

The use of small immobilized peptides is popular in the attachment of cell to alginate, particularly with RGD (arginine–glycine–aspartic acid) sequence of first peptides, and promotes cell adhesion on a biomaterial. This tripeptide motif sequence has been identified in ECM proteins such as fibronectin, collagen, laminin, osteopontin, and vitronectin [57]. Several other combined modifications have been investigated to improve alginate properties such as ECM-like 3-D cellular microenvironment for alginate hydrogel. Other than the RGD sequence for grafting, there are several sequences used for the attachment such as protease-labile cross-linking peptide (proline–valine–glycine–leucine–isoleucine–glycine, PVGLIG) that is cleavable by metalloproteinases (MMPs) produced by cells [16, 36], but some sensitive hydrogels are remodeled by cell-driven proteolytic mechanisms, which increase evasion/invasion. Despite these peptide linkages, alginate can functionalize with cell-signaling moieties such as galactose to improve hepatocyte cell recognition [61–63]. Several other alginate modifications have been expected for the improvement of cell delivery and its behavior [64].

10.5 Photocross-Linking

For better regulation of mechanical properties, swelling ratios, and degradation rates, photocross-linking method is introduced in the formation of alginate gel. The photocross-linking method is most popularly used in tissue engineering [44, 46, 65, 66]. Photocross-linked alginate delivers the cell rapidly by less interference *in situ* following a brief exposure to ultraviolet (UV) light [69]. This process has been done in mild conditions. For photocross-linking, alginate was modified with 2-aminoethyl methacrylate that is directly photocross-linked using UV light with a photoinitiator [44]. In a recent study, photocross-linkable alginate with cell adhesive properties is shown to be of great interest in tissue engineering applications [44, 67, 68, 70, 71]. Photocross-linking method is a newly formed method and learning their effectiveness requires further study.

10.6 Shape-Memory Alginate Scaffolds

According to the desired shape and size, a novel type of method has been developed that is based on covalent cross-linking from a macroporous structure. *In vitro* condition shape-memory alginate modulates the shape according to delivery and targeting of biomaterial with alginate and further