

# Biodegradable Polymers

Polysciences is pleased to offer a range of bio-erodable polymers for evaluation and product development. These materials find usefulness for studies involving bio-erodable drug matrices, biodegradable sutures and implant materials, as well as for situations requiring polymers which can biodegrade when placed in the soil. **These polymers are offered for research purposes only. They are not offered for use in or on humans as a drug or device.**

### PLA and PEG Based Biodegradable Polymers

The exploration of polyethylene glycolated (PEG) materials in biosciences and pharmaceuticals has grown rapidly. Biodegradable Polymers based on copolymers of polylactic acid (PLA) and polyethylene glycol (PEG) offer scientists new tools for controlled release formulations and delivery platforms.

The biodegradability of polymers based on lactic acid (LA) and its copolymers with ethylene glycol (EG) opens up new avenues for:

- Encapsulation & Drug Delivery
- Gene Therapy
- Drug Targeting
- Dental & Medical Devices
- Sutures
- Tissue Engineering
- Micellar Anti-cancer Carriers
- Orthopedic Fixation Devices
- Formulation of Artificial Blood Systems
- Determination of Cellular Pathway Mechanisms

**Poly(caprolactone) (PCL)** undergoes a two stage degradation process. The first stage is bulk hydrolysis. Lower molecular weight fragments are subject to intracellular degradation. These polymers are studied for drug delivery.

**Reference:** S.C. Woodward, et.al., J. of Biomed. Materials Res., 19, 437-444 (1985)

### Poly(glycolic acid) (PGA) - Cat. #06525

Used to make biodegradable drug matrices and sutures for cataract surgery and for repairing inguinal hernias.

**References:** Acta Ophthalmol. (Copenh.), 58, 48 (1980); Br. J. Clin. Pract., 33 (7), 191 (1979); Hefte Unfall heil Kd., 138, 302 (1979)

### Poly(dl-lactic acid) (P dl-LA) MW 20,000 - Cat. #16585

**Poly(l-lactic acid) (P l-LA)** This polymer has been widely used in sutures, implants and controlled release systems. Its low molecular weights are for drug matrices, but its high molecular weights are for osteosynthesis (pins for bone repair). Poly(l-lactic acid) Kit (Cat. #18599) contains 5g each of 4 available polymers in the MW range of 2,000 to 300,000.

**Poly(lactide-co-glycolide) (PLG)** These copolymers are prepared for easier processability and for modified properties. Polysciences offers both l-lactide and dl-lactide copolymer in several ratios. Other ratios can be prepared on a custom basis.

- 16587 - Poly(l-lactide co-glycolide) (P l-LG) 70:30
- 19247 - (P dl-LG) 70:30
- 19077 - (P dl-LG) 80:20
- 19076 - (P dl-LG) 90:10

These copolymers hydrolyze within the organism to form lactic acid and glycolic acid.

**References:** Methods in Enzymology, 112, 436; "Drug Carriers in Biology and Medicine", D.L. Wise, et al., pp. 237-270, Academic Press, New York, (1979); J. Biomed. Mater Res., 19, 349 (1985); Contraception, 13, 375 (1976), 97, 253 (1978); J. Pharm. Pharmacol., 31, 294 (1979), 32, 399, (1980)

### Biodegradable Polymers Kit - Cat. #18401

- Poly(glycolic acid) MW 33,000 i.v. 1.0-2.0
- Poly(dl-lactic acid) MW 20,000 i.v. ~0.4
- Poly(l-lactide-co-glycolide) 70:30 MW 5,000 i.v. ~0.2
- Poly(l-lactic acid) MW 100,000 i.v. ~1.5

### Poly[(-)3-hydroxybutyric acid] (PHB) MW ~500,000 - Cat. #16916

Purified natural polymers used in biodegradable studies include Chitosan (Cat. #00281 & 21161) and Pullulan (Cat. #21115).

**Caution:** The full chemical, physical and toxicological properties of the products mentioned herein are not fully known.

**These polymers are water sensitive and must be kept dry.**

**Ordering Information:**

<b>Cat. #</b>	<b>Description</b>	<b>Size</b>
19561	Poly(caprolactone) MW 43,000-50,000	500g
06525	Poly(glycolic acid) MW ~100,000	5g 25g
16585	Poly(DL-lactic acid) MW 20,000	10g
18580	Poly(L-lactic acid) MW 2,000	10g
06529	Poly(L-lactic acid) MW 50,000	10g
18402	Poly(L-lactic acid) MW 100,000	10g
18582	Poly(L-lactic acid) MW 300,000	10g
18599	Poly(L-lactic acid) Kit Contains 5g each of 4 available PLLA polymers	
16587	Poly(L-lactide-co-glycolide), 70:30	10g
19247	Poly(DL-lactide-co-glycolide) 70:30	5g
19077	Poly(DL-lactide-co-glycolide) 80:20	5g
19076	Poly(DL-lactide-co-glycolide) 90:10	5g
18401	Biodegradable Polymers Kit	1 kit
16916	Poly[(-)3-hydroxybutyric acid]	10g
21161	Chitosan Powder, Purified	50g
21115	Pullulan, Desalinized MW 200,000	50g

**PLA and PEG Based Biodegradable Polymers****Diblock Polymers**

24375	PEG(350)-b-PLA(300)	1g
24378	PEG(1000)-b-PLA(750)	1g
24381	PEG(1000)-b-PLA(5000)	1g
24386	PEG(5000)-b-PLA(1000)	1g
24389	PEG(5000)-b-PLA(5000)	1g

**Triblock Polymers**

24500	PLA(1000)-b-PEG(1000)-b-PLA(1000)	1g
24501	PLA(2000)-b-PEG(1000)-b-PLA(2000)	1g
24502	PLA(5000)-b-PEG(1000)-b-PLA(5000)	1g
24503	PLA(1000)-b-PEG(4000)-b-PLA(1000)	1g
24509	PLA(1000)-b-PEG(10,000)-b-PLA(1000)	1g

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