

Functional Synthetic Polymers for Biomedical Applications

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Tissue engineering is a multidisciplinary and interdisciplinary field that applies principles and methods of engineering, biology, and medicine toward development of biological substitutes that restore, maintain or improve function in normal and pathological tissues or organs. The requirement of polymer scaffolds for tissue regeneration is known as follows. Polymer scaffolds should have nontoxicity, good biocompatibility, suitable biodegradability, proper pore size and high porosity, and favorable interaction with cells. Until now, among many polymers, only polyglycolic acid, polylactic acid and their copolymers are being used as biodegradable scaffolds because they are nontoxic and approved from FDA. The shapes of these scaffolds are implantable bonded fibrous mesh, porous sponge, or injectable hydrogels. In the future, to obtain ideal intelligent polymer scaffolds, the followings are further demonstrated: 1) to make 3D porous scaffold, 2) to control biodegradation rate, 3) to examine blood compatibility, 4) to graft peptide ligands for specific cell adhesion, and 5) to release some bioactive agents including growth factors. Moreover, vascular stents for coronary and peripheral arteries, tissue adhesives for skin bonding, and other functional biomedical polymers will be mentioned.