Targeting Wistar rat as a model for studying benign, premalignant and malignant lesions of the prostate

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Abstract

Aims: The purpose of this study was to describe a suitable experimental model for studying aging-related prostate disorders including cancer.

Materials and methods: 12-month old Wistar rats were kept in control conditions (n = 12) or treated (n = 16) for 6 months with Silastic implants filled with testosterone (T) and estradiol (E-2). After the experiment period (at 18 months of age), animals were euthanized and the prostate and other organs were harvested, dissected, weighed, and processed for morphological, ultrastructural and molecular analyses.

Key findings: We demonstrated that male rats of Wistar strain nicely recapitulate the carcinogenesis process taking place in the aging prostate through the arising of benign, precancerous and malignant lesions, and above all yields a modest incidence of spontaneous PCa (similar to 36%). Moreover, our results highlight that 100% incidence of PCa and precancerous lesions such as prostatic intraepithelial neoplasia and proliferative inflammatory atrophy were achieved in this rat strain after T + E-2 treatment, without changing the broad spectrum of changes that naturally emerge in the prostate at advanced ages. Such enhancement of precancerous lesions and tumors was linked to a decreased expression of E-cadherin and beta-catenin in parallel with an increase in Vimentin and N-cadherin, hallmark modifications of epithelial-mesenchymal transition.

Significance: Our findings provide solid evidence that aged Wistar rats may be an excellent model for studies regarding human prostate biology and related disorders including cancer.

Palabras clave

Palabras clave de autor: Prostate lesions; Adenocarcinoma; Aging; Androgen:estrogen imbalance; Wistar rat
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