Abstract

Introduction: The use of an injection combining the self-assembling peptide, P11-8 and chondroitin sulphate has been previously assessed, to restore the biomechanical function of glycosaminoglycan depleted cartilage. This treatment is being developed to halt the early progression of osteoarthritis, where there is a lack of preventive treatment available. The problem previously has been the inability to visualise this histologically, therefore, not being able to directly link the restoration in biomechanical function to the treatment. This is due to the peptide becoming diluted, de-assembling and consequently leaching out. This is what this project aims to address.

Methods: Osteochondral samples were taken from porcine legs (n=6), specifically from the medial and lateral condyles. The lateral condyles were glycosaminoglycan depleted and injected with the self-assembling peptide and chondroitin sulfate combined. Paraffin histology, and different methods of fixation pre- and post-cryoembedding were assessed using Safranin O staining, to detect the treatment. Immunohistochemistry (n=3) was conducted to see if any staining was specific for chondroitin sulphate and hence the treatment.

Results: Paraffin embedding and changing the fixatives post-cryoembedding were not able to visualise the treatment. However, fixing pre-cryoembedding with 1-Ethyl-3-(3-dimethylaminopropyl)carbodiimide did allow visualisation of the treatment in Safranin O staining.

Conclusions: Conclusively, the new fixation method enables future assessment of the treatment, to address an unmet clinical need for biomechanical restoration of early grade cartilage lesions in osteoarthritis.