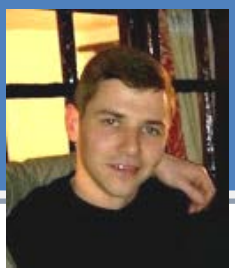
>>> ANNOUNCEMENT



Christopher Hill

Institute of Translational Medicine and Institute of Integrative Biology, University of Liverpool, Liverpool, UK

Development of engineered protein nanofibers for cartilage tissue engineering

ABSTRACT

The *in vitro* propagation and directed differentiation of autologously-derived adult mesenchymal stem cells (MSCs) for cartilage repair is attractive due to their ease of isolation from a variety of tissues and ability to differentiate to a chondrocyte-like phenotype. However, progress in this field is limited due to the propensity of MCS-derived chondrocytes to redifferentiate upon removal of inductive factors. These shortcomings may be overcome by the development of novel bioscaffolds able to induce the terminal differentiation of MSCs to the permanent hyaline phenotype observed in articular cartilage. Here we introduce a protein-based biomaterial composed of an engineered immunoglobulin (Ig) domain chain and cross-linking protein which self-assemble to form nanofibers. Utilising supramolecular protein platforms as biomaterials offers distinct advantages over polymer and peptide-derived counterparts including an increased capacity for bottom-up functionalization, display of exogenous peptide sequences with near-native stoichiometries and the ability to engineer biodegradation pathways. Furthermore, the spatial density and topographical distribution of functional moieties, factors which are important for stem cell differentiation, are controllable at the nanoscale. Modification of Ig domains by insertion of an adhesion motif does not perturb the three-dimensional structure or inhibit fiber formation, and the functionalized scaffold promotes cell adhesion *in vitro*. Additionally, whole protein exhibition is achievable via the incorporation of chimeric fusion proteins, providing a means for targeting more complex molecular interactions and demonstrating the potential of the system to support orthogonal functionalities.

BIO

Since 2012	PhD Translational Medicine, University of Liverpool, UK Thesis Title: Development of engineered protein nanofibers for cartilage tissue engineering
2011 - 2012	MSc Advanced Biological Sciences – Chemical Biology First Class Honours, University of Liverpool, UK
2008 – 2011	BSc Biochemistry Second Class Honours, University of Liverpool, UK

September 10, 2014 at 10 am

Leibniz Institute of Polymer Research, Max Bergmann Center of Biomaterials Dresden
Seminar Room B1, Ground Floor, Budapester Straße 27

Contact: Prof. Carsten Werner, IPF/Max Bergmann Center of Biomaterials Dresden

Leibniz-Institut für Polymerforschung Dresden e. V.

MAX BERGMANN center of biomaterials dresden