PLGA (poly(lactic-co-glycolic acid))

Subjects: Materials Science, Biomaterials

Contributor: Jack Zhong

PLGA (poly(lactic-co-glycolic acid)) is a copolymer of lactic and glycolic acid, and it is the most widely used biodegradable polymer for parenteral drug delivery. Its ester backbone hydrolyses in water, and the degradation products, lactic and glycolic acid, enter normal metabolic pathways [1]. The copolymer ratio controls the crystallinity and the degradation rate: a higher glycolic acid fraction gives a faster degradation and a shorter release period [2]. Nanoparticles and microspheres are prepared by emulsion-solvent evaporation, and the size distribution and the encapsulation efficiency depend on the solvent, the stabiliser, and the shear applied [3]. The acidic products accumulate inside a large implant and catalyse further hydrolysis, which is observed as a bimodal release profile [4]. Sterilisation by gamma radiation can shorten the chains and change the degradation rate, and this effect is often overlooked [5].

lactic acid | glycolic acid | copolymer ratio | hydrolytic degradation | microsphere | encapsulation efficiency | autocatalysis

References

1. Singh; Singha, P. Effect of Modifications in Poly (Lactide-co-Glycolide) (PLGA) on Drug Release and Degradation Characteristics: A Mini Review. *Current Drug Delivery* **2021**, *18*, 1378-1390. [CrossRef]
2. Liu, G.; McEnnis, K. Glass Transition Temperature of PLGA Particles and the Influence on Drug Delivery Applications. *Polymers* **2022**, *14*, 993. [CrossRef]
3. Jia, Z.; Ma, C.; Zhang, H. PLGA Coatings and PLGA Drug-Loading Coatings for Cardiac Stent Samples: Degradation Characteristics and Blood Compatibility. *Coatings* **2021**, *11*, 1427. [CrossRef]
4. Cunha, A.; Gaubert, A.; Latxague, L.; Dehay, B. PLGA-Based Nanoparticles for Neuroprotective Drug Delivery in Neurodegenerative Diseases. *Pharmaceutics* **2021**, *13*, 1042. [CrossRef]
5. Sydow, S.; Aniol, A.; Hadler, C.; Menzel, H. Chitosan–Azide Nanoparticle Coating as a Degradation Barrier in Multilayered Polyelectrolyte Drug Delivery Systems. *Biomolecules* **2019**, *9*, 573. [CrossRef]

Retrieved from https://encyclopedia.pub/entry/history/show/135492