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Thermogels as an injectable 3D scaffold

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3D scaffolds with in situ forming properties have been extensively investigated for injectable tissue engineering applications. Chemical reactions or physical association triggered by change in external stimuli lead to the formation of the cell-incorporating hydrogel. However, to achieve the sustained delivery of growth factors, live cell retention and targeted differentiation into the cells are required in the in situ formed gel, which are based on the well-defined chemical and physical properties of a polymer. We have been developing thermogels which undergo solution-to-gel transition as the temperature increases. Mild and cytocompatible procedure for gel formation as well as capability to maintain a neutral pH during the degradation, polypeptide-based thermogels are proved to be an excellent platform for such purpose. As an injectable scaffold of stem cells, the physicochemical properties, the polypeptide thermogels and composite systems of the thermogels have been characterized. In addition, cell viability, differentiation of stem cells into target cells were monitored by using biomarker expressions and biofunctions of the differentiated cells. Polypeptide-based thermogels are very promising scaffolds for injectable tissue engineering applications and stem cell therapy to replace damaged/disease tissues in the future.

Biography

Byeongmoon Jeong has received his BS degree in the Department of Chemistry from Seoul National University, MS from KAIST and PhD in the Department of Pharmaceutics and Pharmaceutical Chemistry from the University of Utah. He has worked at Pacific Northwest National Laboratory, USA as a Senior Research Scientist prior to joining Ewha Womans University. He has authored 120 international peer-reviewed papers and patents on stimuli-sensitive polymers. He is also the Director of the National Research Laboratory on biodegradable thermogels. He was also a Fellow at Ewha Womans University and his research focuses on stimuli-sensitive hydrogels and their applications for drug delivery and tissue engineering.

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