

INVESTIGATIVE UROLOGY

Compositional changes of collagen and glycosaminoglycans in the tunica albuginea and corpus cavernosum from the human penis during the fetal and postnatal periods

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Purpose: We investigated the composition of collagen and glycosaminoglycans (GAGs) in the corpus cavernosum (CC) and tunica albuginea (TA) of normal human penises.

Materials and Methods: Penises were obtained from a 6-month-old child (group 1), a 2-year-old child (group 2), 18 to 34-year-old adults (group 3), 37 to 53-year-old adults (group 4) and 22 fetuses at 17.2 to 33.3 menstrual weeks (group 5). Total GAG and collagen concentrations were expressed per mg dry tissue and proportions of GAG species were determined by agarose electrophoresis and ion exchange chromatography.

Results: The GAG concentration in group 1 CC and TA was 1.32 and 0.52 microg/mg, respectively, and thereafter it increased noticeably. TA collagen concentration followed a similar pattern. TA had more collagen than CC in groups 3 (mean +/- SD 93.41 +/- 6.17 vs 53.77 +/- 11.18 microg/mg, $p < 0.001$) and 4 (89.94 +/- 5.53 vs 55.39 +/- 5.89 microg/mg, $p < 0.01$). In these groups TA and CC differed markedly in the proportion of hyaluronan, heparan sulfate and dermatan sulfate. In TA group 4 had slightly less hyaluronan and more chondroitin sulfate than group 3 but in CC the GAG proportions were similar. Collagen content in the whole fetal penis correlated with gestational age ($r = 0.78$, $p < 0.001$).

Conclusions: Collagen and the GAG concentration in the human penis undergo extensive modifications during development and shortly after birth but from ages 2 to approximately 46 years changes are limited to the proportion of GAG species in TA from older individuals. Reflecting diverse biomechanical roles, the extracellular matrix of CC and TA are markedly different.

Editorial Comment

It is well known that depending on function and biochemical properties, extracellular matrix (ECM) differs noticeably among tissues. The present paper demonstrated that proportions of hyaluronan, heparan sulfate and dermatan sulfate are different in corpus cavernosum and tunica albuginea of human penis, indicating the different properties of these structures. In terms of tissue engineering, their compositions should be taken into account when choosing the ideal material for surgical reconstruction of penile tissues

Interestingly, this paper demonstrates that the most significant ECM developmental changes in the penis occur between 17 and 33 weeks of gestation, which were reflected by important increase in collagen concentrations. Surprisingly, collagen and glycosaminoglycans concentrations in the corpus cavernosum and tunica albuginea remain unchanged from ages 2 to 36-53 years, suggesting that the hormonal alterations that markedly affect penile morphology and function with the onset of adolescence have little or no effect on the overall collagen and GAG composition of penile erectile tissues.

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Maternal gestational protein-calorie restriction decreases the number of glomeruli and causes glomerular hypertrophy in adult hypertensive rats

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Objective: This work analyzed the renal function and structure in offspring rats that were submitted to maternal protein-calorie restriction during prenatal or lactation periods.

Study design: Kidneys from adult offspring were studied. Animals from mothers that were submitted to food restriction were separated in 3 groups: control, prenatal restriction, and lactation restriction. Blood pressure, microalbuminuria, and glomerular filtration rate were determined. Kidney cortical remodeling was analyzed with stereology; volume-weighted glomerular volume and the number of glomeruli were estimated.

Results: Adult prenatal restriction offspring showed enhanced microalbuminuria, decreased glomerular filtration rate, and hypertension; their kidneys showed a smaller number of hypertrophied glomeruli than control and lactation restriction animals.

Conclusion: Maternal prenatal protein-calorie restriction in rats causes kidney disease in adult offspring, which is characterized by hypertension and renal dysfunction and suggests secondary kidney remodeling because of an impairment of glomerulogenesis.

Editorial Comment

This is one more important study from the State University of Rio de Janeiro on the effects of maternal protein and energy malnutrition during prenatal or lactation periods.

After an extensive study using different methodologies, the authors found that rats prenatally submitted to undernutrition became hypertensive and proteinuric. On the other hand, the effects on the renal function and blood pressure are not evident when the protein-calorie restriction takes place after birth.

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RECONSTRUCTIVE UROLOGY

Urethral reconstruction after erosion of slings in women

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Purpose of Review: The purpose of this review is to summarize the recent peer review literature and provide expert opinion about the diagnosis and treatment of sling erosions.

Recent Findings: The incidence of sling erosion depends partly on the composition of the sling. Synthetic slings, particularly those made of woven polyester and other tightly woven material erode 15 times more often than autologous, allograft and xenograft slings. The presenting symptoms for all types of sling erosions include