Author's response to reviews

Title: Alterations in the vimentin cytoskeleton in response to single impact load in an in vitro model of cartilage damage in the rat

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Version: 3 Date: 3 March 2008

Author's response to reviews: see over
**Reply to reviewers**

We very much welcomed the further comments from the reviewers and feel that their criticisms have been used constructively to improve the manuscript. We sincerely apologise for the repeated problems with figure ordering. These are not apparent when uploading and we were assured on the last submission that the order of the figures would be correct when going to referees. We have reordered the a,b,c system of labelling which the BMC uploading mechanism struggles to deal with and have numbered figures sequentially. Figure legends have been changed accordingly.

**Referee 1**

**Major revisions**

1. Figures relabelled and reordered.
2. Figure 3b (now figure 4) is included to show that, with the proteoglycan component of the MMS removed, the structural damage to the cartilage is increased in the presence when subjected to SIL. Please note that the other reviewer wishes to have more data included rather than less.
3. In Figure 2/3a – now Figure 3 the total MMS is <5 in control sections as they have not had any damage applied, however when they have SIL the MMS rises to 8

**Minor and discretionary revisions**

These have all been done

**Referee 2**

**Major revisions**

1. Q A paragraph has been included in the discussion to make it clear that this work cannot be considered as a comparison between the horse and the rat for the reasons clearly pointed out by the reviewer. The paragraph reads:

“At the current time SIL studies have been reported in a number of species, with a recent paper describing the validation of an *in vitro* SIL model of the initiation of OA-like changes in equine articular cartilage [5]. In comparison with equine cartilage, rat cartilage is much thinner and contains a growth plate, making the rat SIL model as described here essentially a model of the behaviour of the cartilage/bone subunit,”
rather than a simple cartilage model as in the horse. Thus direct comparison of this rat SIL model with the equine model should not be made, rather the rat SIL model should be compared to *in vivo* rat models.”

2. Q re: Vimentin localisation. This study is not a measure of the amount of vimentin present in the cells but a description of where in the cell the vimentin is localised. In order to describe the location of the vimentin a scoring system was developed and the scores at each time point under each condition were recorded. It is valid to compare these scores statistically in order to ask whether there are significant differences in location of vimentin stain. The results for disassembly are statistically significant and this has now been made clear in the abstract, results and discussion section, where attention has been drawn to the semi-quantitative nature of the scoring system used.

3. Q re: Figures. The figures should now be complete and in the correct order.

4. Q re: Proteoglycan loss. This has been clarified in the text on page 8. The results are not shown as they are not statistically significant and the other reviewer is keen to decrease the figures as it is.