

# Event Abstract

[Back to Event](#)

## The *in vitro* cytocompatibility of chitosan-alginate-Bioglass® composite scaffolds

[Laurence Ohia](#)<sup>1</sup>, [Andrew P. Hurt](#)<sup>1</sup>, [Darren S. Pink](#)<sup>1</sup> and [Nichola J. Coleman](#)<sup>1</sup>

- <sup>1</sup> University of Greenwich, Faculty of Engineering and Science, United Kingdom

**Introduction:** Bioactive glasses are widely applied in the field of bone tissue regeneration<sup>[1]</sup>. Chitosan and alginate are cytocompatible polymers which upon blending interact to form a polyelectrolyte complex<sup>[2],[3]</sup>. The present study investigates the *in vitro* cytocompatibility of freeze-dried chitosan-alginate-Bioglass® composite scaffolds.

**Materials and Methods:** 100, 50 and 0% (w/w) chitosan-alginate blends (C100, C50 and C0, respectively) were prepared as 1% (w/v) solutions in 1% (v/v) aqueous acetic acid to which 10% Bioglass® by total weight of polymer were added. 5 cm<sup>3</sup> aliquots of the solution were frozen at -18 °C for 24 h then lyophilized for a further 24 h to produce the scaffolds. Optical microscopy was performed on the samples.

1 x 1 x 4 mm sections of scaffold were placed in contact with human MG63 osteosarcoma cells at a concentration of 10<sup>6</sup> cells/cm<sup>3</sup> for 24 and 72 h. The control consisted of cells only. Cell viability was measured by MTT assay<sup>[2]</sup>.

**Results and Discussion:** Optical micrographs indicated that all blends formed macroporous scaffolds (Fig. 1). Scaffolds with increased proportions of chitosan displayed a higher porosity and a decreased matrix density.

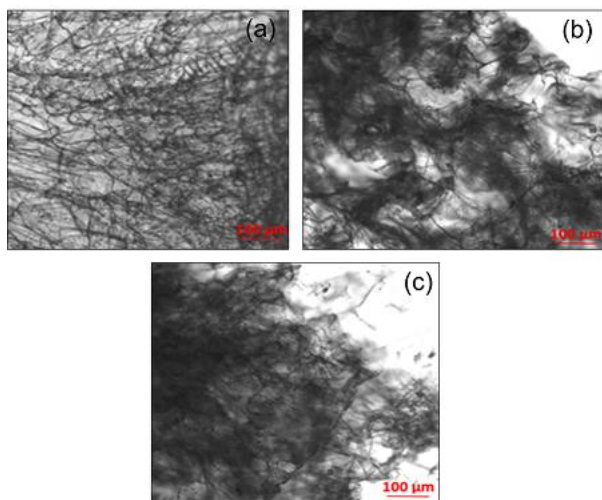


Figure 1: Optical micrographs of (a) C100, (b) C50 and (c) C0

Cell viability data demonstrated that all scaffolds supported the growth of MG63 cells (Fig. 2), and that biocompatibility increased as a function of chitosan-content.

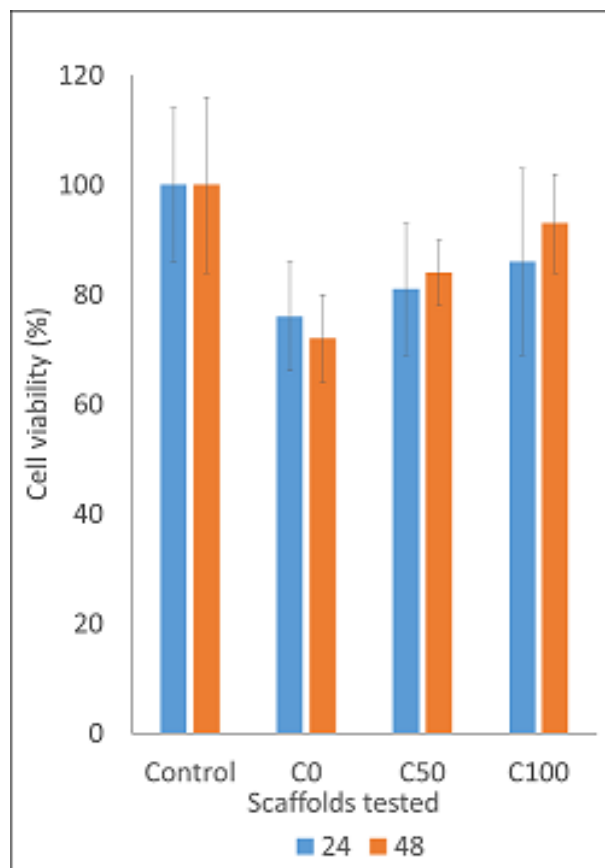


Figure 2: Cell viability after contact with scaffolds for 24 and 72 h

**Conclusions:** Porous scaffolds can be prepared from chitosan-alginate-Bioglass® blends. Increasing the chitosan content improved in vitro biocompatibility with respect to human MG63 osteosarcoma cells.

**References:**

- [1] J. R. Jones, "Review of Bioactive Glass: From Hench to Hybrids," *Acta Biomaterialia*, 9,4457-86, 2013.
- [2] A.P. Hurt, G. Getti and N.J. Coleman, "Bioactivity and biocompatibility of a chitosan-tobermorite composite membrane for guided tissue regeneration," *International Journal of Biological Macromolecules*, 64, 11-16, 2014.
- [3] W-Y. Chuanga, T-H. Youngb, C-H. Yaoc and W-Y. Chiu. "Properties of the poly(vinyl alcohol)/chitosan blend and its effect on the culture of fibroblast in vitro," *Biomaterials*, 20, 1479-1487, 1999

Keywords: Scaffold, Biocompatibility, composite, polymer

Conference: 10th World Biomaterials Congress, Montréal, Canada, 17 May - 22 May, 2016.

Presentation Type: Poster

Topic: Biodegradable polymers

Citation: Ohia L, Hurt AP, Pink DS and Coleman NJ (2016). The in vitro cytocompatibility of chitosan-alginate-Bioglass® composite scaffolds. *Front. Bioeng. Biotechnol. Conference Abstract: 10th World Biomaterials Congress*. doi: 10.3389/conf.FBIOE.2016.01.02414

Received: 27 Mar 2016; Published Online: 30 Mar 2016.