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Isolation, Identification, and Quantitation of Urinary Glycosaminoglycans

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Background: Substantial amounts of glycosaminoglycans (GAGs) are present in the urine of healthy individuals, but the concentration in the serum is very low. This finding suggests that urinary GAGs come from the glomerulus and may reflect the turnover of GAGs in the glomerulus.

Hypothesis: However, little is known about the physiologic regulation of the urinary GAGs in humans, and so investigations are needed to evaluate the effects of age and sex on urinary GAGs in normal individuals.

Methods: Eighty-seven healthy subjects were included in this study. Urinary GAGs were isolated and quantified at the nanogram level by combined azure A-silver staining in agarose gels.

Results: The level of urinary GAGs peaked at 10-19 years in both sexes. The proportion of chondroitin sulfate decreased with age, but the proportion of heparan sulfate increased with the age.

Conclusion: The total amount of GAGs and the proportions of chondroitin sulfate, heparan sulfate, and dermatan sulfate appear to change with age. Therefore, investigations in which urinary GAG is used as a parameter of glomerular GAG turnover should ensure that control groups are precisely matched for age. Changes in the proportions of each GAG may be more informative than their absolute levels.