

10.8.3 Cell Culture

The applications of alginate gels are increasing like a model system in biomedical studies for mammalian cell culture. These are gladly modified to supply as both 2-D and 3-D culture systems. The mammalian cell has no receptor for alginate. The mammalian cells and alginate gels were united with the small protein adsorption, allowing these supplies to be provided in several ways like a perfect blank slate, on which extremely precise and quantitative processes for cell adhesion can be integrated (e.g., combining artificial peptides particularly for cellular adhesion receptors). Additional essential findings exposed that *in vitro* observation can be gladly converted *in vivo*, because of the biocompatibility and simple penetration of alginate into the body. Alginate gels modified with RGD have also been mainly and often utilized *in vitro* cell culture. The RGD part in alginate gels facilitates one to regulate the phenotype of myoblasts [67], chondrocytes [109], osteoblasts [110], and ovarian follicle [111], in addition to bone marrow stromal cells [112, 113]. For instance, RGD peptides chemically conjugate to the alginate spine and there was severely improved linkage and production of cultured myoblasts compared to nonconjugated alginate gels (Figure 10.4). Additionally, the amount of cells adherent and the growth speed were robustly connected to the mass RGD density in the gels. A key factor in the controlling of cellular reaction is the extent of the spacer arm connecting the RGD peptide and the alginate sequence. The linkage and growth of main human fibroblasts cultivated on alginate gels customized with a peptide with the chain of (glycine) n -arginine-glycine-aspartic acid-serine-proline (GnRGDSP) were severely affected by the spacer arm extent, in spite of the entirely similar concentration of the peptides in the gels (Figure 10.5) [114].

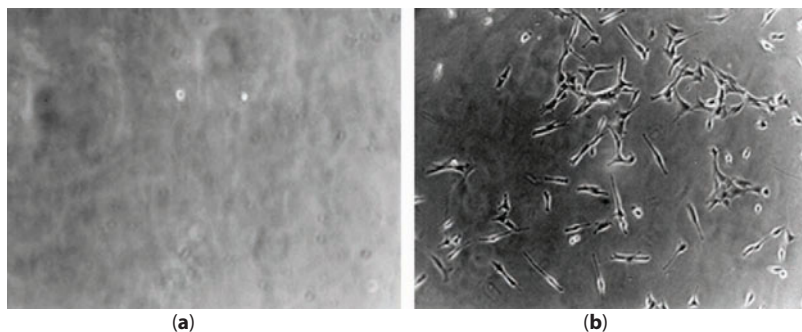


Figure 10.4 Images of optical microscopic C_2C_{12} myoblasts linked to the shell of (a) nonpeptide-modified alginate gels and (b) alginate gels modified with RGD [114].