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BIOCHEMICAL ANALYSIS OF EXTRACELLULAR MATRIX DURING DEVELOPMENT OF THE HUMAN FETAL BLADDER WALL

AIMS OF STUDY: Glycosaminoglycans (GAGs) play key roles in the normal physiology and pathology of the bladder. There is little data, however, on GAG composition in the human fetal bladder wall. In the present study we aimed at establishing the composition of GAGs in the bladder wall of human fetuses at different gestational ages.

METHODS: Bladder samples consisting of the dome and front wall were obtained from 4 fresh, macroscopically normal human fetuses aged 13 to 32 weeks postconception (WPC). GAGs in delipidated tissue samples were extracted by papain digestion and cetylpyridinium chloride/ethanol precipitation. The concentration of total GAG was assessed by a hexuronic acid assay and expressed as µg hexuronic acid per mg dry tissue, while the proportions of sulfated GAG species were determined by agarose gel electrophoresis

RESULTS: At 13 WPC bladder GAG concentration is about 2.2 µg/mg. It then decreases slowly, and at 32 WPC the value is 1.8 µg/mg Proportions of sulfated GAGs from 13 to 21 WPC are stable, with 40% chondroitin sulfate, 50% dermatan sulfate, and 10% heparan sulfate. At 32 WPC, however, the proportions of chondroitin and dermatan sulfate are 48 and 42%, respectively.

CONCLUSION: Overall, the extracellular matrix of the vesical wall does not undergo dramatic compositional changes between the 13th and 32nd WPC. Still, the lower GAG concentration and the change in the proportions of GAG species at the 32nd WPC suggest that major developmental modifications in the vesical wall, which certainly bear on the mechanical properties of the bladder, occur by this period.

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