

Macroporous hydrogel matrix-supported in situ formation of injectable ECM-like hydrogel as the carrier of growth factors and living cells

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Abstract:

Hydrogels loaded with biologics hold great potential for various biomedical applications such as regenerative medicine. However, biologics may lose bioactivity during hydrogel shipping and storage. While injectable hydrogels do not have this issue, they face problems such as difficult injection and slow gelation. The purpose of this study was to develop an aptamer-based affinity hydrogel by integrating a pre-formed macroporous hydrogel matrix and an injectable hydrogel. The data show that the macroporous hydrogel matrix can hold a large amount of solution for the formation of in situ injectable hydrogels loaded with growth factors or living cells. The cells could maintain high viability and proliferate in the composite hydrogels. The growth factors could be stably sequestered and sustainably released due to the presence of aptamers. When both living cells and growth factors were loaded together into the hydrogels, cells could maintain viability under culture conditions with a reduced serum level. Therefore, a macroporous matrix-supported formation of aptamer-functionalized injectable hydrogels is a promising method for developing the carriers of living cells and growth factors.