



Analysis of Collagen, Glycosaminoglycans, and DNA

Cartilage tissue engineering generally requires the analysis of collagen, glycosaminoglycans (GAGs), and DNA in conjunction with cellular or extracellular matrix components (ECM) (1,2). Consequently, depending on the analytes, appropriate sample preparation protocols must be utilized. Table 1 shows three sample preparation protocols and assay kits as guidelines for ECM analysis depending on the analyte. Please contact Chondrex, Inc. at support@chondrex.com for more information.

A. Guanidine hydrochloride (GuCl) extracts GAGs, but fails to completely extract collagen and DNA, resulting in underestimated values (1,3).

B. Papain digestion solubilizes GAGs (4) and DNA (5) but degrades collagen.

C. Chondrex, Inc.'s collagen solubilization protocol can be used on samples for the GAGs assay (6), but not for the DNA assay.

To ensure accuracy, assay results can be normalized by the sample's weight, cell count, or DNA levels, according to the preparation method used (7,8).

Table 1. Sample Solubilization

Protocol		Sulfated GAGs	DNA	Total Collagen	Individual Native Collagen Types
A	Guanidine Hydrochloride (GuCl) Extraction*	Yes	Yes*	No	No
B	Papain Digestion	Yes	Yes	Yes	No
C	GuCl Extraction*, Pepsin Digestion, and Elastase Digestion	Yes	No	Yes	Yes
Recommended Assays (Catalog #)		6022	6023	6017	6012-16, 6018, 6019, 6021

*GuCl extraction works for samples consisting of chitosan or agarose, but not for tissues such as cartilage due to poor extraction efficiency (60%) (1).

References

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