

(e.g., acrylic acid, acrylamide). Semi-interpenetrating structures were prepared by copolymerization of N-isopropylacrylamide with polyethylene glycol macromer in the presence of sodium alginate in UV light [12]. The swelling ratio can be altered by changing the ratio of sodium alginate at a constant temperature. The mechanical strength shows improvement when combined with semi-IPN (interpenetrating polymer network) structures. Graft copolymerization of N-isopropylacrylamide (NIPAAm) in alginate after reaction with ceric ions also provided useful means for preparing temperature-sensitive alginate gels (Lee and Mooney, unpublished data).

4.2.1.4 Cell Cross-Linking

When the alginate gel is modified with ligands that show cell adhesion, the ability of cells to bind polymers can lead to a long distance without the help of any chemical-binding agents. Cell added to restriction site associated (RAD) modified alginate solution can generate cross-linked network structures via specific receptor–ligand interaction without using any other cross-linking in such modified alginate [13]. But cells added to a nonmodified alginate form non-uniform dispersion. Even if the cross-linking in the structures is broken, the structures are recovered within a few minutes due to weak and reversible ligand–receptor interaction in the system. Also it was reported that cells can provide additional mechanical integrity to Arginylglycylaspartic acid (RGD), alginate gels. RGD alginate gels are ionically cross-linked with calcium ion through a binding interaction between cells and adhesion ligands that are coupled to the alginate chain [14].

4.2.2 Biomedical Applications

4.2.2.1 Pharmaceutical Applications

Conventionally, alginates in pharmaceutical fields serve gel-forming and stabilizing agents, and they play a significant role in the controlled release of drugs to the desired site. Most common forms of dosage in pharmaceutical application is in the oral dosage form. But the use of hydrogel as a tissue-centered drug delivery system is the currently growing field. Here we briefly discuss the recent progress in drug delivery using alginate or its derivatives.

4.2.2.1.1 Delivery of Small Chemical Drugs

Alginate gels can be used for the controlled delivery of drugs having low molecular weight and are found to be highly useful when primary and secondary bond between the drug and the alginate can be used to regulate the