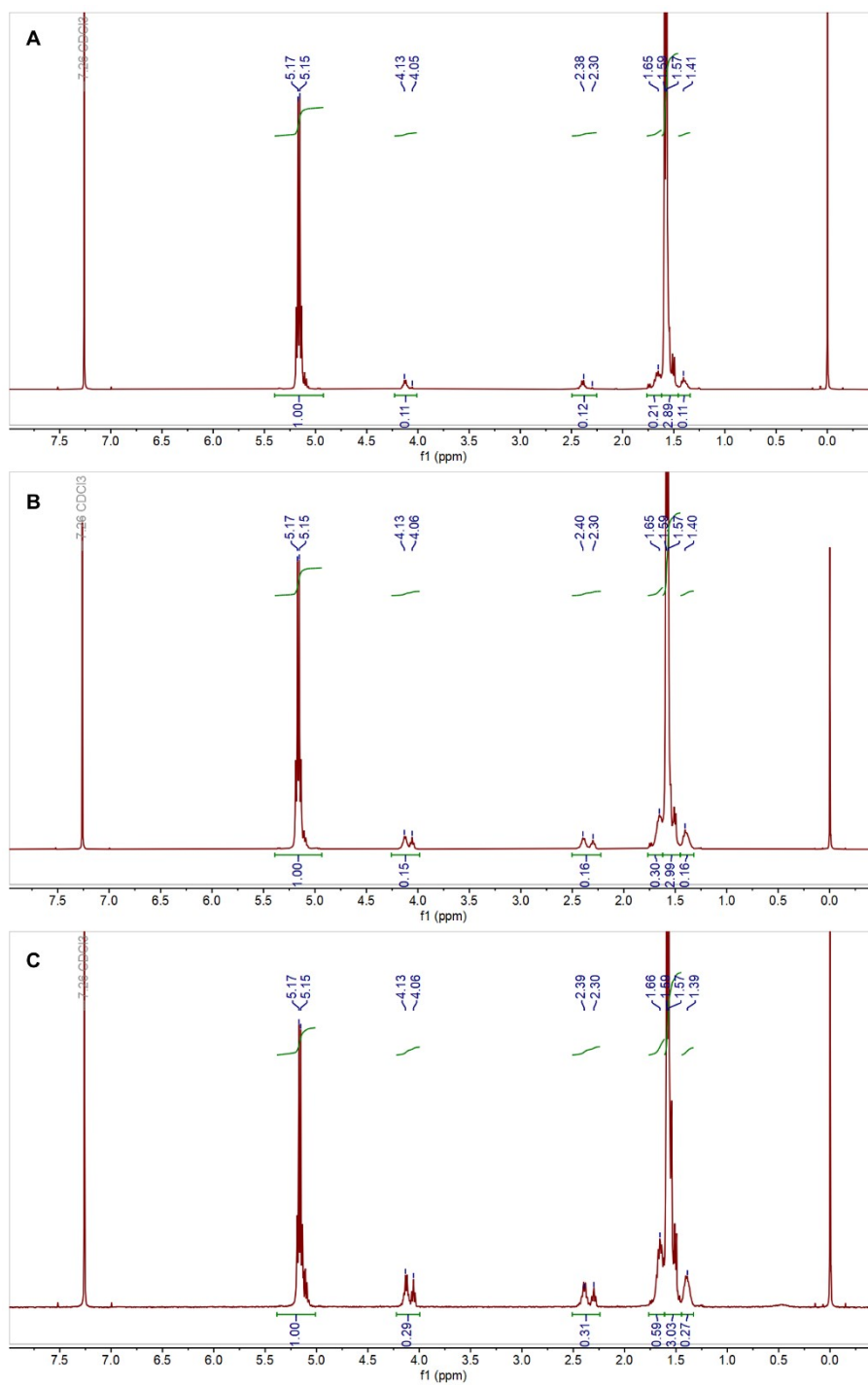


Fig. S1 ¹H NMR spectra of P(CL-r-LLA) copolymers (with peak assignments and integrations). (A) RP10. (B) RP15. (C) RP20.

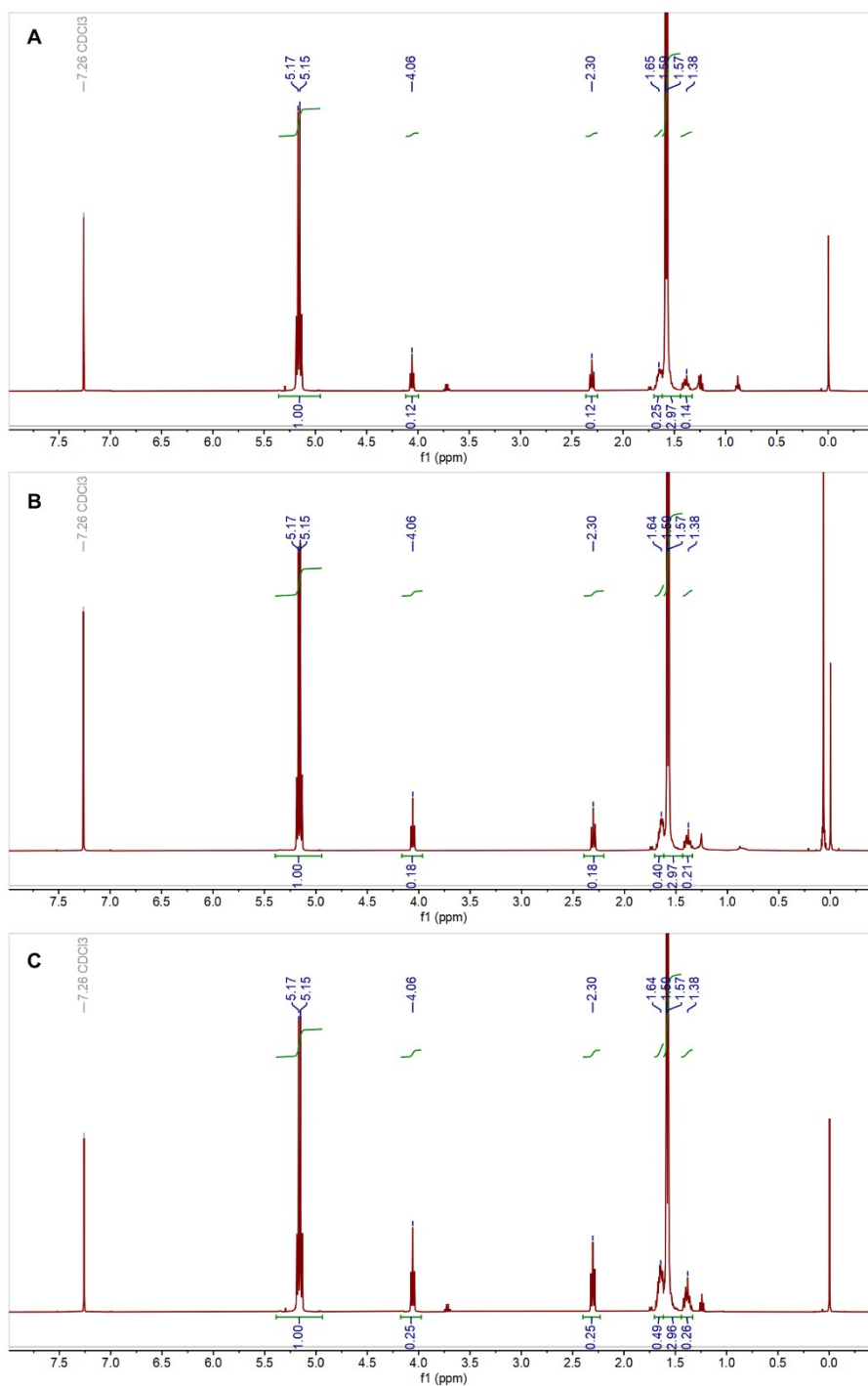


Fig. S2 ^1H NMR spectra of PCL-b-LLA copolymers (with peak assignments and integrations). (A) BP10. (B) BP15. (C) BP20.

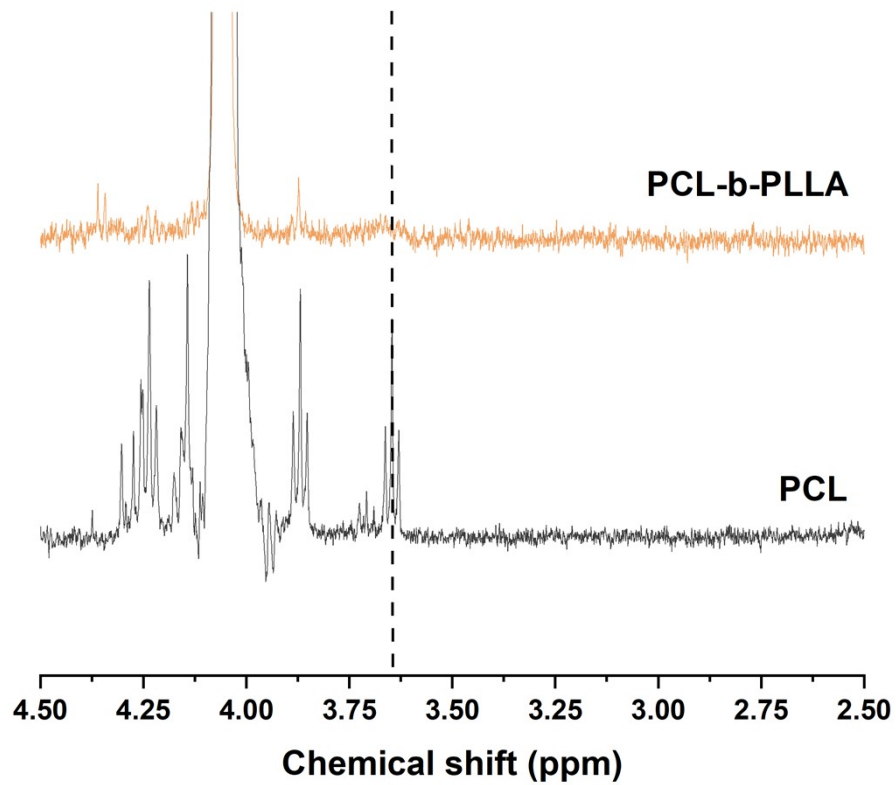


Fig. S3 Enlarged views of characteristic regions in the ¹H NMR spectra of PCL and PCL-b-PLLA.

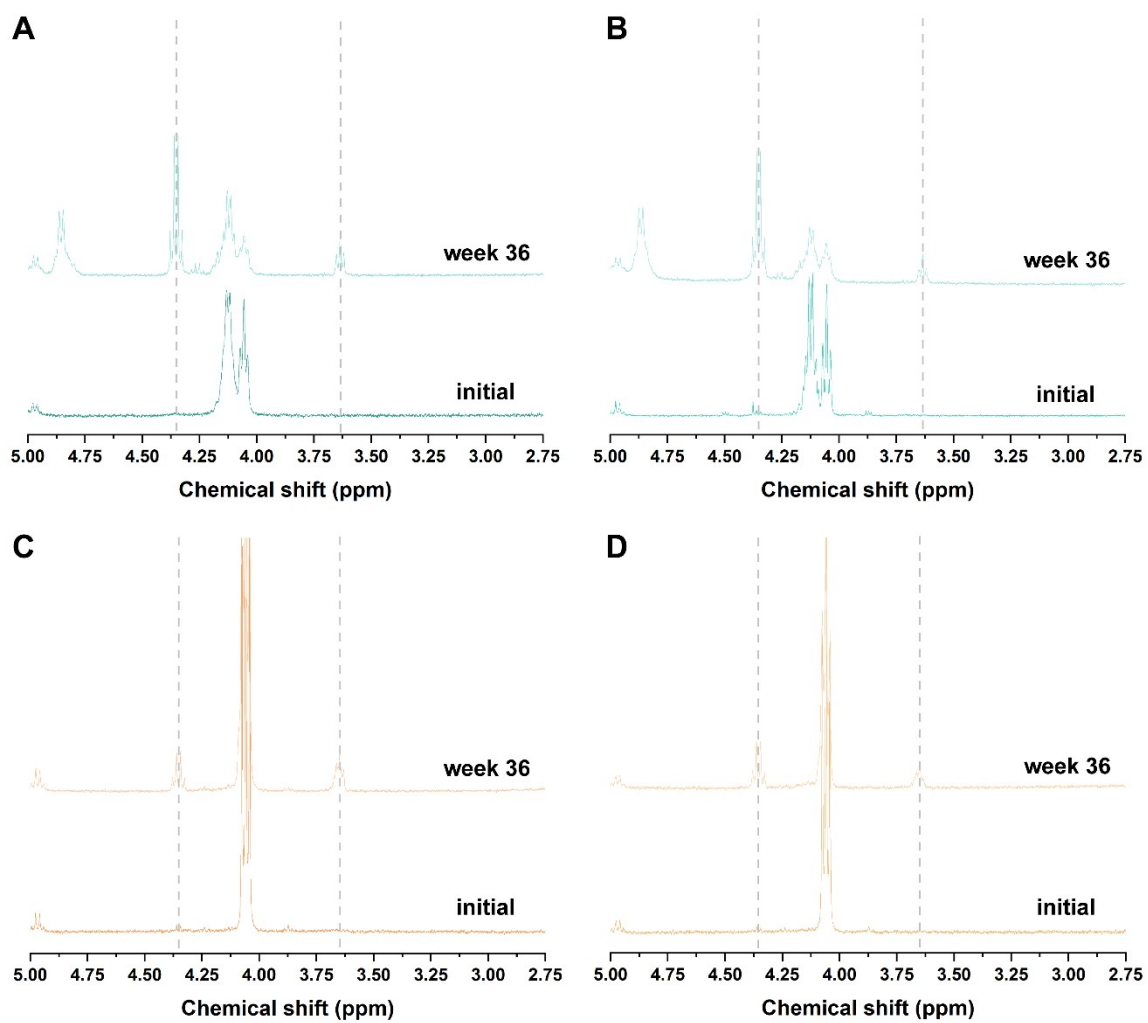


Fig. S4 Enlarged views of characteristic regions in the ^1H NMR spectra of RP15, RP15 clips, BP15, and BP15 clips after 36 weeks of in vitro degradation compared with the initial state. (A) RP15. (B) RP15 clip. (C) BP15. (D) BP15 clip.

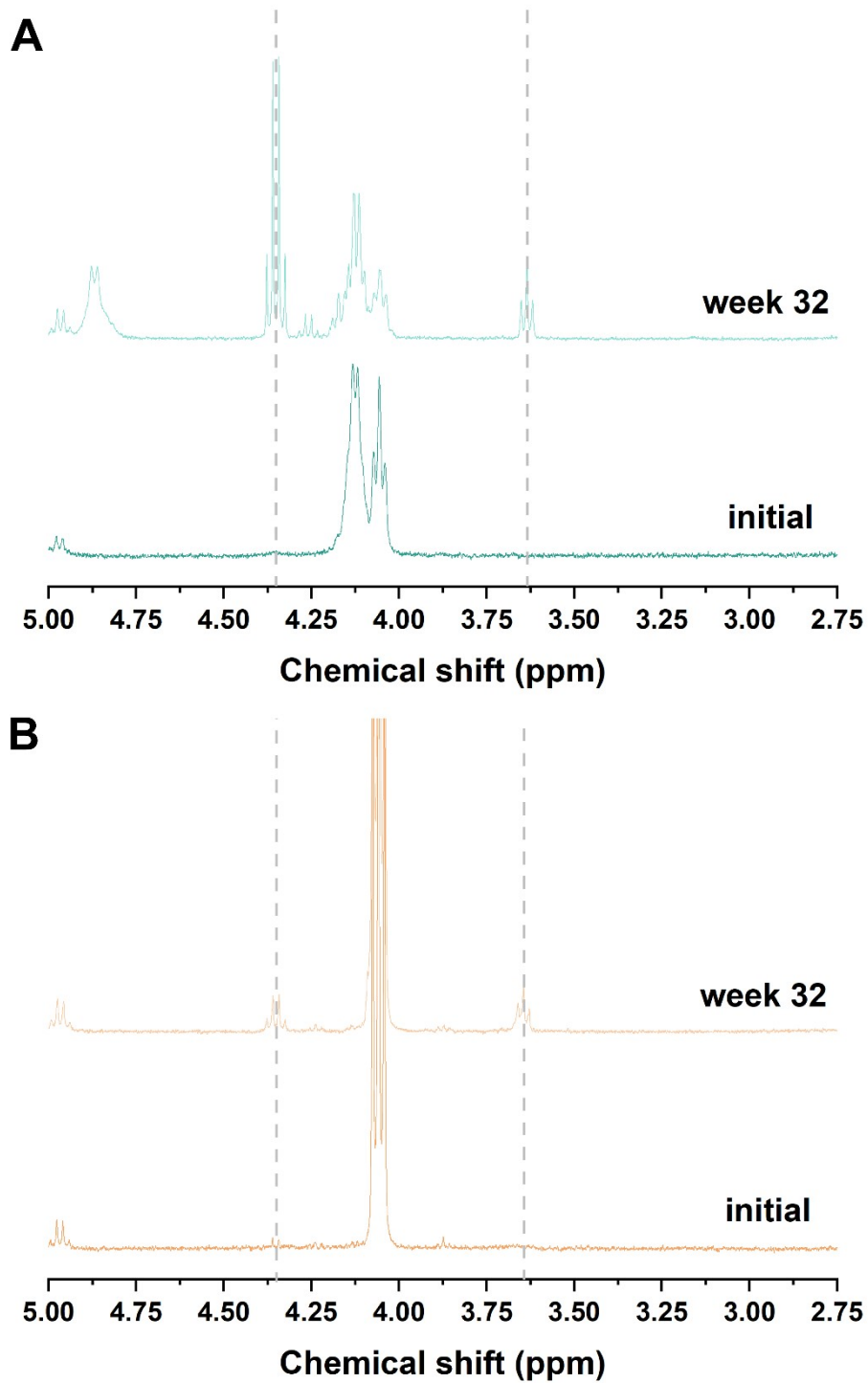


Fig. S5 Enlarged views of characteristic regions in the ^1H NMR spectra of RP15 and BP15 after 32 weeks of in vivo degradation compared with the initial state. (A) RP15. (B) BP15.

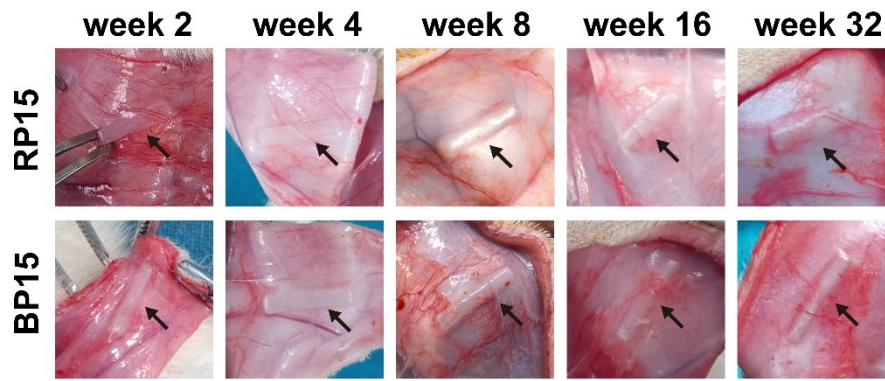


Fig. S6 Macroscopic observation of the subcutaneous implantation sites of RP15 and BP15 at different sampling time points.

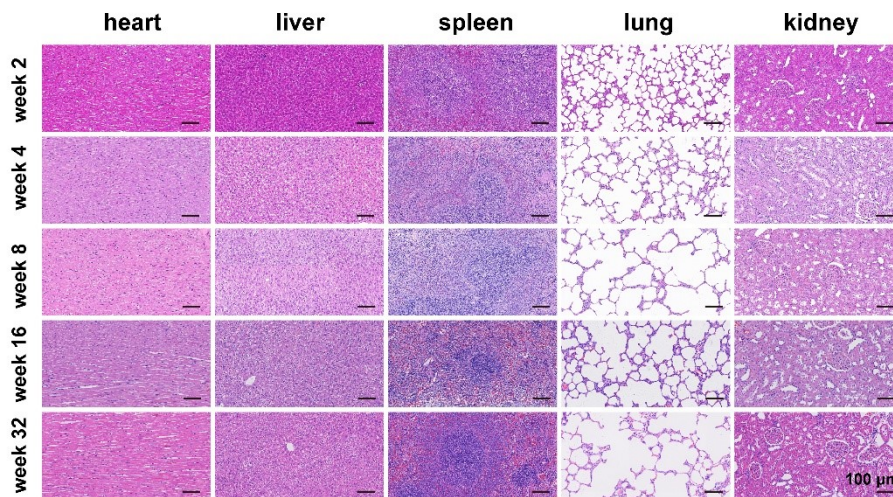


Fig. S7 H&E staining of major organs (heart, liver, spleen, lung, and kidney) of rats at different sampling time points.