

Glycosaminoglycan

Glycosaminoglycans (GAGs) or mucopolysaccharides are long unbranched polysaccharides consisting of a repeating disaccharide unit. The repeating unit (except for keratan) consists of an amino sugar (N-acetylglucosamine or N-acetylgalactosamine) along with a uronic sugar (glucuronic acid or iduronic acid) or galactose.

Glycosaminoglycans are highly polar and attract water. They are therefore useful to the body as a lubricant or as a shock absorber.

The [nucleus pulposus](#) consists of chondrocyte-like cells, collagen fibrils, and proteoglycan aggrecans that aggregate through hyaluronic chains. Attached to each aggrecan molecule are the [glycosaminoglycan](#) (GAG) chains of chondroitin sulfate and keratan sulfate.

Biochemical imaging with glycosaminoglycan chemical exchange saturation transfer (CEST) distinguished morphologically degenerative from non-degenerative lumbar intervertebral discs (IVD) in nucleus pulposus and annulus fibrosus of healthy volunteers at a clinical 3T-MRI system. The depletion of GAG content in degenerative lumbar discs correlated significantly with the morphological disc classification. Schleich et al. could demonstrate that disc pathologies, such as protrusion and extrusion, were accompanied by lower GAG content ¹⁾.

¹⁾

Schleich C, Müller-Lutz A, Eichner M, Schmitt B, Matuschke F, Bittersohl B, Zilkens C, Wittsack HJ, Antoch G, Miese F. Glycosaminoglycan Chemical Exchange Saturation Transfer (gagCEST) of Lumbar Intervertebral Discs in Healthy Volunteers. Spine (Phila Pa 1976). 2015 Nov 16. [Epub ahead of print] PubMed PMID: 26583472.

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