

Spring 2016 Research Project Abstract

**ANALYSIS OF chABC INJURY METHOD AS MODEL FOR BOVINE
INTERVERTEBRAL DISC DEGENERATION**

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The intervertebral disc (IVD) is a cartilaginous joint that is biochemically similar to articular cartilage but plays a very unique roll mechanically. The IVD displays signs of degeneration and ageing earlier than any other connective tissue in the body and degeneration has been associated with chronic back pain and suffering. However, the clinical and mechanical definition of degeneration is vague. There is no good animal model that can mimic the effects of degeneration on the mechanics of the IVD. Chondroitinase ABC (chABC) is an enzyme that cleaves the bonds in glycosaminoglycan (GAG), a protein in the nucleus of the IVD responsible for storing water. chABC has been used in rat spine studies to mimic degenerative changes in the disc but this method has not yet been validated on larger animals, such as bovine. The purpose of this study is to validate the testing protocol for chABC injury, in order to mimic degeneration in the bovine IVD. A biochemical analysis was performed on healthy and injured bovine discs to measure GAG content in the nucleus. Two disc samples were prepared and tested both intact (healthy) and injured with 200 μ L chABC + saline with 0.3 U/mL chABC. The results of the biochemical analysis were inconclusive, as they showed little change in GAG with injury, with low statistical significance ($p > 0.05$). The mechanics of the IVD were altered with chABC injury in one sample, but the trend did not continue with the second sample. The chABC injury may not be a good model for degeneration in the bovine disc, even though it was successful in rat studies. The discrepancy in data may also suggest that the protocol needs to change to hold the samples at a higher temperature for the chABC to activate. Future work will include testing more samples to verify this theory and increase statistical significance of data trends.