Kazunari Akiyoshi

1 .Topic in Research Achievements in the Year 2006

We can develop tailor-made functional nanogels to create novel nanobiomaterials (nanogel engineering) by the self-assembly of functional associating polymers as building blocks. Macrogels with well-defined nanostructures can be obtained by self-assembly using these nanogels as building blocks. In tissue engineering, hydrogels have been intensively studied to deliver the appropriate amount of growth factors to a target site on desired time scale. Recently, we modified CHP nanogel with methacryloyl groups and polymerized with other hydrophilic polymer to prepare the hybrid hydrogel with nanogel domains. The immobilized nanogels retained their ability to encapsulate proteins. In addition, the trapped proteins can be released form hydrogel in an active form (chaperon like activity). We cross-linked acryloyl-group modified CHP (CHPA) nanogels with thiol-group modified poly (ethylene glycol, PEGSH) to prepare a biodegradable hydrogel (CHP-PEG gel). Nanogel-based delivery system is expected to serve as a preferable hydrogel with the efficient drug-loading capacity for tissue engineering. The CHP-PEG hydrogel delivery system was an efficient delivery system of bone anabolic agent, PGE_2.

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