

## Accepted Manuscript

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PII: S1742-7061(14)00200-1  
DOI: <http://dx.doi.org/10.1016/j.actbio.2014.04.031>  
Reference: ACTBIO 3219

To appear in: *Acta Biomaterialia*

Received Date: 20 December 2013  
Revised Date: 16 April 2014  
Accepted Date: 28 April 2014

Please cite this article as: Balakrishnan, B., Joshi, N., Jayakrishnan, A., Banerjee, R., Self cross-linked oxidized alginate/gelatin hydrogel as injectable, adhesive bio-mimetic scaffolds for cartilage regeneration, *Acta Biomaterialia* (2014), doi: <http://dx.doi.org/10.1016/j.actbio.2014.04.031>

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## **Self cross-linked oxidized alginate/gelatin hydrogel as injectable, adhesive biomimetic scaffolds for cartilage regeneration.**

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### **ABSTRACT**

Biopolymeric hydrogels that mimic the properties of extracellular matrix have great potential in promoting cellular migration and proliferation for tissue regeneration. We have reported earlier that rapidly gelling, biodegradable, injectable hydrogels can be prepared by self-cross-linking of periodate oxidized alginate and gelatin in the presence of borax without using any toxic cross-linking agents. The present paper investigates the suitability of this hydrogel as a minimally invasive injectable, cell attractive and adhesive scaffold for cartilage tissue engineering for the treatment of osteoarthritis. Time and frequency sweep rheology analysis confirmed gel formation within 20 s. Hydrogel integrated well with the cartilage tissue having a burst pressure of  $70 \pm 3$  mm of Hg indicating its adhesive nature. Hydrogel induced negligible inflammatory and oxidative stress responses, a prerequisite for the management and treatment of osteoarthritis. SEM images of primary murine chondrocytes encapsulated within the matrix revealed attachment of cells onto the hydrogel matrix. Chondrocytes demonstrated viability, proliferation and migration within the matrix, while maintaining their phenotype, as seen by expression of

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