

Chitosan-based self-healing hydrogel: Preparation and bio-applications

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A new chitosan-based biocompatible self-healing hydrogel system has been developed. The hydrogel was achieved readily through the formation of Schiff base linkage between the amino groups on chitosan and the benzaldehyde groups on a telechelic PEG chain ends. The Schiff base is a dynamic linkage, thus the crosslink points in the hydrogel keep open and close all the time. Therefore, this hydrogel is self-healable and its gelation state can be altered by many external stimuli, such as pH, vitamin B6 derivative, some enzymes and amino acids, making it possible for controlled drug delivery applications. We have also found that this hydrogel is biocompatible, suitable for 3D cell proliferation, tissue engineering and cell free protein expression. Because of its self-healability, the hydrogel containing cells is injectable that could help fix cells at targeted positions for therapeutic. In addition, the system could also be further modified with magnetic nanoparticles, mesoporous silica to get organic-inorganic hybrids, which have interesting potential for bio-applications.

Biography

Lei Tao, born in 1976, graduated from University of Science and Technology of China to get his Bachelor and Master degrees in 1999 and 2002, respectively. After his Ph.D. study in Warwick University (2003-2006), he moved to University of California, Los Angeles (UCLA, USA) in 2006, and then University of New South Wales (UNSW, Australia) in 2008 as a postdoctoral research assistant. In 2010, he joined Department of Chemistry, Tsinghua University. His research interests are focused on the synthesis of well-defined polymers and applications of those polymers in biological areas. He has published more than 50 SCI papers, and the H-index is 23 by now.

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